

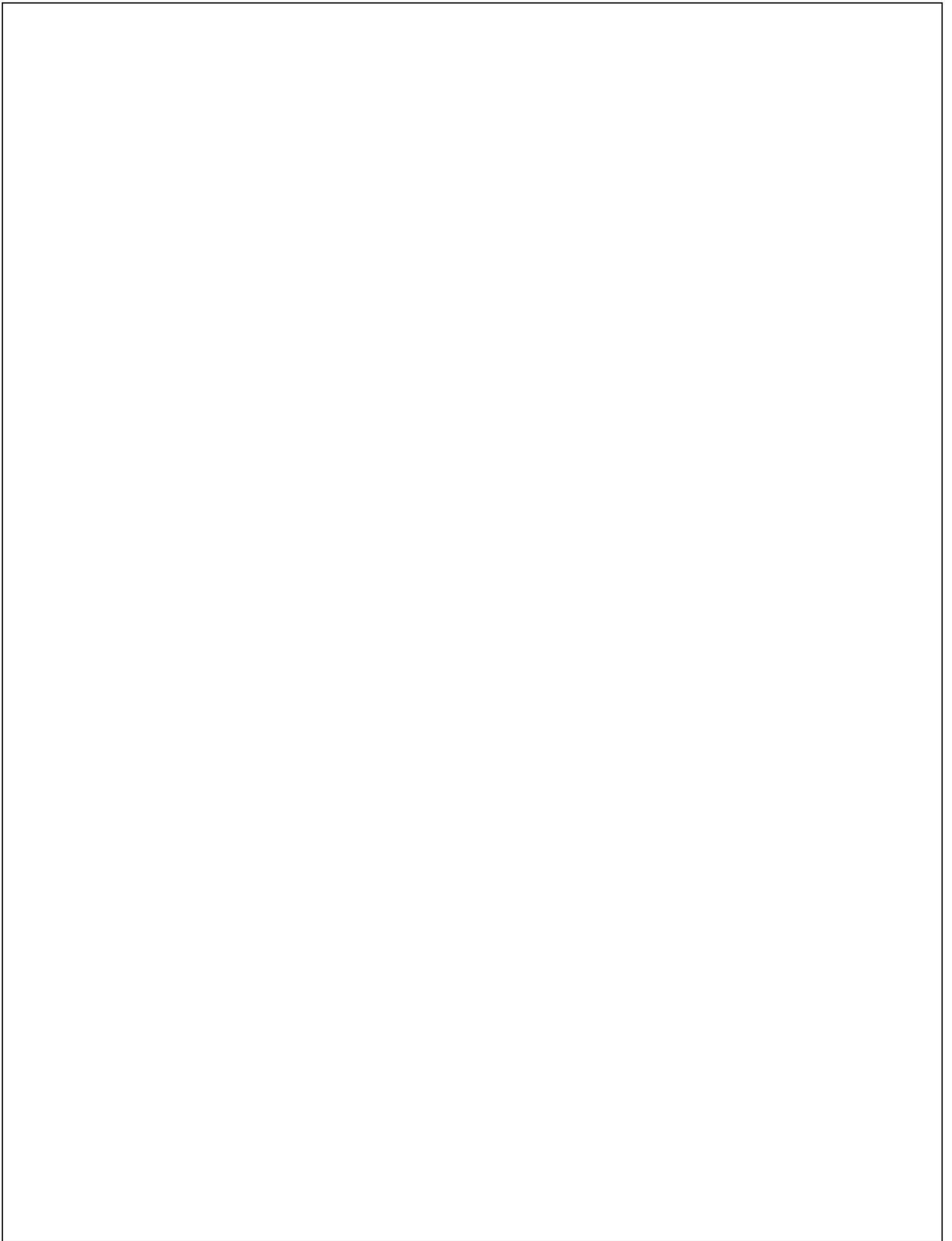


North Central Public Health District



Climate Adaptation Plan

August 2013



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I. Climate and Health Project Overview

There is general consensus that the global climate is changing. Communities throughout the world and in the United States are currently experiencing the effects of climate change, including increased frequency and severity of heat waves, drought, extreme precipitation events, and flooding. Even if action is taken to reduce carbon emissions, temperatures will continue to rise in Oregon and the Northwest through the end of the century. Based on assessments by public health workers in Oregon and the United States, resulting impacts from climate change include increased instances of vector borne disease, waterborne and some infectious diseases, increased frequency of asthma exacerbation episodes, higher rates of other respiratory diseases, and increased risk of heat stress and related mortality. While many local health departments and tribal governments are aware of and concerned about these potential impacts, most lack the resources, capacity, or funding to develop and implement tools to address these issues on their own.

In 2011, the Oregon Health Authority (OHA) was awarded a cooperative agreement through the National Center for Environmental Health at the Centers for Disease Control and Prevention to build climate change capacity at the state and local level. Through this federal grant, OHA allocated funds for a limited number of county and tribal governments to engage in developing and implementing climate change and public health capacity building tools.

In June 2011, North Central Public Health District joined the Oregon cohort working on the Climate Ready States and Cities Initiative. North Central's approach to the climate action planning process has been a collaborative effort with participation from NCPHD staff, local Emergency Management and OHA Climate and Health program staff. Initially, the internal NCPHD planning team consisted of District Director, Public Health Emergency Program (PHEP) coordinator, Communicable Disease Nurse, Environmental Health Supervisor, and Health Officer. Changes in staffing resulted in that internal team being pared down to the Communicable Disease Nurse and the

Director; other members will be oriented to the plan for future activities and updates. The NCPHD Climate Action Planning effort has been presented to and supported by the NCPHD Board of Health and other area partners.

NCPHD also relied on community stakeholders to help inform planning efforts. The knowledge and skills of local experts helped NCPHD to meet goals and prioritize efforts in a relevant and meaningful way for the residents of Wasco, Sherman and Gilliam counties. Stakeholders supported this process by sharing what measures are already being taken in the community, what challenges/gaps exist, and bringing a local rural perspective to the larger climate project as a whole.

In the end, NCPHD staff determined which climate factors might already be addressed via other public health programs and local emergency management plans, and which factors would likely need more attention. Drought seemed the most likely factor that is currently not focused on by public health, and due to its chronic nature, not as well addressed via emergency management lens. So for now, NCPHD will focus on building community resiliency to address the many possible public health sequela of drought. Climate health will be rolled into the All Hazard Response plan cycle so that the NCPHD Climate Action Planning Team may revise the priorities and adaptation strategies to align with new climate and health discoveries and new insights provided by climate health scientists.

II. An Introduction to North Central Public Health District

North Central Public Health District (NCPHD) serves Wasco, Sherman and Gilliam Counties, and is located in the heart of the Columbia River Gorge along Oregon's border with Washington State. The Health District has a history of taking unique approaches to meet goals and serve its constituency. NCPHD is the only three-county Health District in the state, allowing for many advantages associated with coordinating efforts and pooling resources in a rural area. NCPHD serves a diverse population of approximately 28,000, and covers over 4,400 square miles.

North Central Public Health District employs a total of 31 regular employees and one VISTA volunteer; services are provided from one central office located in the city of The Dalles and with one 0.60 FTE Nurse being located offsite in Gilliam County. Many members of staff travel throughout the community to provide services.

As an organization, NCPHD continually strives to promote the mission of Public Health- "Prevent. Promote. Protect." Likewise, NCPHD works towards its own Mission and Vision Statements in all activities:

Vision Statement: *We strive so that one day all people will live in a safe environment free from fear of preventable diseases; that all businesses, organizations and individuals will have access to health information and have the desire to promote and be responsible for a healthy lifestyle for themselves and each other.*

Mission Statement: *We promote health and protect against disease to ensure the optimal health and well-being of the communities we serve.*

Values: *Our community shall be guaranteed access to confidential and professional public health services and shall be treated with respect while honoring individual diversity. We conduct ourselves by always remembering:*

- *We relate to each other with respect and cooperation.*

- *We strive to communicate openly and with clarity.*
- *We conduct and present ourselves with the highest level of professionalism, accountability and integrity.*
- *We believe that a collaborative approach with community partners is the most productive and enjoyable way of doing business.*
- We believe in the value of continuous improvement and seek opportunities for personal/professional growth.
- We take pride in what we do and strive for the highest possible standards.

Jurisdictional Area Description

At 2,381 miles, Wasco County is the largest county within the Health District. Both Sherman and Gilliam counties have land area less than 1,205 miles². Wasco County also has the largest population size with 24,149 residents. Sherman and Gilliam counties have population sizes significantly lower than Wasco, with Sherman County having a population of 1,711 and Gilliam County having 1,645.

The Economy

The Mid Columbia region has economic challenges that are likely to affect future ability to respond to climate change. Sherman and Gilliam Counties have the least economic diversity of all counties in the state of Oregon and 90% of the region's businesses are small businesses employing less than 20 people. "The prevalence of small businesses in the Mid-Columbia Region is an indication of sensitivity to natural hazards because small businesses are more susceptible to financial uncertainty." At first glance, these factors may seem unrelated to the topic of climate change, however economic diversity will influence how climate change may be experienced and how resilient and adaptable the NCPHD region might be to economic impacts related to climate change. Economic factors are closely related to vulnerabilities in a number of ways, so the plans for adaptation to a changing climate must consider local economy if it is to be holistic.

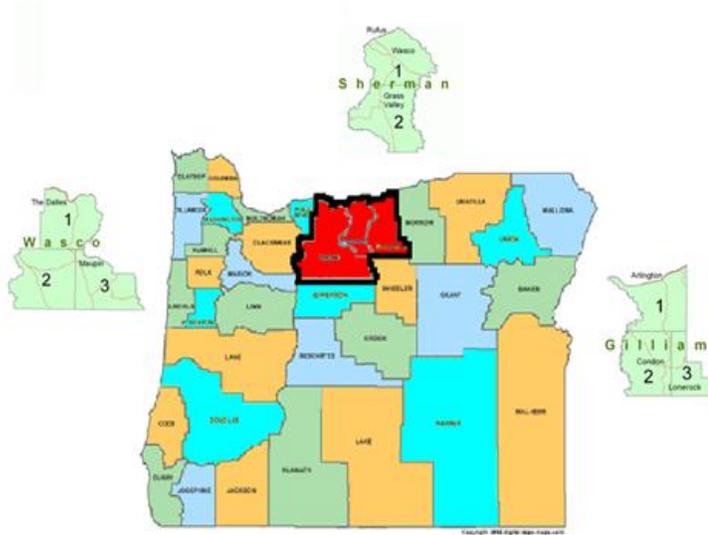


Figure 1. North Central Public Health District provides services to three counties. These three counties are Gilliam, Sherman, and Wasco, located in the North Central region of Oregon

The Land

North Central Public Health District is bordered on the north by the Columbia River, beside which runs the BNSF Railway and Interstate 84. Additionally, there are two major supply routes running north/south throughout the District: Highways 97 and 197.

Geographically, North Central Public Health District is very diverse. Notable features include the beautiful Columbia River Gorge, rolling wheat country and extensive fruit orchards, the east Cascade Mountain Range, the high desert and a number of pristine rivers.

With the striking natural surroundings come many emergency-planning challenges. Top threats to the three counties include severe weather/winter storms, droughts, floods, wildfires, earthquakes and landslides. The agricultural industry in the region utilizes large quantities of chemicals (many toxic), and HAZMAT emergencies are another top concern. HAZMAT incidents have the potential to be either fixed-site or transportation related with the large amount of traffic that occurs on the interstate, highways, railroad and the Columbia River.

The Population

Race/Ethnicity

The demographics of a population within the Health District vary slightly depending on location. Figure 2 shows race/ethnicity between the three counties, Oregon, and the United States. Caucasians are the majority population in all three counties, and persons of Hispanic or Latino origin represent the second largest group. This data parallels the demographic data for both Oregon and the United States. Notably, NCPHD's population has a larger percentage of Native Americans than is found in Oregon or the United States.

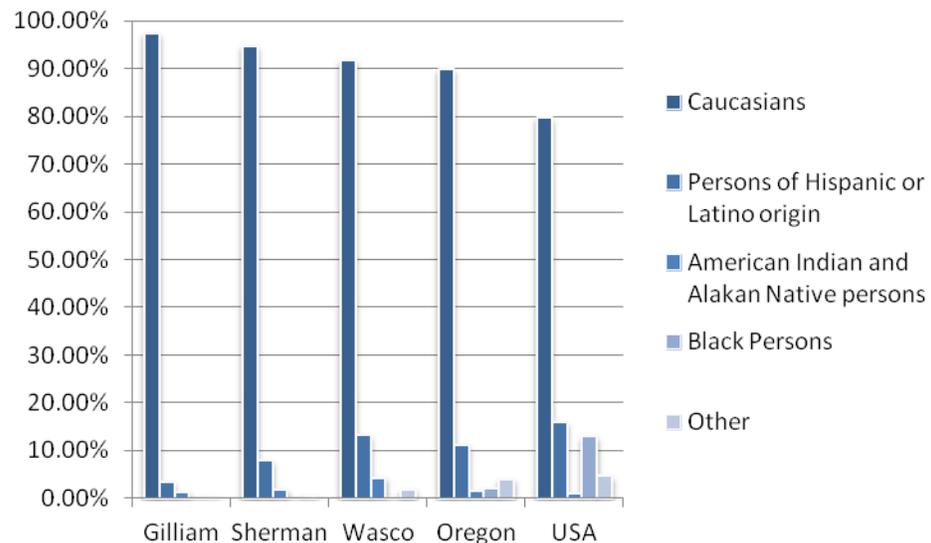


Figure 2. Demographic Comparisons: County, State and United States

Language

North Central Public Health District focuses on providing all information in both English and Spanish. NCPHD employs many skilled bilingual/bicultural employees who offer assistance to non-English speaking clientele. Staff are trained on appropriate communication techniques including interpretation and translation, as well as cultural competency. Offering equal services to all people regardless of language barriers is of paramount importance to the Health District- ensuring higher levels of care to all citizens

and maintaining community health education and awareness. Wasco County has a significant percentage of people who speak a language other than English in their homes (Figure 3); Spanish is the primary language spoken in the Health District after English.

	Gilliam Co.	Sherman Co.	Wasco Co.	Oregon	USA
Percent of population with a language other than English spoken at home, Age 5+.	7.8%	4.20%	16.2%	14.6%	20.3%

Figure 3. Languages Spoken at Home
US Census Data from 2007-2011

Education

As of 2010, the percentage of people above age 25 graduating high school was above 83 % in Gilliam, Sherman, and Wasco Counties. The percentage of people, who earned higher than a Bachelor’s degree, as of 2010, was less than 22% in all three counties.

Educational attainment does not compare favorably to Oregon or the rest of the US. Regionally, high school graduation rates are slightly lower, but the portion of residents with bachelor degrees or higher lags behind Oregon by 8% and the US by 7%.

Income & Poverty

Per capita income across all three counties is approximately 83% of the State Average and 85% of the US average; US average per capita income 2007-2011 (in 2011 dollars) was \$27,915.

According to US Census data, 2007-2011, the percent of citizens in the US living below the poverty level was 14.3%; in Oregon it approaches 15%; in the NCPHD district it is closer to 19%.

Migrant Workers

Seasonal migrant workers numbering around 7,500 create a population surge of greater than 25% during summer harvest months. These workers require extra efforts on behalf of the Health District, as the health services and WIC programs adapt to increased demand. Ultimately, these populations are more likely to be adversely affected in the event of a disaster due to their numerous vulnerabilities including poverty, language barriers, transportation challenges, cultural, legal and political barriers, and unfamiliarity with local resources. Climate impacts that affect agriculture are likely to affect these people as well.

III. The CDC's BRACE Framework and NCPHD Perspective

BRACE Framework

North Central Public Health District, together with State and local partners, followed the 5 steps of the CDC's BRACE (Building Resilience Against Climate Change) Framework. Briefly, the Brace Framework consists of the following 5 steps:

Step 1: Forecasting Climate Impacts and Assessing Vulnerabilities where a health department identifies the scope of the most likely climate impacts, the potential health outcomes associated with those climatic changes, & the populations and locations vulnerable to these health impacts within a jurisdiction.

Step 2: Projecting the Disease Burden where a health department, as best as possible estimates or quantifies the additional burden of health outcomes due to Climate Change – to support prioritization and decision making.

Step 3: Assessing Public Health Interventions where a health department seeks to identify the most suitable health interventions for the health impacts of greatest concern. The health impacts will have been quantified or better defined in the previous health risk assessment step.

Step 4: Developing and Implementing a Climate and Health Adaptation Plan where a health department develops and implements a health adaptation plan for climate change that addresses health impacts, gaps in critical public health functions/services, and a plan for enhancing adaptive capacity in the jurisdiction.

Step 5: Evaluating Impact and Improving Quality of Activities step for the Framework – whereby a health department can evaluate the processes it has used, determine the value of utilizing the framework and the value of climate and health activities undertaken. This step is also important for quality improvement and to incorporate refined inputs such as updated data or new information. Note that this report is written prior to complete implementation of the adaptation strategies, so evaluation and quality improvement processes will be addressed as the plan is implemented and as it is updated on a regular basis in the All Hazards Response Plan.

Initial Efforts at Forecasting Climate Impacts and Assessing Vulnerabilities

Initially, the NCPHD Climate Action Team (consisting of the District Director, Public Health Emergency Program coordinator, Communicable Disease Nurse, Environmental Health Supervisor, and Health Officer) began this process with the data provided by the Resource Innovation Group, which gave rough ideas of expected climate changes in the NCPHD region. This is expanded upon later in Section IV, Selection of Top Climate Threat and Intervention. Because of the multitude of possibilities resulting from changing climate patterns, the Brace Framework process seemed a little cumbersome due to the very broad focus of public health implications. Looking at such a big picture and figuring out where public health fit best and how to integrate efforts with other community partners was overwhelming at first. The NCPHD team was, in the end, able to narrow their efforts by considering current resources and hazard plans and thinking in terms of public health's ten essential services.

Local Hazard Planning and Information Sources

Like many of their public health peers, the NCPHD team started the BRACE process step 1, brainstorming each individual climate scenario that would likely be seen in the three county region, and pairing them with all the possible health consequences, in addition to considering what populations were particularly vulnerable and which locales would be most affected by each scenario. This initial process was not focused enough to be realistic, however.

Eventually, NCPHD team members turned to existing local hazard planning information in plans housed within the offices of Local County Emergency Management and the NCPHD Public Health Emergency Preparedness Program; by doing so, it was possible to identify ways in which the many possibilities were already addressed in other places and where there were gaps that could use more attention. The local hazard planning plans included:

Emergency Management

- Emergency Operations Plans
- Natural Hazard Mitigation Plans
- Threat and Hazard Vulnerability Analysis

Public Health Emergency Preparedness

- All-Hazards Emergency Preparedness Plan
- Threat and Hazard Vulnerability Analysis
- Public Health Climate Change Consequences Assessment (*created during the Climate Action Planning process*)

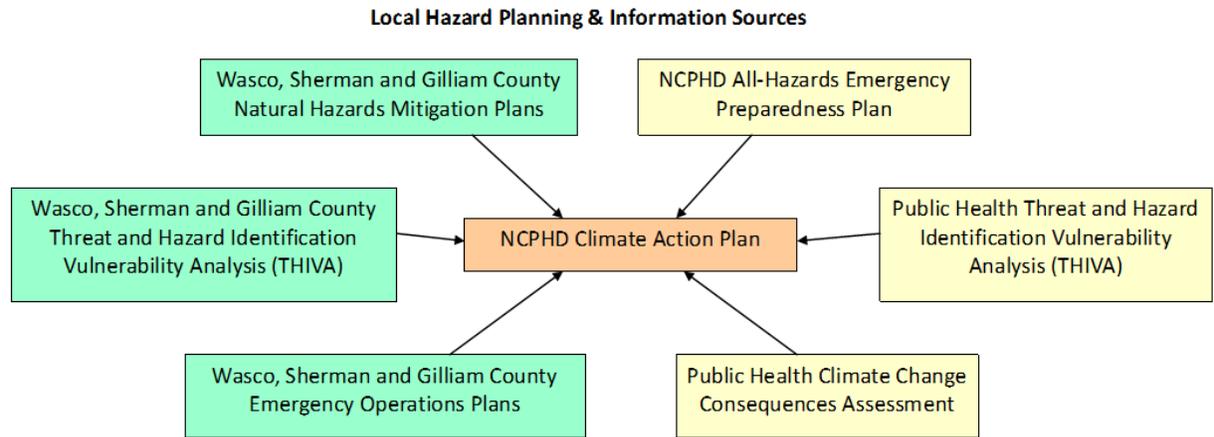


Figure 4. Information gathered from existing local plans laid the foundation for the NCPHD Climate Action Plan.

Community Outreach Efforts

The NCPHD Team reached out beyond the Health District and into the community to explore with other agencies, especially those dealing with water resources, what was being considered and how their work might support efforts towards climate change planning, mitigation, and adaptation. Water experts consulted included area water masters, watershed coordinators, and the soil and water conservation district. Contact was also made with Regional Public Health Emergency planning members (public health, emergency management, mental health, the local hospital system, etc.) informing them of the grant and seeking any input they might have.

Research That Informed the Process

The Oregon Climate modeling provided for grantees by the Research Innovation Group gave initial direction regarding likely climactic change in the region. Additional information was gathered through extensive research of topics related to climate change both specific to Wasco, Sherman and Gilliam Counties as well as regions far beyond local borders facing similar climate challenges. Background information on demographics and economic disparities, as well as a broader understanding of the region’s vulnerabilities was sought via a variety of sources, including but not limited to US Census data, and Oregon’s Natural Hazard Mitigation Plan, most recently updated in 2012; (the regional profile for the Mid Columbia Region within that State plan was

especially useful in understanding necessary background information within the three-county-district that would influence vulnerabilities.) Information sought on the effects of drought in other regions included mid western United States and New South Wales in Australia.

IV. Selection of Top Climate Threat and Interventions

Considering all the Possibilities

From the modeling received from the state and the Research Innovation Group, NCPHD staff understood that the region is likely to experience change in precipitation patterns: more precipitation as rain and much less as snow compared to what has been experienced historically. Temperature changes will create impacts as well. Aquifers that meet much of the rural water demand are typically recharged by winter snow that melts gradually over time. The same amount of precipitation falling as rain is less useful for this purpose.

The NCPHD Team considered a variety of extreme climate events associated with climate change (such as heat, increased winter storms, changes in precipitation, floods, forest fires, changes in vectors, vector borne disease and water borne disease) and implications to public health. The Team also considered which threats the health district and the larger community was well positioned to respond to. Local Natural Hazard Mitigation Plans address many climate-related issues and a great number of agencies participate in this planning process and accept various responsibilities to implement strategies included in the plans. Currently, many of these agencies also have their own plans in place for many of climate related disasters even though they are not necessarily designed with “climate change” in mind. Likewise, there are organizations that already address rural water usage and conservation.

Agriculture features prominently in the NCPHD regional economy, and is susceptible to climatic factors of all sorts, whether winter storms, flooding, change in weather patterns or decrease in water availability.

Consulting with regional water masters and watershed coordinators informed the team of the causes of dwindling water supplies in some areas of the region; reductions in water are multi-factorial in nature, and not entirely related to changes in climate. Regardless of their cause, climate change is unlikely to improve rural water availability. Water experts agreed that changes to the climate within Wasco, Sherman and Gilliam Counties could already be among the factors impacting water availability. Ironically, as temperatures rise, the demand for water goes up. Oregon Climate Assessment Report from OCCRI indicated that an increase in temperature of 1 degree Centigrade corresponds to a 10% increase in water use.

There are many possible health effects related to a changing climate. The NCPHD Climate project began as a broad and comprehensive overview of all the possible climate changes that could affect the region, and the myriad effects on human health. Although numerous climate scenarios can be identified and described, it is so overwhelming as to be unhelpful. The team was eventually able to narrow the focus by taking into account the probability of various scenarios, and also by looking at what plans were already in place for some of the scenarios that were considered.

Scenarios considered for climate change impacts were:

- **Flooding** due to change in timing of precipitation, a shift from snow precipitation to rain precipitation. Flooding causes water quality deterioration, waterborne illness, mold proliferation and subsequent respiratory compromise, housing displacement for vulnerable populations, and disruption of essential services. The populations most vulnerable to flooding are, first of all those who live in more flood-prone locations, those with mobility issues, lack of transportation, lack of financial resources, language barriers, etc.
- **Wildfires**, due to many factors, including increases in grass fuels related to shifts in precipitation and temperatures, and years of fire suppression policies. Summertime increases in temperatures and dwindling snow pack lead to dry

forests. Many forests also succumb to disease caused by insect damage; the combination of dry and dying trees and abundant dry undergrowth create greater combustibility of forests. In recent years, wildfires have become more frequent and severe. Human health impacts can be direct, as in the case of smoke's negative effects on lungs, particularly those who are most vulnerable due to age or disease. Indirect human health impacts are related to fires effects on agriculture, (crops and grazing of cattle), tourism, and other effects that impact this regions fragile economy. Lastly, forestlands that have been burned are less able to contribute to clean water supplies and less able to mitigate erosion and flooding.

- **Severe Winter Storms**, due in part to more severe and unpredictable weather patterns globally. Additionally, the region has historically been predisposed to ice storms and snowstorms causing interruption of essential services, in addition to subsequent power outages, and accidents.
- **Drier, hotter summers** impact human health in multiple ways, including the possibility of heat stroke, effects on ozone and air quality, lowered stream flows impacting water quality and ecosystems that normally support our wild fish and game, changes in distribution of disease causing organisms previously less prevalent this far north, (which can lead to communicable disease outbreaks,) changes in rural water sources that depend on snow pack to recharge the aquifers that supply the regions wells.
- **Drought**, due to less precipitation, higher temperature, and reduction in snowpack. Human health effects of drought are largely overlooked in climate change literature, depending on the region, and they are challenging to quantify, because of the more insidious nature of drought. Drought in comparison to other health effects of climate change more chronic in nature. Many effects of drought on human health are less direct than other health effects of climate change events, because of effects on regional agriculture, life styles, income, food security, and mental health.

Drought emerged as a top priority

Drought emerged as a top priority for NCPHD regional planning for climate change. After thorough consideration, drought emerged as a top climate change concern to North Central Public Health District for a number of reasons.

Baseline Data:

Demographics and economy: North Central Public Health District is a three county district with a total population of less than 30,000 people per 2010 Census. Wasco County has more than 85% of District's residents and is considered "rural"; Gilliam and Sherman Counties are considered "frontier" because of their low population density and distance to services. Gilliam and Sherman Counties are the least economically diverse of any of the 36 counties in Oregon, with their largest economic sector being agricultural; the economy of Wasco County is moderately diverse with a ranking of 22, 1 being the most diverse, 36 being the least. (Source: Oregon Partnership for Disaster Resilience, Region 5 Mid-Columbia Region Hazards Assessment; January 2009 <http://csc.uoregon.edu/opdr/stateplan/regional>).

Low economic resilience: The overwhelming majority of the regional population is employed by small businesses, less equipped to weather financial impacts of natural disasters. The region has other socioeconomic factors that may negatively impact resilience: approximately 15% of the population over 25 years of age has not graduated from high school, and only 20% are college educated. There are approximately 20% more residents 65 and older across the region compared to the state average. Median household income is approximately 15% lower than the rest of the state. This all paints a picture of a population with socioeconomic challenges.

The current state of water supplies: Knowledge of areas with diminishing well water such as the regions around Mosier and Dufur, led the NCPHD planning team to contact regional water masters and water shed coordinators; they also spoke with the Soil and Water Conservation District (SWCD) and Natural Resource and Conservation Service (NRCS). Discussions revealed that there are wells that have been studied in the region

which show decreases in supply as well as watersheds that have decreased stream flow in some areas. There is inadequate data available to make a strong case for climate change as the primary driving force behind the water shortages, because there are other factors such as poorly constructed wells, co-mingling in aquifers, and over use that also contribute to the current problems.

Team members were informed of supply problems in the Fifteen-mile watershed and experts attributed the changes in some wells in part to declines in annual precipitation. Some wells show greater stress than others, but the problems are multi-factorial in nature. It was noted that at some point regulation of water use might become necessary if the downward trend continues.

In general, groundwater levels have been causing some concern in recent years to the local Natural Resource and Conservation Service (NRCS) office. The Mosier area in particular has seen significant declines in groundwater levels in the last 30-40 years. Improper casing and sealing of wells has caused draining due to leakage into permeable rock layers. In the Dufur area, the watershed is also showing some declines in groundwater levels, but the situation is not well understood. In any case, reliance on groundwater to serve all local needs if/when streams run dry is not feasible because the aquifers do not appear to be very stable either. Low flow is a concern in several streams in Wasco County.

Other vulnerable systems: It is clear that water and irrigation systems as well as the farm economy are at risk from any worsening of water supplies. Less obvious, but possibly just as serious, is the effects of drought on medical and mental health systems, and the various organizations that support vulnerable populations around the region. To fully comprehend this, health implications of drought must be understood.

Health Implications of Drought

The County Drought Risk Summaries for Wasco, Sherman, and Gilliam Counties indicate that the mid Columbia region has suffered from drought conditions on a regular

basis over the past century with the second worst drought year on record for Wasco County occurring as recently as 2005.

In 2012 the National Wildlife Federation (NWF) with support from the Robert Wood Johnson Foundation compiled a comprehensive report: The Psychological Effects of Global Warming on the United States. In this report, a scientist, Dr. Robert Corell was quoted with the following perspective: "...as a society, we would do well to appreciate the relative climate stability we have had since the last ice age." During this 10,000-year period, the development of our civilization was founded on a premise of "relative climactic 'calm'". Economic growth and development depends on climate predictability. Those resources, which have in the past been largely taken for granted, will become unreliable. Historically, plentiful and predictable natural resources supported our strong US economy. Previously abundant water supplies will dwindle, water quality will suffer, and the timing of freezes and rainfall, and the amount of snow will be more difficult to predict, having an impact on agriculture and subsequent economic and food security.

For information on health as it relates to Drought, look to Australia. Cited in the NWF report is an article by Gina-Maree Sartore, BSc (Hons), PhD. She wrote in the Australian Family Physician, December 2007:

Drought and its effect on mental health, How GPs can help. Below are the summary points that might provide common ground:

- Prolonged drought is a serious stressor for rural communities, involving financial hardship, practical uncertainty, and anxiety about future prospects.
- Drought can affect all members – adults and children – of farming families.
- The stressful effects of drought extend to farm and nonfarm related businesses in rural communities and may increase social isolation.
- Chronic stress and uncertainty combined with relative isolation increase the risk of developing a mental disorder such as depression or anxiety.
- People are unlikely to present directly with complaints of depression or anxiety, but may appear with symptoms relating to physical complaints, injury, sleeping

problems, or problems relating to 'self medication' with alcohol. They may also present with concerns about family members.

Further useful information on Drought and its effects on rural communities can be found in a report from New South Wales (NSW), Australia:

Social Impacts of Drought; A report to NSW Agriculture. (See excerpt below):

“Three key questions guided the social impacts of drought research project” in the NSW Social Impacts of Drought report:

“What are the social impacts of drought for farm families? Social impacts assessed included economic implications for individual families including debt restructuring and income access; loss of crops and livestock as a result of drought; educational access for family members; implications for employment of family members; health status of family members; welfare implications; impacts on social interactions; changes in lifestyle and knowledge of service providers.

What are the social impacts of drought for small towns?

Social impacts assessed included loss of employment, health and welfare implications consequent on the drought, loss of population and business, implications for social capital in small communities.

What are the impacts for businesses in small towns consequent on the drought?

Impacts assessed included loss of business, employment consequences, health and welfare implications, consequences for business survival and support services available.”

While this is a broader focus than NCPHD’s climate change project currently encompasses, mental health has a significant relationship to socioeconomic context, and this article provides insights into the effects of prolonged drought on rural communities and farm families, with health effects being woven into the broader fabric of life, circumstances, income and social factors.

Lessons Learned from Drought in New South Wales Australia:

Many lessons learned in the drought in New South Wales can easily be applicable to the NCPHD region. Due to the stigma associated with mental illness, in New South Wales, financial concerns were typically the presenting need, and oftentimes they masked deeper social and emotional needs related to stress and relationship problems. In seeking help, people often seek help for other medical problems, while staying silent about emotional or mental stressors. If providers are cognizant of this, they can screen for unmet social, mental and emotional needs.

Another key concept shared by New South Wales, was the difference in the ways that various sectors of the population reacted to the stressors and their willingness to admit vulnerability and seek help. It is likely that rural Oregonians might react similarly. In New South Wales, women more commonly sought help earlier than did their husbands. Men were more reluctant to seek help, typically feeling an obligation to appear strong. Older people were less likely to ask for help than younger people, and older people were more socially isolated. These patterns observed in South Wales, Australia can provide insight in meeting the needs of local populations.

During the New South Wales drought, farm women were often in the position of having to seek outside sources of income to augment struggling farm income and these women were stretched thin trying to meet the needs of their families and their outside jobs. Rural farm children shared the burden of workload, as struggling farms could no longer support outside labor. Children's needs for support and for counseling were, at times, significant. It is probable that the same pattern would hold true in many agricultural regions, including Oregon's rural counties.

Accessibility of services, in terms of distances, costs, and even availability, presented a major hurdle to helping rural families in New South Wales. They found that people need to know what is available, and services must be offered affordably and locally, often by outreach. In Australia, they came up with creative solutions to overcome the stigma associated with counseling services by pairing such services with other services

perceived as more socially benign whether by outreach teams or by co-locating such services.

Service gaps identified in New South Wales included lack of prompt timing to provide support services, a need for flexible appointment times for extremely busy working families, the need for services to address domestic violence, a need for financial relief, not only for farmers, but for the other small businesses in the rural communities as the ripple down effects of financial hardships were present. Childcare was not always available for families with long working hours for both parents and for health providers in the communities. These gaps and unmet needs can easily be foreseen in the rural communities of North Central Public Health District, as rural communities the world over share many common challenges.

The Chronic Nature of Drought: Drought's effects are chronic and longer lasting than the effects of a wildfire, flood or winter storm. Health and wellbeing are negatively impacted when people suffer economic hardships and resulting poverty. Stressors affecting rural agricultural communities can have negative financial effects, stress to relationships, mental instability, depression, substance abuse, domestic violence and child neglect and abuse.

The demands for services in North Central Public Health District already strain the existing mental health system, and much of this is due to social, economic, and educational inequities. The health district has no magic bullet to address the chronic health effects of drought, but it does have the ability to raise awareness among partnering organizations, and to educate the public about services available to them. Unlike the acute nature of extreme weather events, the chronicity of drought allows communities to start conversations, and to anticipate what might lie ahead and start long range planning. In line with the ten essential services of public health, NCPHD is in a position to link people to needed services. NCPHD can provide brochures and website access to identify available resources for each of the district's communities. Outreach via newspaper, various E-Newsletters (i.e. the Library's monthly E News, Sherman County Newsletter, etc.) will need to occur before the public is likely to benefit

from these efforts. Many resources, specific to each county and community wherever possible, have been identified for water conservation, water-wise gardening, self-sufficiency, mental health, addictions, domestic violence and even legal aid.

Other health impacts of climate change are well addressed within other local public health emergency planning processes and as time goes on and modeling gives way to reality, public health climate change planning will be updated to reflect changes.

Local Hazard Assessment Data Supporting Drought Prioritization:

Based on research of local County Emergency Management Hazard Vulnerability Assessments and Public Health Emergency Preparedness assessments, the following discoveries were made to support the decision to pursue drought as the top climate change related threat in North Central Public Health District:

Drought ranks second/third in the three county's Hazard Vulnerability Assessments, largely due to historical data, a region wide vulnerability, a high probability of occurrence and the overall threat presented by drought.

For an overview from the Natural Hazards Mitigation Plan Region 5 Mid-Columbia Region, Characteristics and Brief History (on Drought) are summarized below:

“Droughts are not uncommon in the State of Oregon, nor are they just an “east of the mountains” phenomenon. They occur in all parts of the state, and in both summer and winter. They appear to be cyclic and they can have a profound effect on the state’s economy, particularly the hydropower and agricultural sectors. The environmental consequences also are far-reaching. They include insect infestations in Oregon forests and the lack of water to support endangered fish species. Severe drought conditions preceded the four disastrous Tillamook fires (1933, 1939, 1945, and 1951) and pitted farmer against fish propagation groups during the Klamath Basin drought of 2001. The minimum drought loss included about 1200 jobs and \$150 million dollars in goods and services. Local farmers maintain that the cost was considerably more. Water allocation continues to be controversial. In recent years, the state has addressed drought

emergencies through the Oregon Drought Council. This interagency (state/federal) council meets to discuss forecasts and advise the Governor as the need arises. “

The Public Health Emergency Preparedness Public Health Hazard Risk Assessment Model for Emergency Support Function (ESF) 8, 2012 (See Appendix B): According to the assessment performed by local preparedness planners in public health, emergency management and the medical community, drought currently poses a relatively low risk to public health (ranking 6th of 6 hazards – see public health risk column).

However, drought rises to the number 1 hazard when examined through a climate change lens, as demonstrated on in Appendix B: Climate Change Health Risk Assessment Model. This assessment, conducted in 2012 by North Central Public Health District staff, analyzed the potential impacts of climate change on local public health, response capacity and regional systems. A high probability, coupled with sweeping potential impacts and local vulnerabilities elevated drought to the highest hazard in the NCPHD area.

Projected changes and additional information from Oregon Climate Control

Research Institute:

"Higher temperatures are also likely to reduce the amount of land appropriate for grazing in some regions, with implications for livestock productivity. In addition, warming may lead to greater irrigation requirements. These factors may contribute to lower agricultural yields, which may increase dependence on global grain markets and threaten food security, particularly of the urban poor, who are already heavily influenced by prices in global markets."

"For irrigation managed cropping systems small changes in water availability will necessitate the need for more water and greater efficiencies in irrigation infrastructure. For a rise in temperature, irrigation demands are projected to increase. Moreover, decreases in water from snow- and glacial-melt could, over time, impact smallholder irrigation systems and hence food production. However,

shifts in the amount and timing of precipitation (e.g., snow falling later, melting earlier) will likely have greater impacts, at least in the near term."

- Data from Oregon Climate Change Research Institute, (OCCRI)

Additional Rationale for the Prioritization of Drought

From researching the health effects of drought on populations in New Zealand and even across the United States, drought was identified as a priority area, because drought is a chronic problem (as compared to floods, winter storms, and wildfire.) It is complex and chronic in nature; drought creates multifaceted stressors that negatively impact livelihoods, social cohesion, family dynamics, mental health, addictions and domestic violence. Mental health was the main focus of health effects of drought in Australia, and the mental health systems existing within North Central Public Health District are already overburdened as it is. Without adequate financial resources to directly respond to the health effects of drought, the NCPHD Climate Action Planning team decided to focus on what can be done with current resources to mitigate climate change effects upstream. It was decided that the plan should focus on efforts to support people's self reliance and resiliency and link people to information and services that will empower them to weather uncertainties and rough times ahead.

V. Information from Natural Hazard Mitigation Plans

About Natural Hazard Mitigation

"Natural hazard mitigation is defined as permanently reducing or alleviating the loss of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include planning, policy changes, programs, projects, and other activities. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government."

- Oregon Partnership for Disaster Resilience

“Engaging in mitigation activities provides jurisdictions with a number of benefits including reduced loss of life, property, essential services, critical facilities, and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and term communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.”

- Oregon Partnership for Disaster Resilience.

Policy Framework for Natural Hazards in Oregon

Policy framework for Natural Hazards in Oregon is nicely summed up in Sherman County’s Natural Hazard Mitigation Plan of 2007.

“Planning for natural hazards is an integral element of Oregon’s statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. [The Oregon Land Use Planning Act (ORS Chapter 197)]The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies, and ordinances to guide development in hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the County’s Comprehensive Plan, and helps the County meet the requirements of statewide land use planning Goal 7.

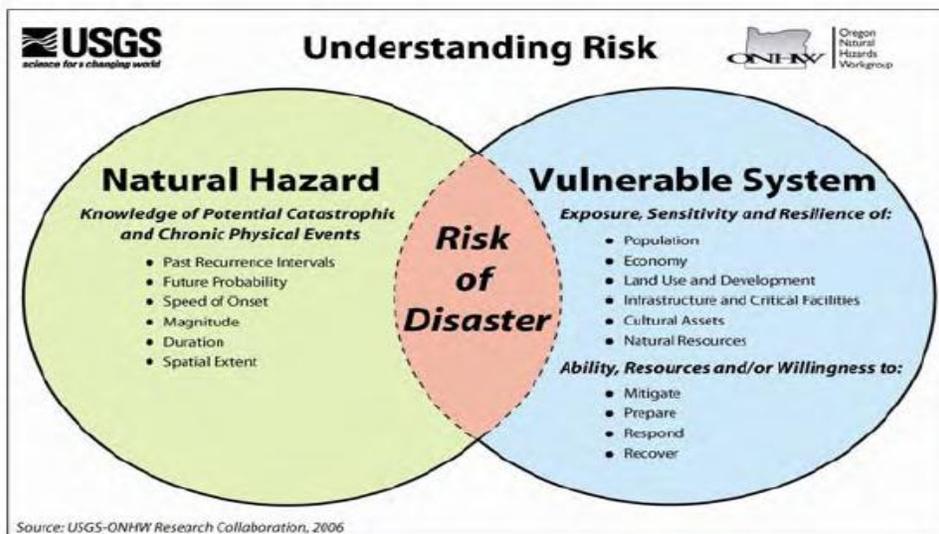
The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes

Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) is the latest federal legislation addressing mitigation planning. The legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act established a pre-disaster hazard mitigation program and new requirements for the national post disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. States and local communities must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.”

(A more recent plan is currently in progress.)

As shown in the graphic below, County Natural Hazard Mitigation Plans examine risk as a relationship between natural hazards and vulnerable systems.



Source: Oregon Natural Hazards Workgroup, 2006

The Wasco County Natural Hazard Mitigation Plan provided the information that follows, which is illustrative for all three counties.

Drought History

DATE	DESCRIPTION
1904-1905	Statewide drought period of about 18 months
1917-1931	Dry period punctuated by brief wet spells in 1920-21 and 1927
1939-1947	Three year intense drought
1959-1964	Primarily affected eastern Oregon
1985-1997	General dry period, capped by statewide droughts in 1992 and 1994
2000-2004	General dry period, with State of Drought Declarations in 2001 and 2003
2005	2nd Worst drought year on record

Sources: OR-SNHMP Risk Assessment (Region 5) Mid-Columbia &

<http://arcweb.sos.state.or.us>

Conditions and Concerns

The following conditions and concerns are found in portions of the counties which contribute to the drought threat and potential for economic loss and environmental degradation:

- Areas relying on wells, the Cities of Mosier and Dufur for example, have seen a reduction in groundwater supply
- Potential population growth and development within the County could pose serious problems in future drought years if water management practices and public education and outreach are not properly coordinated
- Extended drought and loss of agricultural production may have significant impact on the industry and, specifically, employment and wages of seasonal migrant workers

Impact Summary

Economic

- The effects of drought result in economic and revenue losses for business, cities and the county: primarily agriculture
- Loss of timber income due to disease and fire

- Increased irrigation costs
- Loss related to curtailed tourist activity (e.g. fruit tours, hunting, fishing, kayaking) and impact on recreational equipment retailers
- Strain on financial institutions (forecloses, higher credit risk, capital shortfalls)
- Unemployment from drought-related declines in agricultural production
- Reduced productivity of rangeland (increase in livestock mortality rates, disruption of reproduction cycles, decreased stock weights, increased cost for livestock water/feed)

Environmental

- Increased danger of wildfire resulting from drought conditions
- Low stream flows create high water temperatures, oxygen depletion, disease, and lack of spawning areas for fish (native steelhead, chinook, endangered bull trout and other fish species)
- Tree diseases
- Loss of wetlands
- Increased risk of range fires

Historical and potential impacts of drought upon Wasco County from Oregon Emergency Management, State Natural Hazard Mitigation Plan, 2012, Drought chapter are discussed below:

Recurrence

Oregon's drought history reveals many short-term and a few long-term events. The average recurrence interval is somewhere between 8 and 12 years. The table below provides an overview of some severe droughts in Oregon.

Significant Droughts-

Date	Description
1904-1905	A Statewide drought period of about 18 months
1917-1931	A very dry period throughout Oregon punctuated by brief wet spells in 1920-21 and 1927
1939-1941	A three year intense drought in Oregon
1959-1964	Primarily affected Eastern Oregon
1985-1997	Generally a dry period, capped by statewide droughts in 1992 & 1994
2005	Governor issued drought declaration for Gilliam, Hood River, Morrow, Sherman, and Umatilla Counties
2013-	Governor declared drought for Baker, Gilliam and Malheur Counties

Source: Oregon Emergency Management, State Natural Hazard Mitigation Plan, 2012
a. Taylor, George H., and Ray Hatton, 1999, *The Oregon Weather Book*
Source of update for 2013: Oregon Public Broadcasting, June 25, 2013

Probability

Source: Oregon Emergency Management, State Natural Hazard Mitigation Plan, 2012,
Drought chapter:

The probability that Region 5 will experience drought and the region's vulnerability to their effects are depicted in the table below. Scores are based on an analysis of risk conducted by county emergency program managers, usually in collaboration with a team of local public safety officials.

These scores point to the likelihood of major drought within a specific period of time as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

Probability Assessment of Drought in Oregon’s Mid Columbia Region

	Gilliam Co.	Hood River	Morrow	Sherman	Umatilla	Wasco
Probability	H	H	-	H	-	H

Vulnerability

Source: Oregon Emergency Management, State Natural Hazard Mitigation Plan, 2012, Drought chapter:

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

Vulnerability Assessment of Drought in Oregon’s Mid-Columbia Region

	Gilliam Co.	Hood River	Morrow	Sherman	Umatilla	Wasco
Vulnerability	M	H	-	M	-	H

Emergency Management Strategies for Drought in the three counties:

The Emergency Management Strategies that follow were developed via the County Emergency Managers, in conjunction with community partners. These strategies were not developed as part of the climate change project, and it is beyond the scope of this report to determine how and why these priorities were determined, but it is likely that feasibility and financial constraints influenced the process.

While NCPHDs climate team members considered the various scenarios that climate change might present to the region, emergency management and PHEP plans were

reviewed to determine what current plans were in place within the county to make the most of county resources, avoid duplication and identify gaps. Inclusion of these strategies serves to inform readers of planning efforts already identified within the jurisdiction.

The Oregon Partnership for Disaster Resilience made the following statement about drought that summarizes its effects nicely:

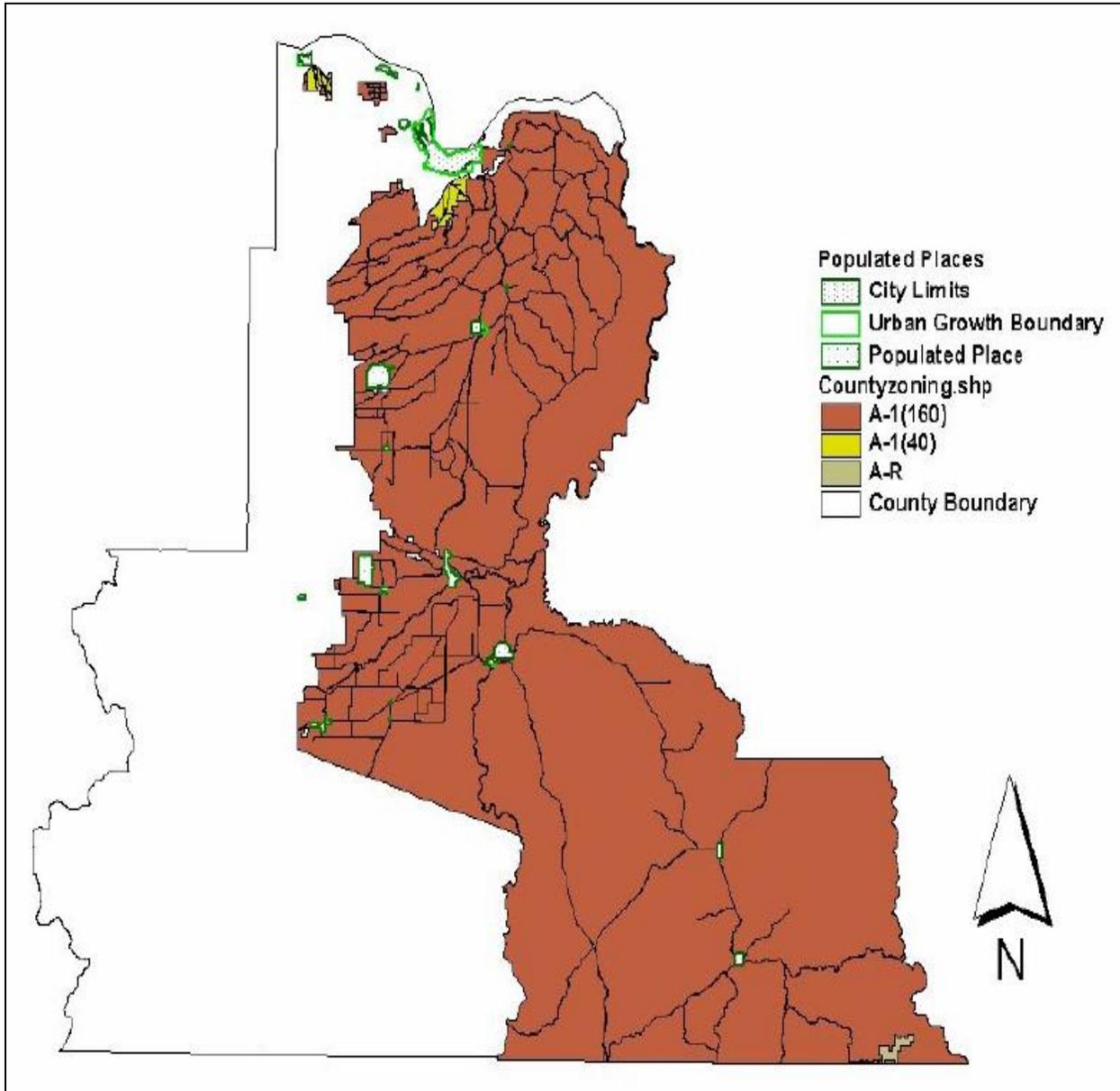
“Droughts are not uncommon in the State of Oregon, nor are they just an “east of the mountains” phenomenon. They occur in all parts of the state, and in both summer and winter. They appear to be cyclic and they can have a profound effect on the state’s economy, particularly the hydropower and agricultural sectors. The environmental consequences also are far-reaching. They include insect infestations in Oregon forests and the lack of water to support endangered fish species. Severe drought conditions preceded the four disastrous Tillamook fires (1933, 1939, 1945, and 1951) and pitted farmer against fish propagation groups during the Klamath Basin drought of 2001. The minimum drought loss included about 1200 jobs and \$150 million dollars in goods and services. Local farmers maintain that the cost was considerably more. Water allocation continues to be controversial. In recent years, the state has addressed drought emergencies through the Oregon Drought Council. This interagency (state/federal) council meets to discuss forecasts and advise the Governor as the need arises.”

VI. Wasco County Drought Risk Summary

Geographic Extent

The entire population of the county is vulnerable to the effects of drought. The agricultural industry is particularly vulnerable.

Wasco County Agricultural Lands



Source: Wasco County GIS

[A-1 (160) corresponds to agricultural zoning of 160 acre minimums]

Wasco County's strategies for drought

High priority drought strategy for Wasco County Emergency Management:

Action Item Proposal Form

Proposed Action Item Identification: (Example Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic)		Alignment with Plan Goals: (List Goals the action helps to achieve.)
DH#1		<ul style="list-style-type: none"> ▪ Disaster Resilient Economy ▪ Protection of Property ▪ Intergenerational Equity ▪ Facilitate Partnerships & Coordination ▪ Natural Resource Systems Protection
Proposed Action Title:		
Ensure Long-range Water Resources Development		
Rationale for Proposed Action Item: (What critical issues will the action address?)		
<ul style="list-style-type: none"> ▪ Potential and projected growth within the County could place serious burden on water supply for domestic and agricultural use ▪ Certain areas of the County like the City of Mosier are already feeling the impact of growth and reduced water levels in aquifers ▪ Studying alternative sources may reveal under-utilized water resources and other information useful to water managers 		
Ideas for Implementation:		
<ul style="list-style-type: none"> ▪ Assist in the determination of which alternative water sources in or near Wasco County would benefit by detailed studies and also assist in the determination of how these studies can be funded. ▪ Adopt stricter water policies <ul style="list-style-type: none"> ○ Establish stronger economic incentives for private investment in water conservation ○ Encourage voluntary water conservation ○ Improve water use and conveyance efficiencies ○ Implement water metering and leak detection programs ○ Imposing excess-use charges during times of water shortage ○ Imposing mandatory water-use restrictions during times of water shortage ○ Conduct water-conservation education of the public and of school children, including special emphasis during times of water shortage 		
Coordinating Organization:	Planning	
Internal Partners:	External Partners:	
Public Works, GIS, District 3 Watermaster, County Court	SWCD, OSU Extension, DEQ, ODFW, OECDD, DOGAMI, DLCD	
Timeline:	If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	n/a
<input checked="" type="checkbox"/>		
Form Submitted by:	NHMP Coordinator	

This high priority action item is multi hazard-driven with drought being one of many potential hazards. The proposed action is to ensure long-range water resources development. This dovetails very nicely with the various issues raised in the Wasco County drought risk summary above. Partners named to implement the strategies are

organizations whose purpose is in alignment with those strategies; (i.e. soil and water conservation district, Oregon Department of fish and wildlife, etc.) and thus when all the partners and roles are considered, this strategy does not require new funding streams.

Low priority strategy for Wasco County Emergency Management:

Action Item Proposal Form

Proposed Action Item Identification: (Example MH #1 – for Multi-Hazard #1; or FH #3 – for Flood Hazard #3)		Alignment with Plan Goals: (List Goals the action helps to achieve.)
DH #2		<ul style="list-style-type: none"> ▪ Intergenerational Equity ▪ Disaster Resilient Economy ▪ Education & Outreach ▪ Facilitate Partnerships & Coordination ▪ Intergenerational Equity ▪ Natural Resource Systems Protection
Proposed Action Title:		
Support Local Agencies Training on Water Conservation Measures and Drought Management Practices		
Rationale for Proposed Action Item: (What critical issues will the action address?)		
<ul style="list-style-type: none"> ▪ Agricultural economy- crops and livestock- susceptible to drought <ul style="list-style-type: none"> ○ Loss of income for farmers and ranchers during drought season ▪ Need for raised awareness of the impacts of drought ▪ Need for coordinated water conservation efforts ▪ Need for County-wide effort to reduce drought impact 		
Ideas for Implementation:		
<ul style="list-style-type: none"> ▪ In cooperation with OSU Extension Service and agricultural organizations prominent and respected within the farming and ranching community, build on existing outreach methods with the goal of providing water conservation/drought management training to farmers and ranchers. <ul style="list-style-type: none"> ○ Establish a public advisory committee ○ Include public participation in drought planning ○ Organize drought information meetings for the public and the media ○ Implement water conservation awareness programs ○ Publish and distribute pamphlets on water conservation techniques / drought management ○ Organize workshops on special drought-related topics ○ Prepare sample ordinances on water conservation ○ Establish a drought information center ○ Set up a demonstration of on-site treatment technology at visitor center ○ Establish tuition assistance so farmers can enroll in farm management classes ○ Develop training materials in several languages ○ Provide education on different cultural perspectives of water resources ○ Employ public participation and public information 		
Coordinating Organization:	SWCD	
Internal Partners:		External Partners:
Wasco County Planning		Cherry Growers, Cattlemen’s Association, OSU Extension
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	n/a
	x	
Form Submitted by:	NHMP Coordinator	

The same thing cannot be said for the lower priority strategy above, or the rejected strategies which included ideas such as encouraging storage facilities for water, as well as aquifer storage and recovery strategies to mitigate seasonal lows, technical assistance and low interest loans to provide livestock watering systems for ranchers and farmers.

No mention is made in the rejected strategies above whether funding for the proposed strategies were feasible or whether these were a result of “wishful thinking”.

NCPHD Integration with Wasco County Natural Hazard Mitigation Plan (NHMP) Strategies

North Central Public Health District will support the implementation of Wasco County Natural Hazard Mitigation Plan’s strategies for drought mitigation through the following activities:

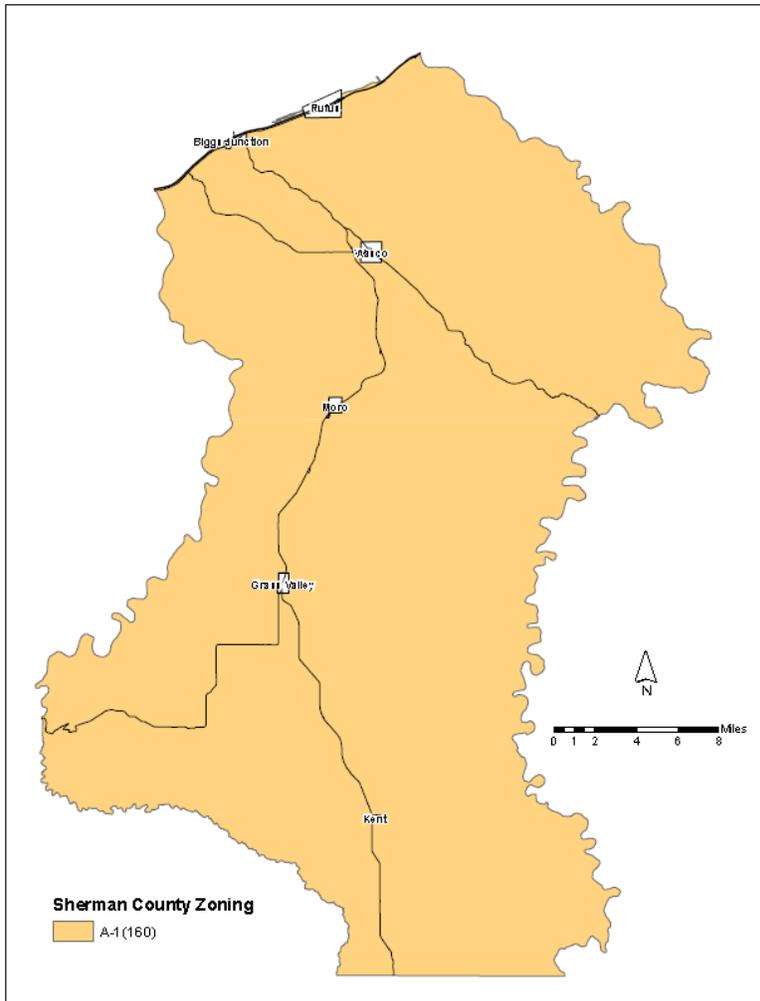
- Participate in future drought mitigation planning efforts by joining the Wasco County NHMP process.
- Assist in public education message formation, ensuring inclusion of public health messages or concerns.
- Provide technical assistance (public health information) to advisory committees.
- Educate well owners about NHMP drought mitigation strategies during encounters with NCPHD Environmental Health. Educate them also about benefits of well water testing.
- Share Provide public health specific guidance around drinking water safety and NHMP drought mitigation strategies on the NCPHD website.
- Assist in culturally appropriate messaging campaigns.
- Droughts.

VII. Sherman County Drought Risk Summary

Geographic Extent

The vast majority of Sherman County's population is vulnerable to the effects of drought. The agricultural industry is particularly vulnerable.

Sherman County Agricultural Lands



The map above was provided by Wasco County GIS department, which provides GIS Services to Sherman County. One can see there is little other than Agricultural zoning throughout Sherman County, zoned as A-1 (160 acre minimum). Like Gilliam County to the East, Sherman County's economy is heavily dependent on Agriculture, therefore, relative climate stability and rainfall.

Sherman County Strategies for Drought

Drought #1

Proposed Action Item: DR#1		Alignment with Plan Goals:	
Include information regarding droughts in a brochure of natural hazards and mail/make available to county residents and the public.		Goal 1: Ability to respond affectively and swiftly Goal 2: Safety of life and property Goal 3: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Drought situations increase the risk of fire hazards. • Drought situations cause visibility hazards. • Drought situations cause critical water shortages for humans, animals and vegetation. • The four incorporated cities in Sherman County –Grass Valley, Moro, Rufus, and Wasco- have limited resources and rely on the county for certain services and public facilities. Because the cities rely so heavily upon the County to provide services, this action is considered to be a multi-jurisdictional action because it benefits both the County and all the participating cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Educate the public on water conservation. • Educate the public on Erosion control. • Educate the public regarding drought resistant plants. 			
Coordinating Organization:		Sherman County Emergency Management County	
Internal Partners:		External Partners:	
County Court, County Road Dept., Sheriff, Planning		Cities of Grass Valley, Rufus, Moro, Wasco; OSU Ext., ODOT, SWCD, NRCS, City Public Works, FSA, Oregon EMS, Ore. Dept. of Agriculture, FEMA, Utilities, Railroad	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
X Some	X Some		
Form Submitted by:	Susan C. Brewer		

NCPHD Integration with Sherman County NHMP Strategies

North Central Public Health District will support the implementation of Sherman County Natural Hazard Mitigation Plan's strategies for drought mitigation through the following activities:

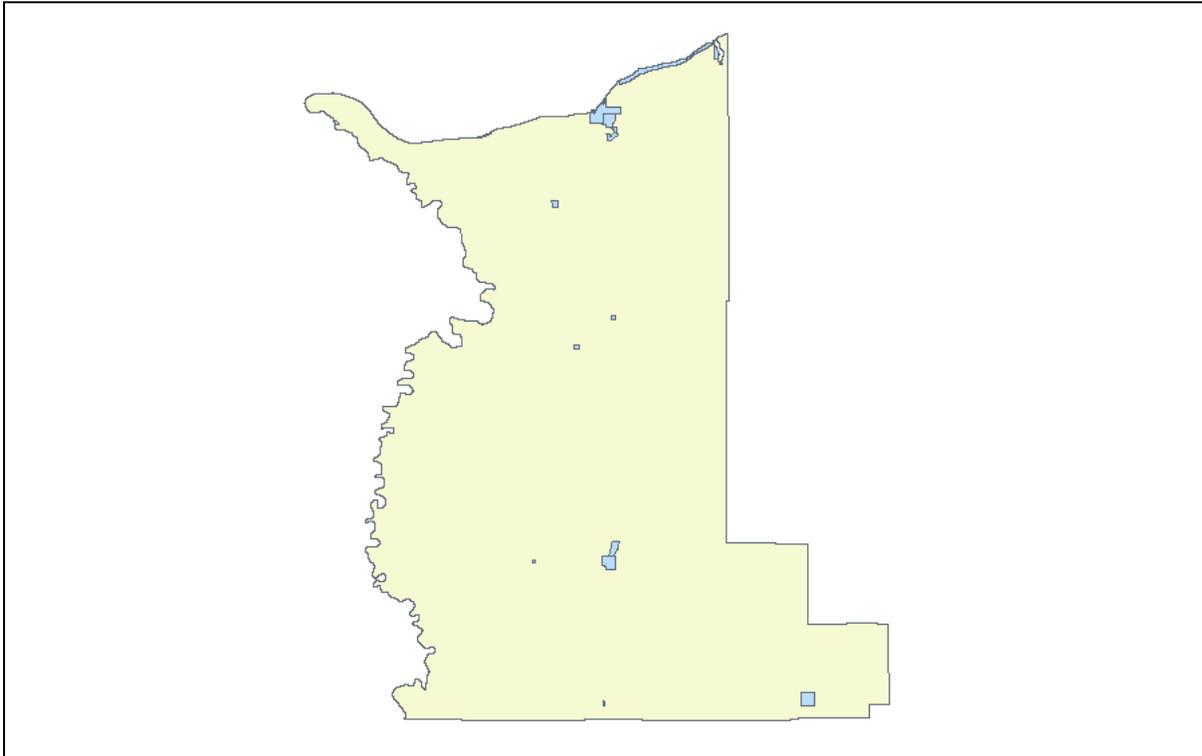
- Participate in future drought mitigation planning efforts by joining the Sherman County NHMP process.
- Assist in public education message formation, ensuring inclusion of public health messages or concerns.
- Educate well owners about NHMP drought mitigation strategies during encounters with NCPHD Environmental Health. Educate them also about benefits of well water testing.
- Share NHMP drought mitigation strategies on the NCPHD website.
- Assist in culturally appropriate messaging campaigns.
- Provide public health specific guidance around drinking water safety and droughts.

VIII. Gilliam County Drought Risk Summary

Geographic Extent

The entire population of Gilliam County is vulnerable to the effects of drought. The agricultural industry is particularly vulnerable, and looking at this map, one can see how economically dependent the county is on Agriculture. This economy relies heavily on a predictable climate and reliable water resources.

Gilliam County Agricultural Lands



The Zoning Map above was provided to NCPHD by Gilliam County Planning Department. The green area covering the vast majority of land is zoned exclusive farm use (EFU). Small gray shaded areas mostly correspond to the small towns from North to South, including Arlington, Condon and Lone Rock.

The Gilliam County Natural Hazard Mitigation Plan provided the information that follows.

Drought Risk Summary

Location of Hazard:	Extent of Hazard at the Location:
<ul style="list-style-type: none"> The entire county is the location for droughts. 	<ul style="list-style-type: none"> The extent of the hazard is the entire county particularly since it is an agricultural based community.
Previous Occurrences of the Hazard Within the Community:	
<p>1904-1905 A statewide drought period of about 18 months.</p> <p>1917-1931 A very dry period throughout Oregon with brief we spells during 1920-21 and 1927.</p> <p>1939-1941 A three- year intense drought in Oregon.</p> <p>1959-1964 Drought which affected eastern Oregon.</p> <p>1985-1997 A dry period with statewide droughts in 1992 and 1994.ⁱ</p> <p>Lonerock has experience declining water supplies from city springs which have continued unabated since 1999.ⁱⁱ</p>	
Local Community's Self-Completed Drought Hazard Risk Rating:	
High	
Community's Probability a Future Hazard Event:	
High probability	
Community's Vulnerability to a Future Hazard Event:	
Medium Vulnerability	
Previous Mitigation Efforts:	
<ul style="list-style-type: none"> N/A 	

Gilliam County Strategies for Drought

Drought #1

Proposed Action Item: DR#1		Alignment with Plan Goals:	
Include information regarding droughts in a brochure of natural hazards and mail/make available to county residents and the public.		Goal 1: Ability to respond affectively and swiftly Goal 2: Safety of life and property Goal 3: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Drought situations increase the risk of fire hazards. • Drought situations cause visibility hazards. • Drought situations cause critical water shortages for humans, animals and vegetation. • The three incorporated cities in Gilliam County –Arlington, Condon, and Lonerock- have limited resources and rely on the county for certain services and public facilities. Because the cities rely so heavily upon the County to provide services, this action is considered to be a multi-jurisdictional action because it benefits both the County and all the participating cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Educate the public on water conservation. • Educate the public on Erosion control. • Educate the public regarding drought resistant plants. 			
Coordinating Organization:		Gilliam County	
Internal Partners:		External Partners:	
Emergency Management		Extension Agent, Water Master, Fire Departments, Public Works,Cities of Arlington, Condon, Lonerock	
Timeline:		If available, estimated cost:	
<u>Short Term (0-2 years)</u>	<u>Long Term (2-4 or more years)</u>		
X Some	X Some		
Form Submitted by:		Susan C. Brewer	

NCPHD Integration with Gilliam County NHMP Strategies

North Central Public Health District will support the implementation of Gilliam County Natural Hazard Mitigation Plan's strategies for drought mitigation through the following activities:

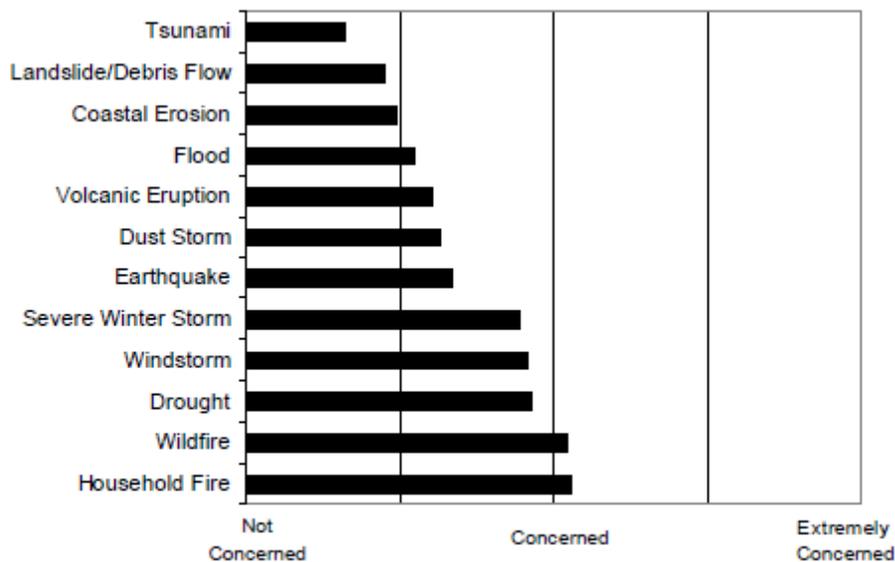
- Participate in future drought mitigation planning efforts by joining the Gilliam County NHMP process.
- Assist in public education message formation, ensuring inclusion of public health messages or concerns.
- Educate well owners about NHMP drought mitigation strategies during encounters with NCPHD Environmental Health. Educate them also about benefits of well water testing.
- Share NHMP drought mitigation strategies on the NCPHD website.
- Assist in culturally appropriate messaging campaigns.
- Provide public health specific guidance around drinking water safety and droughts.

IX. Drought Intervention Strategies and Implementation Plan

Surveys conducted by Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup provide some guidance for understanding the local populations' perceptions regarding the importance of Natural Hazards to residents, as well as their preferred venues for receiving information.

Survey Respondents' Level of Concern Corresponding to Various Natural Hazards

This survey, conducted in 2006, shows that drought is of high concern among respondents living in the Mid-Columbia Region:



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2008)

Survey Respondents' Rating of Various Information Sources in Terms of Outreach Effectiveness

The following survey results demonstrate the methods that work best for local communication. There is no local television station in the Mid-Columbia region, so outreach regarding local concerns is not possible that way. In the event of severe drought, delivering information by mail or running a PSA via newspaper or radio would be top methods considered, although the cost of mailing will likely influence the degree to which that method is utilized. The development of a brochure or factsheet is also considered, as some 35% of people surveyed found that to be an effective method of communication. Finally, the development of a webpage is likely more effective than it

would have been at the time of the survey (2006) because use of the Internet is significantly more widespread than it was at that time. NCPHD team members feel this method would be best utilized if there is a campaign to inform residents of the availability of information on the website.

Source	Percent of Respondents
Television news	53%
Mail	49%
Newspaper stories	48%
Radio news	38%
Fact sheet/brochure	35%
Fire department/rescue	30%
Internet	23%
Public workshops/meetings	20%
University or research institution	17%
Schools	15%
Newspaper ads	11%
Television ads	11%
Books	9%
Radio ads	8%
Chamber of Commerce	8%
Magazine	7%
Outdoor advertisement	7%
Other	6%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Website & Brochure

North Central Public Health District will develop a Climate and Health related webpage located on the NCPHD website, <http://www.wshd.org/wshd/> , focusing on the public health impacts of drought. The webpage will include resources for residents addressing many aspects of drought.

This information will also be made available in brochure format for those who do not have access to a computer or the internet.

Both webpage and brochure will be promoted via multiple public e-newsletters throughout the region and be available in English and Spanish, as per NCPHD standards. The brochure will be available at the NCPHD office and at the offices of other community partners.

NCPHD is launching a completely new website as of early August 2013 as this report is being submitted, so the webpage for climate change and the resources researched

below will be made available on that site very soon. Content is already compiled as seen below in the *Toolbox for Drought and other Weather-related Stressors for Farmers and Others* (see appendix D) and *Resources for Our Region*, including many resources specific to each county and community wherever possible, for water conservation, water-wise gardening, self-sufficiency, mental health, addictions, domestic violence and even legal aid. (See appendix E)

X. NCPHD Climate Strategies through the lens of 10 Essential Services

Following the framework of the 10 Essential Services, NCPHD will implement the following interventions and adaptation strategies:

NCPHD’s approach fits nicely within a few of the “10 Essential Public Health Services.” Public Health can inform, educate and empower people about health issues; Public Health can mobilize community partnerships and action to identify and solve health problems and promote services provided by many community partners so that people know where they can turn to for help. Public Health can “link people to needed personal health services and ensure the provision of health care when otherwise unavailable.” The opportunity to test drive this Brace Framework has led the NCPHD team to explore what is already being done relative to climate change in our region, and what gaps exist. It has also led NCPHD to consider novel ways of reaching out to rural populations.

Service	Climate Change Example	NCPHD: Drought Interventions/Adaptation Strategies
1. Monitor health status to identify and solve community health problems.	Tracking of diseases and trends related to climate change	Continued monitoring of drought related disease by NCPHD Environmental Health (EH) and Communicable Disease (CD) staff. This is well established by Oregon reporting laws, and dovetails into present policy and procedure.
2. Diagnose and investigate health problems and health hazards in the community.	Investigation of infectious water-, food-, and vector-borne disease outbreaks	Investigation of drought related water-, food-, and vector-borne disease by NCPHD EH and CD staff. As new infectious diseases are identified; updates to reporting occur at the state level. Part of current policy and procedure.
3. Inform, educate, and empower people about health issues.	Informing the public and policymakers about health impacts of climate change	Development of an educational webpage to keep the public apprised of climate change related health concerns specific to our area, link them to additional information on topics outside our area of expertise.
4. Mobilize community partnerships and action to identify and solve health problems.	Public health partnerships with industry, other professional groups, faith community, and others, to craft and implement solutions	Maintain partnerships with mental health agencies through the Public Health Emergency Preparedness (PHEP) program. Maintain awareness of local climate related planning efforts through the PHEP program. Insert public health messages as possible.

Service	Climate Change Example	NCPHD: Drought Interventions/Adaptation Strategies
5. Develop policies and plans that support individual and community health efforts.	Municipal heat-wave preparedness plans	Integration of Climate Change activities/Climate Change Hazard Vulnerability Assessment (HVA) into standing Public Health HVA's. Climate Action Plan is added as an annex of the overall NCPHD PHEP Plan to ensure continuity of efforts as this project ends to ensure periodic review and update.
6. Enforce laws and regulations that protect health and ensure safety.	(Little role for public health)	N/A
7. Link people to needed personal health services and ensure the provision of health care when otherwise unavailable.	Health care service provision following disasters	Development of a webpage on NCPHD website and brochure directing citizens to services and information to help them to adequately prepare for and cope with the effects of drought.
8. Ensure competent public and personal health care workforce.	Training of health care providers on health aspects of climate change	Management driven workforce development activities (e.g. providing EH and CD staff the opportunity to attend conferences like OR-EPI) to maintain adequate level of familiarity with new and emerging diseases as related to climate change. This is a core strength of public health: education and adaptation to emerging threats and mitigation strategies.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.	Program assessment of preparedness efforts such as heat-wave plans	Periodic reevaluation of NCPHD Climate Action Plan and adaptation strategies. Synchronize review of Climate Change HVA to align with Local Public Health HVA and Emergency Management HVA review cycle.
10. Research for new insights and innovative solutions to health problems.	Research on health effects of climate change, including innovative techniques such as modeling, and research on optimal adaptation strategies	NCPHD staff to report back any relevant lessons learned from attending trainings (See #8) to internal NCPHD Climate Change group. Partnership between Communicable Disease, Environmental Health, and Public Health Emergency Preparedness staff members is established in NCPHD, and will make it feasible to bring new information to light. New findings will inform what information is selected for the webpage and brochure and may be incorporated into the larger NCPHD Climate Action Plan as appropriate.

XI. Climate Action Plan Maintenance

Plan Housing

North Central Public Health District's Climate Action Plan will be housed in the office of Public Health Emergency Preparedness as annex to the All-Hazard Response Plan and maintained by the NCPHD Climate Action Planning Team. Additionally, Wasco, Sherman and Gilliam County Emergency Managers are to be provided updated copies of the plan.

Staff Awareness

New staff will be made aware of the location and content of the NCPDH Climate Action Plan and related resources (website, brochures, etc.) during their orientation to the Public Health Emergency Preparedness program, during the New Employee Orientation process.

Plan Update Policy

The NCPHD Climate Action Plan shall be updated at least **annually** with the participation of the NCPHD Climate Action Planning Team, in accordance with the planning cycle set forth for the NCPHD All-Hazard Response Plan. Additional updates may be conducted in response to new climate and health discoveries or revisions of national standards or guidelines.

XII. References

1. CDC's Building Resilience Against Climate Change (BRACE) Framework
<http://www.cdc.gov/climateandhealth/BRACE.htm>
2. Robert Wood, Water Master, District 3
The Dalles, OR
Email: robert.l.wood@state.or.us
<http://www.wrd.state.or.us/>
3. Kate Conley, Watershed Coordinator
NRCS-CD, The Dalles, OR
kate.merrick@or.nacdn.net
4. The Dalles Chronicle, Science Section: Sunday, December 2:
Ground Water and aquifers in the Columbia River Gorge by Fred Schubert, Biologist and resident of The Dalles, Oregon.
5. Social Impacts of Drought, 2004
Margaret Alston/Jenny Kent
Centre for Rural Social Research
Charles Sturt University
Wagga Wagga
AUSTRALIA
<http://bcpwww.csu.edu.au/research/ilws/research/publications/crsr/docs/Social%20Impacts%20of%20Drought.pdf>
6. The Resource Innovation Group:
Public Health and Climate Change
http://www.climateaccess.org/sites/default/files/TRIG_Public%20Health%20Guide.pdf
7. Improving Public Health Responses to Extreme Weather/Heat-Waves—EuroHEAT Meeting Report
Bonn, Germany, 22-23 March 2007: http://www.euro.who.int/_data/assets/pdf_file/0018/112473/E91350.pdf
8. The Psychological Effects of Global Warming on the United States:
And Why the U.S. Mental Health Care System Is Not Adequately Prepared
National Wildlife Federation
http://www.nwf.org/~media/PDFs/Global-Warming/Reports/Psych_Effects_Climate_Change_Full_3_23.ashx
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<http://occri.net/wp-content/uploads/2011/04/chapter4ocar.pdf>
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http://public.health.oregon.gov/DiseasesConditions/ChronicDisease/Asthma/Documents/burden/or_asthma2010.pdf
This document shows rankings of counties for asthma rates and Wasco County has a lower adult rate of asthma than the rest of Oregon. Oregon ranks among the top 5 states for asthma incidence however.
12. EPA Climate Change and effects on human health:
<http://www.epa.gov/climatechange/pdfs/CI-human-health-2012.pdf>
13. EPA Climate change impacts on the Northwest:
<http://www.epa.gov/climatechange/impacts-adaptation/northwest.html>
14. Water resources impact and adaptation:
<http://www.epa.gov/climatechange/impacts-adaptation/water.html>
15. Tips for coping with Drought Related Stress: Farm Stress and Disaster Stress:
Missouri Department of Public Health
http://dmh.mo.gov/docs/diroffice/disaster/FarmStressCopingTips_001.pdf

16. Weathering Tough Times: Drought and Heat:
University of Nebraska-Lincoln
<http://lancaster.unl.edu/family/droughtstress1.shtml>
17. Tips for Coping with Drought-related Stress (PDF)
Missouri Department of Mental Health
http://extension.missouri.edu/montgomery/documents/drought_stress12.pdf
18. Checklist of Historical, Current, and Potential Drought Impacts
National Drought Mitigation Center
University of Nebraska–Lincoln
<http://www.drought.unl.edu/portals/0/docs/checklist.pdf>
19. Oregon Drought Monitoring:
<http://cms.oregon.gov/owrd/pages/wr/drought.aspx>
(This shows our region being abnormally dry, but not yet showing drought status.)
20. Effects of Drought on Groundwater Resources
USGS Water Science School: Great Educational Resource. Very extensive.
<http://ga.water.usgs.gov/edu/droughtandgw.html>
21. OR-SNHMP (Region5) Mid Columbia Regional Profile
<http://csc.uoregon.edu/opdr/sites/csc.uoregon.edu.opdr/files/docs/ORNHMP/2-A.%20ORNHMP%20R5%20-%20Regional%20Profile%20and%20Natural%20Hazard%20Assessment.pdf>
22. Oregon Partnership for Disaster Resilience
<http://csc.uoregon.edu/opdr/>
23. Drought-Ready Communities
A Guide to Community Drought Preparedness May 2011
http://www.drought.unl.edu/portals/0/docs/DRC_Guide.pdf
Funded by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, Sectoral Applications Research Program, and from the National Integrated Drought Information System.
This guide is available to walk a community through the steps of identifying benefits of drought planning, organizing stake holders, determining existing perceptions, analyzing past droughts, identifying indicators, monitoring systems, planning for raising awareness and education, planning responses and linking those responses to indicators, identifying and prioritizing strategies, etc.
At this time, this document goes beyond the current focus for NCPHD climate change team, but is useful to be able to refer to later on for a logical approach to planning.

Appendix A County HVA Matrices 2012

Wasco County HVA Matrix 2012

RATING	HAZARD	HISTORY WF = 2	VULNERABILITY WF = 5	THREAT WF = 10	PROBABILITY WF = 7	TOTAL
1	Severe Weather	9 X 2 = 18	9 X 5 = 45	9 X 10 = 90	9 X 7 = 63	= 216
2	Public Health Emergency	4 X 2 = 8	8 X 5 = 40	10 X 10 = 100	8 X 7 = 56	= 204
3	Drought	8 X 2 = 16	8 X 5 = 40	8 X 10 = 80	8 X 7 = 56	= 192
4	Wildfire	10 X 2 = 20	6 X 5 = 30	7 X 10 = 70	10 X 7 = 70	= 190
5	Flood	7 X 2 = 14	3 X 5 = 15	5 X 10 = 50	9 X 7 = 63	= 142

Sherman County HVA Matrix 2012

RATING	HAZARD	HISTORY WF = 2	VULNERABILITY WF = 5	THREAT WF = 10	PROBABILITY WF = 7	TOTAL
1	Wildfire	10 x 2 =20	5 x 5 =25	10 x 10=100	10 x 7 =70	=215
2	Public Health Emergency	2 X 2 = 4	9 X 5 = 45	10 X 10 = 100	8 X 7 = 56	= 205
3	Drought	9 x 2 =18	5 x 5 =25	8 x 10 =80	10 x 7 =70	=193
4	Flood	5 x 2 =10	6 x 5 =30	7 x 10 =70	9 x 7 =63	=173
5	Severe Weather Winter Storm	4 x 2 =8	5 x 5 =25	9 x 10 =90	7 x 7 =49	=172

Gilliam County HVA Matrix 2012

RATING	HAZARD	HISTORY WF = 2	VULNERABILITY WF = 5	THREAT WF = 10	PROBABILITY WF = 7	TOTAL
1	Severe Weather Winter Storm	10 X 2 = 20	10 X 5 = 50	10 X 10 = 100	8 X 7 = 56	=226
2	Drought	10 X 2 = 20	5 X 5 = 25	10 X 10 = 100	10 X 7 = 70	=215
3	Public Health Emergency	2 X 2 = 4	8 X 5 = 40	10 X 10 = 100	8 X 7 = 56	= 200
4	Wildfire	10 X 2 = 20	4 X 5 = 20	7 X 10 = 70	10 X 7 = 70	=180
5	Earthquake	3 X 2 = 6	1 X 5 = 5	7 X 10 = 70	7 X 7 = 49	=130

WF = Weight Factor

Appendix B

North Central Public Health District- Public Health Hazard Risk Assessment Model for Emergency Support Function (ESF) 8: 2012

Enterprise-wide		Worksheet B: Public Health Consequences																Public Health Consequence	Public Health Risk
HAZARD RISK ASSESSMENT MODEL		HEALTH AND SAFETY										RESPONSE CAPACITY				PUBLIC HEALTH INFRASTRUCTURE		Overall Impact (Average)	Probability of Consequences
Revised: Nov 2011		Potential injuries and deaths										Ability to respond				Service Interruption			
Hazards		Probability of Occurrence	Fatalities	Outpatient Injuries	Respiratory Illness	Chronic Disease	Communicable Disease	Mental Health	Vulnerable Populations	Food Security	Water Security	Hospital Beds	Primary Care Providers	Pharmacies	Ambulance	Staffing	Interagency Partners	1 = Lowest 5 = Highest	1 = Lowest 50 = Highest
Natural Hazards	Drought	8	1	1	4	2	1	3	2	4	4	1	1	1	2	1	1	2.08	16.62
	Flood - Riverine	9	1	2	3	3	2	3	4	2	2	3	2	2	3	3	1	2.54	22.85
	Wildfire (WUI)	10	1	2	4	3	1	1	4	1	2	2	2	2	3	3	1	2.23	22.31
	Winter Storm	9	1	3	2	4	1	3	5	4	2	4	4	4	4	3	1	3.15	28.38
Technological	Hazmat Release - Transportation	8	2	2	5	2	1	3	1	1	2	3	2	3	4	2	1	2.31	18.46
Human	Public Health Emergency	8	3	3	4	5	2	3	5	3	4	4	4	4	4	3	1	3.54	28.31

Appendix C

North Central Public Health District- Climate Change Health Risk Assessment Model, August 2012

Conducted by Public Health Representatives from Clinical Services, Environmental Health, Preparedness and Administration.

Enterprise-wide		Worksheet Public Health Climate Change Consequences															Public Health Consequence	Public Health Risk	
CLIMATE CHANGE HEALTH RISK ASSESSMENT MODEL		HEALTH AND SAFETY								RESPONSE CAPACITY- HOSPITAL	PROVIDERS		PUBLIC HEALTH INFRASTRUCTURE			Overall Impact (Average)			Probability x Overall Impact (Average)
Completed: August 28, 2012		Potential Health Risk								Ability to Support Increased Climate Risk Diseases	Surge Capacity		Surge Capacity						
Climate Risk		Probability of Occurrence	Fatalities	Respiratory Illness	Chronic Disease	Communicable Diseases	Vulnerable Populations	Food Access/Quality	Water Access/Quality	Air Quality	Infection Control	Providers	Mental Health	Emergency Service Response Personnel	Environmental Health Staff	Communicable Disease Nurses	Immunizations	1 = Lowest 5 = Highest	1 = Lowest 50 = Highest
	Drought & Reduced Summer Water Supply	10	0	3	3	3	2	3	3	2	0	1	3	1	3	2	0	1.93	19.33
sub-category	Decrease in Summer Flow	10	0	0	0	3	2	2	3	0	0	0	0	0	2	0	0	0.80	8.00
	Extreme Heat Event	10	1	0	2	2	3	3	2	1	0	1	2	2	1	1	0	1.40	14.00
	Wildfire	10	1	3	2	1	2	0	3	3	0	2	2	3	2	2	0	1.73	17.33
	Extreme Precipitation & Flooding	4	1	1	1	3	2	1	2	0	0	2	2	3	3	2	0	1.53	6.13
sub-category	Winter Storm	10	2	2	1	0	2	3	2	3	0	3	3	3	2	1	1	1.87	18.67
	Ozone Pollution	4	0	3	1	0	2	0	0	3	0	0	1	1	1	0	0	0.80	3.20
	Longer Growing Season	6	0	3	0	0	3	0	1	1	0	1	0	0	0	0	0	0.60	3.60
sub-category	Vegetation	6	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0.33	2.00
	Decrease in Frost	8	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	0.27	2.13

Appendix D

Toolbox for Drought and Other Weather-Related Stressors for Farmers and Others

Tips for coping with Drought Related Stress: Farm Stress and Disaster Stress:

http://dmh.mo.gov/docs/diroffice/disaster/FarmStressCopingTips_001.pdf

Missouri Department of Public Health

Weathering Tough Times: Drought and Heat:

<http://lancaster.unl.edu/family/droughtstress1.shtml>

University of Nebraska-Lincoln

Tips for Coping with Drought-related Stress (PDF)

Missouri Department of Mental Health

http://extension.missouri.edu/montgomery/documents/drought_stress12.pdf

Checklist of Historical, Current, and Potential Drought Impacts

National Drought Mitigation Center

University of Nebraska–Lincoln

<http://www.drought.unl.edu/portals/0/docs/checklist.pdf>

Drought-Ready Communities

A Guide to Community Drought Preparedness May 2011

http://www.drought.unl.edu/portals/0/docs/DRC_Guide.pdf

Oregon Drought Monitoring:

<http://cms.oregon.gov/owrd/pages/wr/drought.aspx>

(This shows our region being abnormally dry, but not yet showing drought status.)

Effects of Drought on Groundwater Resources

USGS Water Science School: Great Educational Resource. Very extensive.

<http://ga.water.usgs.gov/edu/droughtandgw.html>

Appendix E

Resources for our Region

Water Testing Resources:

Keeping tabs on the safety of your private water source:

Centers for Disease Control and Prevention (CDC):

<http://www.cdc.gov/healthywater/drinking/private/wells/>

Ground Water and Wells

“When rain falls, much of it is absorbed into the ground. Water that’s not used by plants moves downward through pores and spaces in the rock until it reaches a dense layer of rock. The water trapped below the ground in the pores and spaces above the dense rock barrier is called ground water, and this is the water we get when we drill wells. Another common term for ground water is "aquifer" or "ground water aquifer.”

- Over 15 million U.S. households regularly depend on private ground water wells (1).
- All private wells use ground water.

Oregon Labs for Drinking Water and Public Testing: 971 673-0405

<http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Documents/AllLabsDWMMatrix.pdf>

CDC Guidance on how to test well water, and how often:

<http://www.cdc.gov/healthywater/drinking/private/wells/testing.html>

Oregon Department of Environmental Quality (DEQ) information on Private Wells:

<http://www.deq.state.or.us/wq/dwp/wellowners.htm>

Oregon DEQ “Frequently Asked Questions Page” (FAQs) which answers many common questions: <http://www.deq.state.or.us/wq/dwp/pwofaqs.htm>

Excerpts from the Oregon DEQ, as of October 2012: “Testing for the most common risks will typically cost from \$20 to \$40 for nitrate analysis, \$25-\$40 for coliform bacteria

Resources for our Region

(microbiological) testing, and \$20-\$45 for arsenic analysis. If other contaminants are suspected, more extensive testing may be warranted.

“If test results from your private well indicate contamination, call the OHA Drinking Water Program at 971-673-0405 for information. They can assist with information on how to disinfect your well if you have problems with microbiological contaminants (microscopic bacteria, viruses, or one celled organisms), provide fact sheets for chemicals, or information on how to address other problems.

If test results show your well has toxic contaminants at concentrations above federal drinking-water standards, the responsibility for follow-up falls to DEQ, rather than OHA. In this case, report the results using DEQ's Environmental Complaints System: <http://www.deq.state.or.us/complaints/rep.htm> or phone 1-888-997-7888. As DEQ's regional staff resources permit (depending on the magnitude of the problem and the number of persons affected), they may investigate alternative water supplies and seek the source(s) of contamination.

NOTE: In contrast to private wells, all public water system compliance issues should be referred to the OHA Drinking Water Program, at (971) 673-0405.”

Water Conservation Tips:

There is lots of information on how to use water wisely:

<http://wateruseitwisely.com/links-and-resources/>

Water-wise Gardening:

Some smart water usage has to do with the types of plants you use in your garden. Sometimes we think there are only two choices: 1) to plant you yard like an oasis, and water everything all summer or 2) resign yourself to a yard full of dried grasses and weeds. There is another option, fortunately. Look to Mother Nature. Every region has plants that will grow without additional watering. It may take some water to get such a landscape established, but you should be able to create a beautiful landscape in your

Resources for our Region

yard that doesn't require large quantities of water. This type of landscaping is often referred to as Xeriscaping; the word was invented by the Denver CO water department in 1981, and in fact, they have a copyright on it; it was inspired by two words "Landscape" and the Greek word for dry: "Xeros." Here is the Central Oregon Xeriscaping resource, developed by the cities of Central Oregon:

<http://extension.oregonstate.edu/deschutes/sites/default/files/Horticulture/documents/xeri-all-v3-augus06.pdf>

Information on Xeriscaping from the University of Oregon:

<http://pages.uoregon.edu/recycle/XERISCAPE.htm>

A thorough discussion of Xeriscaping from planning, preparation, plant selection and other essentials, visit *Our Organic Northwest ~Stories, links and ideas for those interested in organic farming and gardening*, at :

http://nwpublicmedia.typepad.com/our_organic_northwest/xeriscaping/

Here is another source for water savvy gardening worth checking out on Squidoo:

<http://www.squidoo.com/xeriscapes>

County Soil and Water Conservation Districts:

"Historically, conservation districts were formed in response to the tragedy that was the Dust Bowl. The first great dust storm of the Dust Bowl occurred on May 11, 1934. It originated in the Great Plains region and swept over Washington DC and 300 miles out into the Atlantic Ocean. The second great storm happened again on March 6, 1935. In response, the Soil Conservation Service was created under the U.S. Department of Agriculture (USDA) to address the catastrophe.

President Franklin D. Roosevelt recommended to state governors that legislative authority be provided for the establishment of soil conservation districts as

Resources for our Region

political or legal subdivisions of the state government to deal with the problems of erosion control and soil conservation. The first conservation districts were guided by local farmers elected to fill Supervisor positions who knew first-hand the environmental issues facing farmers.”

Wasco County Soil and Water Conservation District

Wasco County Soil and Water Conservation District

www.wasco.oacd.org

2325 River Rd. Ste 3

The Dalles, OR 97058

541-296-6178 ext 3 Fax: 541-296-7868

The Wasco County Soil and Water Conservation District provides information and technical assistance to assist the people of Wasco County in conservation of their natural resources.

Sherman County Soil and Water Conservation District ®

<http://www.shermancountyswcd.com/index.html>

302 Scott Street P.O. Box 405, Moro, OR 97039

Open weekdays 8-5 pm

Technical and Cost Share Assistance to Install Your Projects. The SWCD provides technical and Cost Share Assistance for cropland erosion control and range management projects. The SWCD provides workshops on natural resource issues and sponsors an annual conservation tour.

Cropland Erosion Control:

- Terrace Layout
- Water and Sediment Control Basin Layc
- Structure Design

Range Management Projects:

- Farm Plans
- Grazing Plans
- Spring Development
- Solar Wells
- Brush Control
- Pasture Reseeding
- Riparian Buffers
- Stream Temperature Monitoring

Resources for our Region

- Flood Mitigation
- Construction Inspection
- Residue Management Practices

Gilliam County Soil and Water Conservation District

PO Box 106

Condon, OR 97823

Office Address:

Dunn Office Bldg.

333 S. Main St.

Condon, OR 97823

Phone: 541 384-2672

Fax: 541 984-2571

Walter Powell District Manager/Watershed Technical Specialist 541 384-2672 ext. 109

Email: walter.powell@oacd.org or condonswcd@gmail.com

OSU Extension: Resources for Life, Resiliency, Self Sufficiency and much more:

The “Family and Health program exists to improve the life of Oregonians. Our publications, classes, and research-based programs focus on many different topics: nutrition, finances, planning for a healthy retirement, aging well, parenting, emergency preparedness, and food security. From cradle to rocking chair, the OSU Extension Family and Community Health program is here to prepare you for life in the 21st century.”

Gardening: <http://extension.oregonstate.edu/gardening/>

Small Farms: <http://extension.oregonstate.edu/community/small-farms>

Food Preservation: <http://extension.oregonstate.edu/community/food-preservation>

Food & Nutrition: <http://extension.oregonstate.edu/community/nutrition>

Thrifty Meals: http://extension.oregonstate.edu/nep/file_download/651

Family & Youth: <http://extension.oregonstate.edu/community/family-youth>

Other OSU Extension topics: Pesticide Safety and Integrated Pest Management (IPM) Education, Crops, Farm Management, Horticulture, Rainfall, Livestock.

Wasco County Extension Service

<http://extension.oregonstate.edu/wasco/>

400 E. Scenic Drive,

Suite 2.278

The Dalles, OR 97058

Phone: 541-296-5494

Fax: 541-298-3574

Open: 8:00 a.m. - 5:00 p.m., Monday-Friday

Resources for our Region

Master Gardener Hours: April-October, 1-4 p.m., Tuesdays & Thursdays, Extension Office

April-early August, 9-1, Saturdays, Fred Meyer Garden Center

Sherman County Extension Office

<http://extension.oregonstate.edu/sherman/>

409 Hood Street

Moro 97039

Phone: 541-565-3230

Hours 8-12:30/1-4:30

Gilliam County Extension Service

<http://extension.oregonstate.edu/gilliam/>

Oregon State University

333 South Main PO Box 707 Condon OR 97823-0707

Phone: 1-541-384-2271

FAX: 1-541-384-2571

Hours: Monday - Friday

8 a.m. - 12 noon 1 pm - 5 p.m.

Mental Health & Addictions

Mid Columbia Center for Living:

<http://www.mccfl.org/about.html>

Wasco and Sherman Counties:

541 296-5452

Wasco County Annex A

419 East 7th Street

Room 207

The Dalles, Oregon 97058.

Vision: "Empower people to make positive changes."

Mission: "Provide comprehensive and culturally sensitive services in the least restrictive setting."

They accept Oregon Health Plan, Medicare, most private insurances, cash, check, Visa/MasterCard, or money order. A sliding fee scale is available for those who qualify. Some grant supported services are provided at no cost to you. Call for more information.

Mid Columbia Center for Living's comprehensive Resource Page for links relevant to Mental Health, Addictions and Developmental Disabilities:

<http://www.mccfl.org/resources.htm>

Resources for our Region

Sherman County Mental Health and Addictions Services:

Services are provided in the county at the schools, senior center, and the Moro office located at:

110 Main Street, Unit #2

Moro, Oregon 97039

and/or other locations.

Please call the Mid Columbia Center for Living office in The Dalles to make arrangements

(541 296-5452).

Gilliam County Mental Health and Addictions Services:

Community Counseling Solutions

(Offers mental health services and alcohol, drug and gambling addiction treatment services; also, they provide access to Developmental Disability Services.)

Condon Office

P.O. Box 705

422 N Main Street

Condon, OR 97823

Phone:

541-384-2666

Fax:

541-384-3121

Heppner:

P.O. Box 469

Heppner, OR 97836

Phone: 541-676-9161

Fax: 541-676-5662

Gambling Addiction Help:

<http://www.1877mylimit.org/>

Available by phone, live email chat by various instant messaging formats, etc.

Phone: 1-877-695-4648 (MY_LIMIT)

Live Chat

Instant Message (MSN, AIM, YAHOO, GOOGLE, ICQ)

Email: help@1877MYLIMIT.ORG

Resources for our Region

Legal Aid services of Oregon:

This site contains legal information about subjects such as domestic law, Special Education, Housing, Social Security, Disability, Consumer issues and other topics, and there is an option to see the same services in Spanish: www.lawhelp.org/OR

Legal Aid regional office in Pendleton:

365 SE 3rd St.,
PO Box 1327,
Pendleton, OR 97801
Phone: 541 276-6685
Fax: 541 276-4549

Domestic Violence:

HAVEN from Domestic Violence

(This resource covers all of North Central Public Health District, and other counties as well)

Office: 541 296-1662

Crisis: 541 298-4789

Toll Free: 1-800 249-4789

They can provide access to motels or other options, provide counseling/advocacy for women and children, support groups, legal assistance/referrals, help with transportation, free counseling related to intimate partner violence, and financial literacy classes (teaching money management, budgeting and understanding financial abuse.) Haven has bilingual employees fluent in Spanish.

Energy assistance, Food, Housing Resources

Community Action Agencies:

Community Action Agencies (CAAs) are nonprofit private and public organizations established under the Economic Opportunity Act of 1964 to fight America's War on Poverty. Community Action Agencies help people to help themselves in achieving self-sufficiency.

Each Community Action Agency has a slightly different mix of services offered, which may include emergency services, education, food and nutrition, income management, job readiness training, transportation, day care, housing and so forth. You may have to check with your local agency to see what they offer or if they can refer you to other services within your community.

Mid-Columbia Community Action Council, Inc.

Provides services to Hood River, Wasco and Sherman Counties

There is energy assistance outreach to various rural communities; the schedule is posted on their website; besides energy assistance, there is education and weatherization. They also distribute food to various agencies serving low income people, and provide homeless assistance, rent assistance, and transitional housing. AARP tax aid is also available.

<http://www.mccac.com/>

Resources for our Region

Mid-Columbia Community Action Council, Inc. (continued)

The Dalles
312 E. 4th St.
PO Box 1969
The Dalles, OR 97058
Phone: 541-298-5131
Fax: 541-298-5141

CAP of East Central Oregon (CAPECO)

Community Action Agency for Gilliam, Morrow, Umatilla and Wheeler Counties:

CAPECO envisions the success of every youth, adult and senior to eliminate poverty and promote independence through education, employment, and the sharing of resources that move individuals from surviving to thriving

(Their services are broad: they assist with housing, home ownership, emergency services, food and nutrition, energy services, as well as employment and training services.)

<http://www.capeco-works.org/>

721 SE 3rd St, Suite D
Pendleton, OR 97801
Phone: 541-276-1926 or 800-752-1139
Fax: 541-276-7541