CITY OF MEDFORD
COMPREHENSIVE PLAN
ENVIRONMENTAL ELEMENT

PREPARED BY
CITY OF MEDFORD PLANNING DEPARTMENT
200 SOUTH IVY STREET
MEDFORD, OREGON 97501
plnmed@ci.medford.or.us

JAMES E. HUBER, AICP, PLANNING DIRECTOR

COMPREHENSIVE PLANNING SECTION
BIANCA PETROU, AICP, ASSISTANT PLANNING DIRECTOR
SUZANNE MYERS, AICP, PRINCIPAL PLANNER
CARLY GUILLORY, PLANNER
CHRIS OLIVIER, PLANNER
DESMOND MCGEOUGH, PLANNER
JOHN ADAM, AICP, PLANNER
PRALINE MCCORMACK, PLANNER

ADOPTED BY
MEDFORD CITY COUNCIL
ON FEBRUARY 17, 2000
BY ORDINANCE NO. 1999-213
REVISED ON April 17, 2003
BY ORDINANCE NO. 2003-135
Amended (minor changes) December 2, 2010
REVISED ON October 6, 2011
BY ORDINANCE 2011-123

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

LIST OF FIGURES

INTRODUCTION

PURPOSE

A pressing issue in many Northwest communities is the declining environmental quality that accompanies urban growth. The Bear Creek Valley has an abundance of diverse natural resources that provide recreation, wildlife habitat, and valuable urban open space, and contribute to the quality of life in Medford. Urbanization has negatively impacted the valley's natural resources, and, therefore, our quality of life. Diminishing supplies of developable land have forced many communities such as Medford to face the difficult challenge of balancing natural resource protection with the needs and rights of property owners and competing land uses. The impacts of development on the natural environment and its scenic values are evident. Cities, farms, drainage projects, dams, channelized streams, and roads have shaped the local landscape. In many instances, development has out-stepped environmental planning efforts.

This "Environmental Element" of the *Medford Comprehensive Plan* provides goals, policies, and implementation strategies for improving and maintaining environmental quality in Medford, while accommodating continued growth. The *Statewide Planning Goals* that oversee the protection and conservation of natural resources in Oregon are *Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources,* and Goal *6: Air, Water and Land Resources Quality*. Consistent with the objectives of Goals 5 and 6, the "Environmental Element" is a guiding document that strives to protect the natural environment and ensure that long-term growth does not adversely affect the natural resources that contribute to Medford's livability. Other *Statewide Planning Goals* that are pertinent to the "Environmental Element" include *Goal 3: Agricultural Lands*; *Goal 7: Areas Subject to Natural Disasters and Hazards*; and *Goal 13: Energy Conservation*. Most of these *Statewide Planning Goals* are also addressed in other elements of the *Comprehensive Plan,* such as in the "Public Facilities Element," and in related plan documents such as the *Medford Parks, Recreation, and Leisure Services Plan.*

An overriding concept in the goals, policies, and implementation strategies in this element is to incorporate *preventive,* rather than *corrective* measures in land use planning. The goals, policies, and implementation strategies emphasize the importance of developing and maintaining an integrated open space system that incorporates parks and recreation, biological resources, agriculture, and waterways. They must be evaluated and updated regularly, with new information added to the "Environmental Element" as necessary.

GOAL 5

The "Environmental Element" is primarily guided by the provisions set forth in *Statewide Planning Goal 5,* which outline policies and objectives for local land use planning to better protect and restore natural resources. Goal 5 is a broad *Statewide Planning Goal* that covers over a dozen resources, including riparian corridors, wetlands, wildlife and fish habitat, mineral and aggregate resources, energy sources, natural areas, scenic views and sites, open space, ground water resources, wilderness areas, historic resources, cultural areas, adopted Oregon Recreation Trails, and federal Wild and Scenic Waterways. The "goal" of Goal 5 is: *"To protect natural resources, and conserve scenic and*

historic areas and open spaces."[1] Its provisions provide a critical framework for local land use regulation, particularly in growing urban areas such as Medford.

Goal 5 requirements are contained in the *Oregon Administrative Rules* (OAR) 660, Divisions 16 and 23. Recent (1996) revisions to these OARs call for reform of the conservation efforts of the resources originally covered by the Goal, with an increased emphasis on the protection of three specific resources: wetlands, riparian areas, and wildlife habitat. The means to achieve the objectives of Goal 5 must be set forth in Medford's land use guiding documents: the *Comprehensive Plan* and *Land Development Code.*

A fairly recent concept directing resource planning in many urban areas entails reclaiming existing streams, drainageways, wetlands, and canals to serve several functions. These may include stormwater filtration, flood control, preservation of fish and wildlife habitat, and as greenways with paths to link land uses. Preservation of a city's waterways assists in fostering sustainable urban growth, in satisfying the requirements of Goal 5, and in attaining federal and state environmental quality standards. The City of Medford is exploring these possibilities and pursuing policies and strategies to take advantage of existing waterways, ultimately balancing environmental concerns with development needs.

To comply with Goal 5, a plan or course of action that prohibits, limits, or allows uses that may adversely affect a significant Goal 5 resource must be adopted as part of the *Comprehensive Plan* and *Land Development Code*. These may include zoning standards, easement requirements, clustered development, preferential assessments, or public acquisition of land or development rights.2 For example, the cities of Eugene, Oregon, and Chico, California, have developed and implemented comprehensive Natural Resource zoning districts, Resource Conservation Areas, or Waterside Protection ordinances.3 Medford's Bear Creek Overlay Zoning District, adopted in 1989, was replaced with a riparian corridor ordinance, adopted in 2000. This ordinance provides protections for streams that provide habitat for salmon and steelhead, including Bear Creek, Larson Creek, and a portion of Lone Pine Creek. Certain wetland areas in Medford would be protected through a proposed wetland protection ordinance.

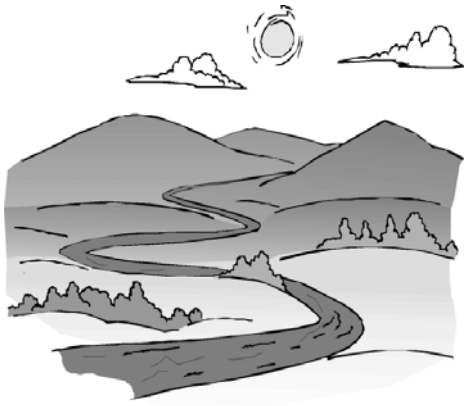
FORMAT

The "Environmental Element" is divided into four major sections: *Physical Characteristics; Natural Resources; Archaeological and Historic Resources*; and *Disasters and Hazards*. Except for the Natural Resources section, each section concludes with *Conclusions* and *Goals, Policies, and Implementation Measures* that pertain to the resources or issues analyzed in that section. The Natural Resources section is further subdivided into *Air Quality*, *Water Quality/Wetlands/Wildlife Habitat, Soils*, and *Energy*, each with their own Conclusions and Goals, Policies, and Implementation Measures. As in many urban areas, water quality, wetlands and wildlife habitat are highly interrelated in Medford, where a majority of the important habitat exists near waterways. The "Environmental Element" ends with several Appendices containing inventories of various resources and a list of environmental agencies and laws.

[1] *Oregon's Statewide Planning Goals and Guidelines,* 1995 Edition, Oregon Department of Land Conservation and Development.

PHYSICAL CHARACTERISTICS

This section of the "Environmental Element" discusses Medford's physical characteristics, including location, climate, and geology, and presents the Conclusions and Goals, Policies, and Implementation Measures pertinent to these factors.



LOCATION

Medford lies within the upper Rogue Valley, bounded by the Siskiyou Mountain Range to the south, the Cascade Mountains to the east, and the Coast Range to the west. The Rogue Valley has the lowest precipitation among Oregon's western interior valleys, with Medford averaging about 20 inches of rain per year.[2] Bear Creek, one of the Rogue River's primary tributaries, flows through the City of Medford, which has an elevation of 1,300 to 1,400 feet. The Pacific Ocean lies approximately 80 miles to the west.

Medford (Township 37 South, Ranges 1 and 2 West, of the Willamette Meridian) is located in Jackson County, one of Oregon's southernmost counties, abutting California. For the smaller outlying communities, Medford is the only nearby city of substantial size. Consequently, Medford has developed into a regional service center. As the Jackson County Seat, Medford provides governmental, commercial, and medical services for an estimated market area of 400,000 to 450,000 people - a population area extending to the coast, into Northern California, and on both sides of the Cascades in Southern Oregon.[3] It is anticipated that Medford's role as a regional service center will continue into the future.

Medford's location in the Rogue Valley first attracted settlers and commerce in the mid-1800s. Resources such as gold, timber, and agricultural products led to economic "booms" in the late 1800s and early 1900s. (See the "Economic Element" of the *Comprehensive Plan* for a full description of Medford's economic history.) While its position as a regional service center is advantageous for Medford's economy, it can conflict with the goal of conserving and sustaining natural resources. As noted in the 1996 *Comprehensive Medford Area Drainage Master Plan*:

> *"Until the 1800's, the Medford area consisted largely of ponderosa pine and grassland, interrupted by a large number of wetlands. After about 1860, settlers arrived in increasing numbers from the east. They logged forests, plowed under native grasses, and drained wetlands. These actions increased the erosion of topsoil and decreased the habitat available for native species. Although the effects on the natural hydrological cycle were limited at first, they were greatly accelerated as*

[2] *Local Wetlands Inventory and Oregon Freshwater Assessment of Method Analysis, City of Medford,* Brown and Caldwell and Woodward-Clyde Consultants, October 1995.

[3] "Medford now finds stores fruitful", *The Oregonian*, December 26, 1996.

> *urbanization increased in the early twentieth century, bringing with it increased density of homes, businesses, and industry, and the advent of paved roadways."*[4]

As Medford continues to be a service center for the region's population, the city must strive to maintain and improve the environmental quality of its air, waterways, and other natural resources, consistent with *Statewide Planning Goal 5* provisions. For example, maintaining federal air quality standards, discussed in the *Air Quality* section of the "Environmental Element," has been difficult at times. Being a major node along the Interstate 5 corridor, with congestion from commuters and visitors, combined with the effects of wood burning and industry, led to high concentrations of air pollutants in the past.

Within Medford's viewshed lies Roxy Ann Peak, elevation 3,571 feet, the dominating topographic feature east of the City. It is designated as an outstanding scenic resource comprising both a "scenic viewpoint" and a "scenic site" in the Jackson County *Comprehensive Plan*. Additionally, it is listed on the *Oregon Natural Areas* inventory, and is identified as winter range for black tailed deer. The 1,200-acre Prescott Park, owned and maintained by the City of Medford, encompasses Roxy Ann Peak, and functions as Medford's premier open space. Currently Prescott Park is located outside Medford's UGB. Because residential hillside development continues to encroach upon Roxy Ann Peak, the city must strive to preserve and protect this valuable resource, in cooperation with Jackson County.

CLIMATE

Medford has a moderate, seasonal climate. Late fall, winter, and early spring months are damp, cloudy, and cool, influenced by marine air. Late spring, summer, and early fall are warm, dry, and sunny due to the dry nature of the prevailing winds. The Siskiyou and Coast Mountain Ranges produce a "rain shadow" effect that causes light annual rainfall. Snow falls on the valley floor occasionally; however, it is normally abundant in the surrounding mountains during the winter, providing excellent winter recreation opportunities.

Medford's average annual rainfall had been decreasing in recent years, but this trend may be reversing. Medford's annual rainfall was more than 30 inches in 1996 and 1997, and more than 28 inches in 1998, while the annual average over the previous 50 years was less than 20 inches. Flooding in late 1996 and early 1997 created important questions about floodplain development. This issue is discussed under *Flooding*, in the *Natural Disasters and Hazards* section below.

The average daily high temperature in Medford is between 80 and 95 degrees in the summer, and between 25 and 45 degrees in the winter. The average growing season lasts 170 days, from April 30 to October 17. Normally, winds average less than five miles per hour (mph), prevailing from the south in the winter and from the northwest during the remainder of the year. Summer thunderstorms often bring gusty winds of 40 or 50 mph from any direction. While most climatic factors are beyond control, urbanization can cause changes in atmospheric conditions. Generally, the urban climate, especially in larger cities, tends to be warmer, less windy, foggier, more polluted, and often rainier than the natural climate.[5] Historically, the geography and climate characteristic to Medford has

[4] *Comprehensive Medford Area Drainage Master Plan*, Brown and Caldwell, September 1996.

[5] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

resulted in atmospheric inversion layers, particularly during the winter, and, consequently, increased air pollution.

Land use regulations and policies can assist in improving the quality of an urban environment. The use of preventive land use planning measures, such as minimizing paved surfaces, reducing the number of motor vehicle trips, adding vegetation and shade trees to streets and parking lots, preserving open waterways, and land use regulations that move to reduce auto use and that promote "pedestrian-friendly" neighborhoods and commercial centers assist in mitigating some of the adverse climatic conditions inherent to cities. Landscaping and waterways are assets to the community, and offset the effects of substantial concrete and asphalt, contributing to livability.

GEOLOGY

The Rogue Valley is located on the edge of the Siskiyou Mountains, which are part of the Klamath Mountain Range that extends to the Pacific Ocean, and divides southern Oregon from northern California. Medford is situated on stream deposits and sedimentary rock deposited 50 million years ago, during the Eocene Epoch, and shaped primarily by erosion and other weathering forces. The Klamath Mountains are a result of processes that occurred 200 million years ago, when molten rock was injected between formations below the surface and cooled. They are composed primarily of volcanic and sedimentary materials that have been folded, faulted, and intruded, and contain intrusive (granodiorite) and metamorphic rock (schists). Subsequent erosion and other mountain-building forces occurred to produce prominent geological features near Medford, such as the Table Rocks and Roxy Ann Peak. Older marine sedimentary rock deposited during the late Cretaceous Era, about 75 million years ago, is found on the eastern margins of the Klamath Mountains, along with the oldest rock (metamorphic) found in western Oregon, possibly as old as the Triassic Era.

The Klamath Mountains are characterized by steep ridges with rugged, deeply dissected slopes, well-defined V-shaped valleys, and few undrained areas. They have elevations ranging from 2,000 to 5,000 feet, and peaks from 4,000 to 7,500 feet. Mount Ashland, at 7,533 feet, is the highest peak in the Klamath Mountain Range in Oregon. The Klamath Mountains have been continuously vegetated for 65 million years, and are home to diverse ecosystems and wildlife habitats.

The Western Cascade Mountains, which stretch toward the communities of Butte Falls and Prospect, are steeper on the east and slope more gently to the west. The terrain is characterized by slopes with rounded mountaintops that have timber-producing vegetation. Many ridge crests are 4,500 to 4,800 feet in elevation, and are composed of thick rock, with exposed outcrops. Most of the waterways in the Western Cascades drain westerly.

The more recently formed High Cascades, located to the east of the Western Cascades, contain gently rolling high plateau terrain, interrupted by glacial channels, some of which carry west-flowing streams. The High Cascades are characterized by scattered dormant volcanic peaks like Mount McLoughlin located northeast of Medford, and smaller cinder cones rising 1,500 to 6,000 feet. Bedrock lies beneath successive layers of material deposited by melting glaciers, or beneath a mantle of pumice and ash from volcanic eruptions. The Cascade Mountains generally have poorly defined drainage, hanging valleys, areas subject to inundation, ill-defined stream courses, and small amounts of weathered material.

The contact zones between the various geologic formations have resulted in deposits of ore that contributed to the rich mining history of the area. The United States Geological Survey (USGS) quadrangle map of the Medford area shows two particular contact zones with distinct types of deposits. The contact along the Klamath Mountains has ore deposits containing gold and quartz, and the intruded granodiorite areas near Mount Ashland have minor deposits of tungsten. Other deposits in the area include silver, molybdenum, and zinc. The contact zone along the Cascade Range provides for a greater variety of ore deposits, including manganese, clay, mercury, and coal.

The predominant rock types west of Medford are metamorphic rock in the form of metavolcanics and breccias, intrusive diorites and granodiorites, and older Cretaceous sedimentary rock. The intrusive granites are 150 million years old and the metamorphic rock is 200 million years old. To the east of Medford, the foothills consist of dark volcanic rock, andesite, and basalt, deposited when the Western Cascade volcanic chain was active.[6] The geologic units to the east were deposited as recently as 50 million years ago during the Eocene Era. The Table Rocks and similar formations are composed of sandstone topped with a basalt flow about one million years old. Erosion removed most of the surrounding flow leaving these spectacular rock features.

Southwest Oregon's western interior valleys, which lie in the rain shadow of the Klamath/Siskiyou Mountains, tend to contain the urban areas, communities such as Medford, Ashland, Jacksonville, Gold Hill, Eagle Point, and Shady Cove. The valleys consist of flood plains, stream terraces, and flat to gentle slopes. Most development has occurred on quaternary alluvial and fluvial deposits, which eroded from the surrounding mountains and were subsequently deposited on the valley floor. A variety of soils developed on these deposits, ranging from deep, dark-colored prairie soils on well-drained terrace locations, to rocky, drought-prone soils to the northeast of Medford.

Pursuant to Goal 5, jurisdictions must inventory *aggregate resources*, which are defined as naturally occurring concentrations of stone, rock, sand and gravel, decomposed granite, lime, pumice, cinders, and other solid materials used in construction. Although deposits of sand and gravel can be found in the northerly part of Medford in the vicinity of Bear Creek, no significant aggregate resources are known to exist in the Medford Urban Growth Boundary (UGB).

[6] *Roadside Geology of Oregon*, David D. Alt and Donald W. Hyndman, 1988.

PHYSICAL CHARACTERISTICS CONCLUSIONS

1. Most of the Medford planning area is located on the Bear Creek Valley floor, which is made up of floodplains, stream terraces, and flat to gently sloping land often having soils with high agricultural capability.

2. Medford has developed into a regional service center for commerce, government, education, and health care for a large geographical area because of its physical isolation from other major urban areas and location on Interstate 5, the West Coast's primary north-south travel corridor.

3. Urban growth and congestion due to Medford's position as a regional service center have had a marked influence on Medford's "western interior valley" ecosystem and its diverse natural resources. The impacts of urban growth have negatively affected the quality of the natural environment. Medford faces the difficult challenge of balancing natural resource protection with the needs of property owners and competing land uses.

4. The dominating topographic feature of the Medford area is Roxy Ann Peak, designated as an outstanding scenic resource in the *Jackson County Comprehensive Plan*, and located in the 1,700-acre Prescott Park, owned and operated by the City of Medford, but currently outside the Medford Urban Growth Boundary. Residential hillside development, both inside and outside the UGB, continues to encroach upon Roxy Ann Peak.

5. Medford's climate includes higher summer temperatures and lower average rainfall than the remainder of the region due to a "rain shadow" effect caused by the surrounding mountains.

PHYSICAL CHARACTERISTICS GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 1: To improve and maintain the quality of life in Medford by using land use planning strategies that have positive effects on the natural environment.

Policy 1-A: The City of Medford shall strive to minimize the negative effects of solar radiation, such as the affect concrete and asphalt surfaces have on summer air temperature.

Implementation 1-A (1): Review the *Medford Land Development Code*, and propose amendments for consideration by the City Council where necessary to address the negative effects of solar radiation, such as requiring adequate vegetation in development projects, requiring retention of open waterways and wetlands, etc.

Implementation 1-A (2): Prepare amendments to the *Medford Land Development Code* for consideration by the City Council to require preservation and maintenance of certain existing trees.

Goal 2: To provide and maintain open space within the Medford planning area for recreation and visual relief, and to protect natural and scenic resources.

Policy 2-A: The City of Medford shall acknowledge Prescott Park (Roxy Ann Peak) as the city's premier open space and viewshed, and recognize its value as Medford's most significant scenic view, currently and historically.

> **Implementation 2-A (1):** Investigate inclusion of Prescott Park in Medford's Urban Growth Boundary and city limits in order to enhance public safety and the feeling of ownership by city residents, protect its natural resources, preserve and enhance convenient public access, protect the public from fire hazards, and help in establishing a network of open space corridors with recreational trails.
>
> **Implementation 2-A (2):** Identify lands surrounding Prescott Park that are critical to ensuring long term protection and meeting open space/viewshed goals and policies, for acquisition or other types of public management. Seek funding sources.
>
> **Implementation 2-A (3):** Consider methods to address the interface between Prescott Park and adjacent development to assure compatibility, such as a buffering program, enhanced review of city and county development applications within a specified area surrounding Prescott Park, and joint policies or an "Area of Mutual Planning Concern" with Jackson County.

Policy 2-B: The City of Medford shall strive to preserve and protect the visual amenities offered by the foothills.

See also Goal 8 and Implementation 8-B (1), of the "Environmental Element," Goal 2 of the *Southeast Plan* section of the "General Land Use Plan Element," and the *Parks* section of the "Public Facilities Element."

NATURAL RESOURCES

Goal 6 of Oregon's *Statewide Planning Goals*, "Air, Water, and Land Resources Quality," strives *"to maintain and improve the quality of the air, water, and land resources of the state."* This section of the "Environmental Element" discusses Medford's natural resources, including air quality, water quality, wetlands, wildlife habitat, soils, and energy, and presents the conclusions, goals, policies, and implementation strategies pertinent to these factors. Because water quality, wetlands, and wildlife habitat are interrelated, their Conclusions and Goals, Policies and Implementation Measures are combined.

AIR QUALITY

Statewide Planning Goal 6 requires Comprehensive Plans to provide for the maintenance and improvement of air resources. In air sheds, such as Medford's, that are *"described or included in state environmental quality statutes, rules, standards and implementation plans"* air emissions *"shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources."*[7]

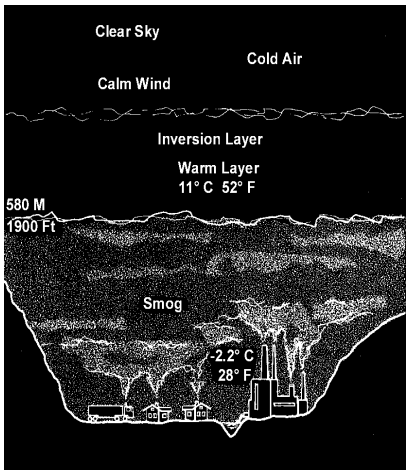
In the past, the largest sources of air pollution in the region included industry and wood stoves, which emit particulate matter and carbon monoxide. Substantial efforts (discussed below) have been made to reduce these emissions. More recently, motor vehicle emissions have become the major source of air pollution. According to one source, *"Motor vehicles are the single largest source of ozone and carbon monoxide emissions in the United States today. Cars, buses, and trucks are responsible for 50 percent of the smog, and 90 percent of the carbon monoxide that exists in urban areas."*[8] Medford is prone to accumulations of air pollution from motor vehicle emissions. As noted previously, Medford provides services to an estimated population of 400,000 to 450,000, exacerbating traffic congestion. The high number of commuters traveling to Medford for work, services, education, and recreation will continue to increase in the future, especially from outlying communities such as Ashland, Grants Pass, and even Yreka, California, affecting Medford's air quality.

As noted in the *Physical Characteristics* section, historically, the Rogue Valley, from Ashland to Grants Pass, has had a high propensity toward periods of air stagnation and atmospheric temperature inversions that trap pollution, particularly during the months of December, January, and February. During these months, the temperature near the ground decreases rapidly toward sunset. As the surface air cools, it flows down the mountain slopes, forming a pool of cold air on the valley floor with the warmer air above acting as a lid. The cooling within this layer typically produces fog, and, as air pollutants are discharged, they become trapped. During these stagnant conditions, the fog and trapped air can remain under this "lid" for several days, becoming increasingly polluted. **Figure 1** illustrates the temperature inversion process.

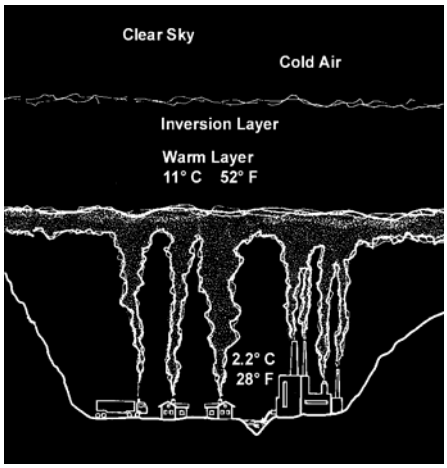
[7] *Oregon's Statewide Planning Goals and Guidelines, 1995 Edition,* Oregon Department of Land Conservation and Development.

[8] *Clean Air Act: Law and Explanation,* Commerce Clearing House, Inc., 1990.

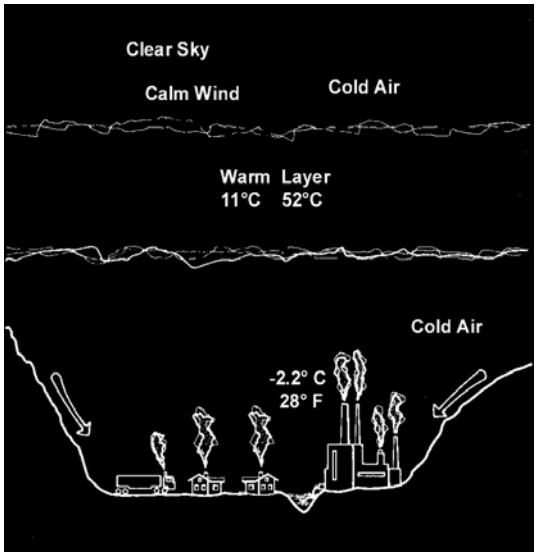
Figure 1
Temperature Inversion



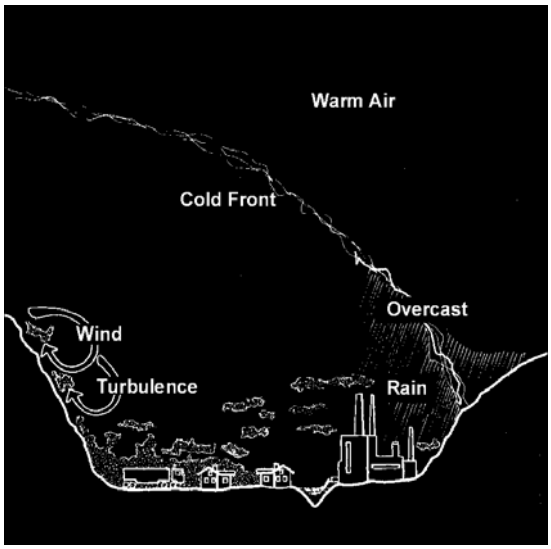
As nighttime comes, the surface air cools and moves down into the valley.



During the day, emissions rise, but become trapped by the warm air layer above.



Since there is no wind to carry the emissions away, the pollution remains under the “lid” of warmer air, accumulating until the inversion layer is broken up.



Breakup of the inversion layer may come from increased temperatures during the day, which increases the depth of the mixing layer, or from the arrival of a new air mass accompanied by stronger wind and precipitation.

Currently, local and state agencies are working to develop an air quality plan for the region that will not only maintain federal air quality standards, but continue to improve air quality, while satisfying the provisions of the *Statewide Planning Goals*. The City of Medford has also begun undertaking preventive strategies to reduce motor vehicle emissions. For example, mixed residential and commercial development, which lessens the number and length of auto trips for work or shopping, is being required in areas such as Southeast Medford.

The Rogue Valley Transportation District (RVTD) is one of the local agencies who is active in air quality issues through their efforts to reduce single-occupancy vehicle trips and their use of compressed natural gas to fuel their buses. Mass transit vehicles operating on compressed natural gas are virtually non-polluting. Other public and private entities in the Medford-Ashland AQMA have turned to use of compressed natural gas as a fuel source, including Jackson County and Avista Utilities Company.

FEDERAL AND STATE REGULATIONS

Federal "Clean Air" legislation began in 1950s, and has undergone subsequent amendments, including revisions in 1960s, 1970s, and 1990s. While initial legislation concentrated on satisfying federal air quality standards, more recent revisions have incorporated the critical role of transportation planning in maintaining and improving air quality. In 1955, Congress took the first step in implementing regulations to improve air quality by passing the *Air Pollution Act*, which authorized the first federally funded air pollution research. Later, the passage of the *Motor Vehicle Pollution Control Act of 1965* expanded federal activity to include setting emission standards for automobiles.

In 1967, the *Air Quality Act* became law, followed in 1969 by the *National Environmental Policy Act* (NEPA), which established the Council on Environmental Quality. The *Clean Air Act of 1970* established the existing system of national air quality standards, and issued a generalized compliance schedule to all states. In the 1970 amendments, National Ambient Air Quality Standards (NAAQS) were developed for seven major pollutants. The seven pollutants assigned NAAQS were total suspended particulate (TSP), sulfur oxides (SO_X), carbon monoxide (CO), hydrocarbons (HC), nitrogen dioxide (NO_2), photochemical oxidants (O_X), and lead (Pb). As part of the *Clean Air Act*, states were required to develop State Implementation Plans (SIPs) for attaining and maintaining the NAAQS.

The federal Environmental Protection Agency (EPA) is responsible for approving or disapproving SIPs. Although the 1970 *Clean Air Act* established the NAAQS, many jurisdictions concentrated on attaining standards through emission controls, instead of fully addressing the prevention of air pollution and maintenance of air quality on a broad, regional level. In the early 1970s, the EPA disapproved all SIPs because many lacked effective mechanisms for maintaining federal standards. The EPA required states to identify areas that had air quality problems or where future growth rates would result in exceeding the NAAQS as "Air Quality Maintenance Areas" (AQMAs). The Medford-Ashland area was designated as an AQMA in 1974, encompassing the communities of Medford, Ashland, Central Point, Phoenix, Talent, White City, Eagle Point, and Jacksonville (228 square miles). The Oregon Department of Environmental Quality (DEQ) was given primary responsibility for enforcing air quality standards in Oregon.

An AQMA that does not meet the NAAQS for a particular pollutant is labeled a "non-attainment area" for that pollutant. **Figure 2** illustrates the steps in developing a SIP in a non-attainment area under the *Clean Air Act*. Strategies for bringing the AQMA into compliance are required as a component of the SIP, as is a detailed analysis of the impact of projected future growth on air quality. Where the analysis indicates that an area may not maintain the NAAQS for the ten years after attainment, the state is required to submit an Air Quality Maintenance Plan.

Figure 2

Steps to Developing a State Implementation Plan (SIP) Under the *Clean Air Act*

(1) National Ambient Air Quality Standards (NAAQS) promulgated by Environmental Protection Agency (EPA).

(2) States and EPA collect/evaluate ambient air quality data.

(3) EPA/states designate and classify areas based on NAAQS attainment status. *If area in attainment, no new SIP required.*

(4) If area found in non-attainment for one or more pollutant, SIP required.

(5) States develop emissions inventory.

(6) States develop SIP, consisting of rules, mobile source strategies, etc., to attain standards by *Clean Air Act* deadline.

(7) States demonstrate to EPA that SIP works, usually through modeling.

(8) States hold public hearing, adopt SIP, and submit to EPA for review and approval.

(9) SIP completeness determined by EPA within six months.

(10) If incomplete, SIP sent back to state to revise and re-submit; *OR*, if complete, EPA must approve, disapprove, or develop Federal Replacement SIP.

Source: Rogue Valley Council of Governments, 1997

Comprehensive amendments to the *Clean Air Act* in 1977 mandated significant involvement by local governments and elected officials in the development, implementation, and enforcement of plans to attain the NAAQS. The increased responsibility of local governments was identified specifically for areas subject to transportation-related photochemical oxidants (ozone or "smog") and carbon monoxide standards that would not be met before 1979. In 1978, the Jackson County Board of Commissioners was identified as the lead agency responsible for controlling mobile air pollution sources in Jackson County. They appointed an Air Quality Advisory Committee to make recommendations on transportation-related air quality control measures for the Medford-Ashland AQMA.

Congress again amended the *Clean Air Act* in 1990, resulting in stricter standards and deadlines for compliance for non-attainment areas, with tougher sanctions for those areas that did not comply. A more recent requirement for non-attainment areas in Oregon is the *Oregon Transportation Conformity Rule*, approved by the state Environmental Quality Commission in April 1995. The *Transportation Conformity Rule* requires jurisdictions to consider air quality in transportation planning, or risk suffering a loss of federal funding and potentially violating the NAAQS in the future. For example, a "particulate matter conformity determination" must be made for future, regionally significant transportation projects in Jackson County. In 1998, additional amendments to the *Clean Air Act* set new standards for particulate matter and ozone.

AIR QUALITY MAINTENANCE AREA STATUS

The Medford UGB was established as the non-attainment boundary for carbon monoxide (CO) in 1978, and, in 1987, the Medford-Ashland AQMA was designated as the non-attainment boundary for particulate matter (PM_{10}). As required by federal law, SIPs were prepared for these two pollutants that exceeded the NAAQS in the Medford-Ashland AQMA. A SIP for CO was developed in 1982 by Jackson County, and later approved by the EPA. However, the SIP for PM_{10}, developed in 1991, was not approved, and has been withdrawn. A revised SIP for PM_{10} and an Air Quality Maintenance Plan for CO are currently being developed. Representatives from industry, government, and public interest organizations comprise the local working group (Medford-Ashland Air Quality Advisory Committee) overseeing the development of these two plans.

The original emission control measures in the PM_{10} SIP included the following:

- Mandatory woodstove curtailment program
- Industrial source-control technology requirements
- Local open burning ordinances
- Slash burning restrictions on "red days"
- Cleaner road sanding materials

New emission control measures recommended by the Medford-Ashland Air Quality Advisory Committee include:

- Unified woodstove curtailment program for all jurisdictions in the AQMA
- Roadway paving projects in Medford and White City
- Education program regarding "track out"[9] for orchard owners
- Unified "track out" ordinance for all jurisdictions in the AQMA
- Improved street vacuuming programs in Medford and White City
- New industrial toxic air emission control standards

NATIONAL AMBIENT AIR QUALITY STANDARDS

Air pollution reduction efforts have succeeded in reducing emissions in the Medford-Ashland AQMA due to increased public awareness and proactive programs, but the potential to revert to previous conditions still exists. The topography of the Rogue Valley, the abundance of motor vehicles, and the continued growth in population in the region are all factors that contribute to the potential for poor air quality. Moreover, the 1998 revisions to the *Clean Air Act*, making the NAAQS stricter for both ozone and PM_{10}, could result in future violations.

Federal air quality standards were developed to address health, safety, and welfare concerns. The NAAQS are divided into two levels, "primary" and "secondary." *Primary* standards are designed to protect the public health with a built-in margin of safety. *Secondary* air quality standards, which are more stringent than primary standards, are designed to protect the public welfare from adverse effects, such as injury to crops and livestock, decreased visibility, deterioration of materials and property, and other types of environmental damage. Oregon's air pollution control strategies are

[9] Track-out describes dirt and mud deposited onto streets and roads from equipment and vehicle tires.

directed to meet the more stringent *secondary* air quality standards. Where the secondary standard is identical to the primary standard, the primary standard is also protective of public welfare. **Figure 3** displays the ambient air quality standards currently in effect in Oregon.

Figure 3
State and National Ambient Air Quality Standards

Pollutant	*Average Time*	*Primary (Health)*	*Secondary (Welfare)*	*Proposed Standard*
Carbon Monoxide (CO)	8 hours 1 hour	9 ppm 35 ppm	9 ppm 35 ppm	NA
Lead (Pb)	Calendar Quarter	1.5 mg/m^3	1.5 mg/m^3	NA
Nitrogen Dioxides (NOx)	Annual Arithmetic Mean	.053 ppm	.053 ppm	NA
Ozone (O_3)	1 hour	.12 ppm	.12 ppm	.08 ppm
Sulfur Oxides (SOx)	Annual Arithmetic Mean 24 hours 3 hours	.03 ppm .14 ppm .50 ppm	.02 ppm .10 ppm .50 ppm	NA
Particulate Matter (PM_{10})	Annual Arithmetic Mean 24 hours	- -	50 mg/m^3 150 mg/m^3	15 $mg/m^{3\,*}$ 65 $mg/m^{3\,*}$
Total Suspended Particulate (TSP)	Annual Geometric Mean 24 hours	NA NA	60 mg/m^3 150 mg/m^3	NA

Source: *1995 Oregon Air Quality Annual Data Summary*, Oregon Department of Environmental Quality, Air Quality Division

Notes: Oregon standards are the same as the federal secondary standards.
ppm = parts per million
mg/m3 = micrograms per cubic meter
NA = not applicable
* These are the new standards for $PM_{2.5}$. It is expected that there will be stricter standards developed for PM_{10} as well.

While there are NAAQS for seven pollutants, there are currently three pollutants of significant concern for Medford: ozone, carbon monoxide, and particulate matter.

Ozone (O_3)

Ozone (smog) typically forms on days when the temperature exceeds 95 degrees and there is a high volume of motor vehicle traffic, typical conditions during the summer in Medford. According to data in the *Jackson County Air Quality Annual Report, 1995-1996*, the annual average ozone level in Medford was below the proposed new higher standard of .08 parts per million (ppm) for several years; however, several days in July and September of 1998 exceeded the existing standard of .12 ppm. Continued population growth and its accompanying traffic increases could lead to more violations of the federal and state standards in the future.

Carbon Monoxide (CO)

The NAAQS for carbon monoxide was exceeded throughout most of the 1980s in Medford, yet levels have decreased in recent years. CO, a colorless, odorless, deadly gas that interferes with the body's ability to use oxygen, is produced by all forms of combustion, including motor vehicle internal combustion engines. Between 1991 and 1999, CO standards were exceeded in the AQMA

only once (in 1994) due to a car rally event in Medford. This was not considered a violation because it occurred only once. Sources of CO emissions include mobile "non-road" and "on-road" sources. *Non-road* sources include equipment, off-road vehicles, aircraft, and railroads. *On-road* sources are gas and diesel vehicles and trucks driven on roads. "Light duty gas vehicles" (generally cars) account for nearly 66% of CO emissions within the Medford AQMA, and most CO emissions occur on arterial streets.[10] Monitoring systems for CO have been installed by the DEQ in Medford at two highly congested areas - near the Rogue Valley Mall and at Main Street and Central Avenue.

Particulate Matter (PM_{10} and $PM_{2.5}$)

The *Clean Air Act* requires the EPA to review and revise air quality standards to ensure that citizens are protected from the harmful effects of air pollution. "Particulate matter" comes mostly from smoke, dust, and vehicle exhaust. The current standard for particulate set in 1987 covers particles that are 10 microns or less in diameter (PM_{10}). A comprehensive review of the human health effects of PM_{10} revealed that the standards were not sufficient to protect human health. Health studies show harmful effects from breathing particles as small as 2.5 microns in diameter ($PM_{2.5}$). This smaller particle is inhaled deeper into the lungs and can potentially cause more damage than larger particles. The new $PM_{2.5}$ standard will require new monitoring equipment to collect data. According to the Oregon DEQ, any population center in the state may potentially violate the new $PM_{2.5}$ standards. Particular areas of concern include Bend, Eugene-Springfield, La Grande, Portland, Grants Pass, and Medford. Areas designated as out of compliance will have up to ten years to attain the new standards.[11]

In 1989, Jackson County began programs to improve PM_{10} levels, including regulating industry, outdoor burning, and wood stoves to reduce the regional smoke problem. The most heavily polluted areas had more than double the hazardous level of PM_{10}.[12] The more populated areas, such as Medford, were especially affected, although all portions of Jackson and Josephine Counties were affected to some degree. The severity of the wood smoke problem has decreased in recent years because of the smoke reduction measures and a decline in the wood products industry. PM_{10} levels have been drastically reduced, to roughly 12.5% of their 1989 levels. The last exceedance of the 24-hour PM_{10} standard in the Medford area occurred in 1991. The more recent standards for $PM_{2.5}$ will create further challenges for the Medford-Ashland AQMA, however.

Land use strategies, implemented through the *Land Development Code* and *Comprehensive Plan*, such as those that reduce vehicle miles traveled (VMT) and retain vegetation can assist in achieving and maintaining compliance with the new standards. The present primary contributor of PM_{10} is road dust from use by motor vehicles (55%), although industry (24%) could once again become a significant contributor according to DEQ.

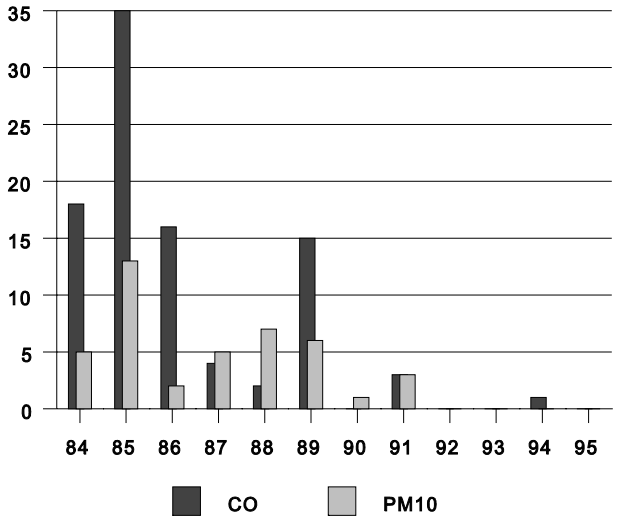
Figure 4 lists a history of the air quality status of the two pollutants (CO and PM10) in violation of the NAAQS in the Medford-Ashland AQMA. While the reduction in the number of days of NAAQS violations is notable, the region is still considered a non-attainment area, since the AQMA has no federally-approved SIP for PM_{10}.

[10] *Oregon 90 SIP: Introduction and Overview,* Draft Plan.

[11] *Proposed New Air Standards and How They Might Affect Oregon Communities,* U.S. Environmental Protection Agency, December, 1996.

[12] *Jackson County Air Quality 1995/96 Annual Report,* Jackson County Environmental Health Division.

Figure 4
Number of Days Exceeding the NAAQS for CO and PM_{10}
Medford-Ashland AQMA, 1984-1995



Source: *Jackson County Air Quality Annual Report, 1995-96.*

AIR QUALITY IMPROVEMENT PROGRAMS

As noted, air quality in the Medford-Ashland AQMA has improved dramatically in recent years, due, in part, to programs implemented in Medford and the Rogue Valley to reduce emissions and bring the area into attainment with the NAAQS. Although air quality has improved, there is a continuing need for the programs, especially with the arrival of the EPA's stricter 1998 provisions. Each air quality improvement program is briefly described in the following section.

- Vehicle Inspection and Maintenance (I & M) Program
- Oxygenated Fuel Program
- Small Business Assistance Program
- Woodstove Certification Program
- Woodstove Replacement Program
- Liaison Activities
- Daily Wood Stove Advisory
- Outdoor Burning Regulations
- Public Education
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Traffic Signal Timing Program

Vehicle Inspection and Maintenance (I & M) Program

All motor vehicles, with few exceptions, belonging to residents of the Medford-Ashland AQMA are required to be tested for excessive emissions through the state Vehicle Inspection and Maintenance (I & M) Program. The vehicles must meet specific standards each time licensing is required.

Oxygenated Fuel Program
In 1992, the *Clean Air Act* began requiring the sale of oxygenated fuel during the winter in Jackson County, Grants Pass, and Klamath Falls, along with Multnomah, Clackamas, Washington, and Yamhill Counties, to reduce CO emissions. CO comes chiefly from motor vehicle exhaust, and can reduce the ability of the human body to process oxygen. The "oxy-gas" program is in effect from November 1 through February 28, the season with typically the worst air quality conditions.

Small Business Assistance Program
The Small Business Assistance Program provides information and technical assistance to small businesses regarding air quality regulations and related environmental issues. Small businesses that produce air emissions, such as dry cleaners, auto-body shops, printers, and small manufacturers, must address regulations in the *Clean Air Act*, and this program is designed to help them meet the most recent emission standards. The program, administered by the Oregon DEQ, is educational and informational in nature, and does not provide any direct financial assistance to the businesses.

Oregon's Wood Stove Certification Program
In 1983, the Oregon legislature mandated a Wood Stove Certification Program to assure use of wood stoves that were less polluting. By 1986, only wood stoves certified as meeting new emission standards were permitted to be sold in Oregon. The certification program required new stoves to achieve a 50% reduction in emissions by 1986, and an approximate 75% reduction by 1988. Later, the EPA adopted nationwide standards for wood stove emissions. In 1991, the sale or installation of uncertified stoves by private parties was banned in Oregon, and uncertified stoves were required to be removed upon sale of a home in a PM_{10} non-attainment area. Few installation permits are now issued in the City of Medford for new wood stoves, and weatherization of the home is required when a new wood stove is installed. Most new fireplaces are equipped with natural gas, with more of a decorative purpose than as a heating source. Some communities, such as the City of Ashland, issue rebates for the removal of wood stoves to expedite the elimination of uncertified stoves, and provide financial incentives to low-income residents.

Wood Stove Replacement Program
The Housing Authority of Jackson County administers programs for lower income households that replace wood stoves used as a sole source of home heating. Most are replaced with natural gas furnaces. The Housing Authority receives federal Community Development Block Grant (CDBG) funds through the City of Medford for such "emergency" repairs. These programs replaced 253 wood stoves in Medford since 1989, and 305 wood stoves countywide.

Liaison Activities
Medford is part of the *Interagency Air Quality Team*, consisting of representatives from Ashland, Central Point, Jackson County, ACCESS, Inc., the Housing Authority of Jackson County, Pacific Power, Avista Natural Gas, and the Oregon DEQ. The Jackson County Environmental Health Division conducts training for air quality staff to reduce duplication of services, and to provide a consistent unified approach to monitoring, surveying, and education. Medford's Air Quality Technicians operate out of the Jackson County office, and participate in joint activities. This cooperation indicates the practicality and cost-effectiveness of a regional approach to air quality issues in the Rogue Valley. Survey activities are conducted throughout the AQMA to obtain information concerning excessive wood smoke emissions. Specific areas have been surveyed every year since 1985. These surveys indicate a decrease in the number of households using wood as a heating source. The increased use of heat sources such as natural gas and electric heat pumps has contributed to the reduction in homes heated by wood stoves.

Wood Burning Curtailment and Enforcement Activities

The Wood Burning Advisory program is used to permit or prohibit smoke emissions in the *Critical PM_{10} Curtailment Area*. It serves to inform the public of the status of PM_{10} levels in the atmosphere relative to federal standards. The Jackson County Environmental Health Division staff establishes the daily advisory by 6:00 a.m. each day from November 1 through February 28. The familiar *green, yellow,* or *red* day status indicators are broadcast on most television and radio stations in the region, are published in local newspapers, and are available by phone. Green indicates that PM_{10} levels are low and good air circulation is predicted. Yellow indicates that PM_{10} levels are rising and poor air circulation is predicted, and red indicates that PM_{10} levels are approaching an unhealthy level and stagnant air conditions are predicted.

On *yellow* and *red* days during the wood burning season, generation of smoke is restricted and enforcement monitoring takes place. Technicians are dispatched to observe smoke emissions. Violators are contacted by mail and targeted for special programs to aid in reducing or eliminating their wood smoke emissions. The winter of 97-98 marked the seventh consecutive winter with no *red* days. Like CO, PM_{10} is considered a wintertime issue. The cold, stagnant air characteristic to the season traps pollution in the Rogue Valley, accumulating to unhealthy levels. While the Medford-Ashland AQMA once regularly violated federal standards for PM_{10} and CO due to excessive wood smoke, the standards have not been exceeded for a number of years (See Figure 4.). A key factor, according to air quality experts, is public cooperation in pollution reduction programs.

Outdoor Burning Restrictions

Outdoor burning is not permitted within the City of Medford, and, in Jackson County, is permitted only when the *predicted afternoon ventilation index* is 400 or greater. From November 1 through February 28, all outdoor burning within the Medford-Ashland AQMA is prohibited. Special allowances have been made for agricultural burning to control diseases and pests. These allowances, mostly for orchard prunings, have been renewed annually as alternate disposal methods for pruned material are investigated. Further restrictions on outdoor burning occur during the fire season, resulting in outdoor burn "windows" in the AQMA outside of cities only in the spring and fall. The City of Medford also administers a fall leaf pick-up program throughout the city to reduce the need for fall burning.

Public Education

Educating the public about ways that individuals can help improve and maintain air quality in the Rogue Valley is one of the most effective means of improving air quality. Public education involves a mix of newspaper, radio, and television announcements and advertising, field and phone contacts, brochure distribution, and community and classroom presentations. The goal of these educational programs is to teach residents that continued compliance with air quality improvement programs is necessary, and that air quality continues to improve because of public cooperation.

Congestion Mitigation and Air Quality Improvement Program

The federal Congestion Mitigation and Air Quality Improvement (CMAQ) Program has provided considerable funding to jurisdictions within the Medford-Ashland AQMA for dust and motor vehicle emission reduction programs. More than $4.7 million was apportioned from the CMAQ program between 1992 and 1997. The City of Medford was allocated funds to pave alleys, install curbs, gutters, sidewalks, and bicycle lanes, and enhance street sweeping. Additional funds have extended the Bear Creek Greenway multi-use path, and aided in the construction of a park-n-ride lot and transit transfer station at the South Gateway Shopping Center for the Rogue Valley Transportation District (RVTD) and a compressed natural gas fueling station in Medford.

Traffic Signal Timing System

The City of Medford has implemented a computerized traffic signal control system designed to minimize overall delay for motorists. Inefficient traffic movement produces increased CO emissions from idling automobiles. As population and vehicle use increases, traffic control has become more critical in maintaining standards for CO. Main arterial streets are favored by the system, so that high traffic streets move vehicles more efficiently. Traffic studies are used to engineer changes within the system. The system has the capability of having "real time" traffic monitoring and dynamic traffic controls that change in response to demand in the future. One innovation in use in Medford, designed to minimize waiting times at signals, and, thereby, air emissions from idling vehicles, is the Protective/Permissive Left Turn Indicator. This feature allows motorists to make a *protected* left turn at intersections when the left arrow is green, and a *permissive* left turn when the light is green *and* oncoming traffic permits.

NATURAL RESOURCES - AIR QUALITY CONCLUSIONS

1. Medford's location in the Rogue Valley below substantial mountain ranges (the Cascades, the Siskiyous, and the Coast Range) increases the difficulty of maintaining federal air quality standards. Medford's climate is influenced by atmospheric inversion layers in the fall and winter months which trap air emissions in the valley.

2. The City of Medford has little influence on the air pollution emissions caused by travelers and freight shippers traveling through the planning area on state highways such as Interstate 5.

3. The Medford-Ashland Air Quality Maintenance Area (AQMA) is a "non-attainment area" for carbon monoxide (CO) and the Medford Urban Growth Boundary is a "non-attainment area" for particulate matter (PM_{10}).

4. While Medford's air quality has improved due to proactive Air Quality Maintenance Area (AQMA) programs and increased public awareness, particularly relating to wood smoke, the potential to revert to previous poor air quality conditions exists. The Rogue Valley's topography, its many motor vehicles, and continued population growth have the potential to further degrade Medford's air quality in the future.

5. The *State Implementation Plan* (SIP) for PM_{10} for the Medford-Ashland Air Quality Maintenance Area (AQMA) is being revised to meet the *National Ambient Air Quality Standards* (NAAQS), including new, stricter standards for particulate matter (PM_{10} and $PM_{2.5}$).

NATURAL RESOURCES - AIR QUALITY GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 3: To enhance the livability of Medford by achieving and maintaining compliance with National Ambient Air Quality Standards (NAAQS).

Policy 3-A: The City of Medford shall continue to provide leadership in developing, adopting, and implementing regional air quality improvement strategies to achieve compliance with the National Ambient Air Quality Standards (NAAQS).

Implementation 3-A (1): Continue to participate, along with state and local agencies involved in air quality attainment, in the preparation and implementation of the applicable *Air Quality Management Plans* (AQMP's) and *State Implementation Plans* (SIP's) for the Medford-Ashland Air Quality Maintenance Area (AQMA).

Implementation 3-A (2): Continue to participate, along with Jackson County and other affected agencies, in administering air quality public education and smoke reduction programs.

> **Implementation 3-A (3):** Implement strategies from sources such as the *Medford Transportation System Plan*, the *State Implementation Plan*s (SIPs) and the *Oregon Transportation Planning Rule* (TPR) that reduce emissions or improve air quality, such as increasing the use of alternative modes of transportation and use of alternative motor vehicle fuels, such as compressed natural gas and electricity, and propose amendments to the *Medford Land Development Code* for consideration by the City Council where necessary to assure compliance with such plans or rules.

See also the policies of the *Medford Transportation System Plan,* and Policy 9 of the "Urbanization Element."

Policy 3-B: The City of Medford shall continue to require a well-connected circulation system and promote other techniques that foster alternative modes of transportation, such as pedestrian-oriented mixed-use development and a linked bicycle transportation system.

See also Goal 1 of the *Southeast Plan* section of the "General Land Use Plan Element."

> **Implementation 3-B (1):** Promote the use of incentives by Medford's larger employers to induce employees to use alternative modes of transportation or work at home in an effort to reduce motor vehicle emissions.

WATER QUALITY

FEDERAL AND STATE REGULATIONS

Oregon's Department of Environmental Quality (DEQ) has primary responsibility for managing water quality in the state, operating under federal and state statutes, rules, and standards. Generally, DEQ implements its water quality program through the issuance of permits for discharge into the *waters of the state*. Permits are issued if an applicant can show consistency with federal rules, and state and river basin water quality management plans. Statutory language governing water quality in Oregon is found primarily in ORS Chapter 468 and OAR 340-41-001.

Forestry, agriculture, and urbanization have negatively affected Oregon's water quality. Under the federal *Water Pollution Control Act of 1972*, each state is required to address farm and forestry-related nonpoint sources of surface water pollution, such as sedimentation, stream clogging debris, nitrogen from fertilizers and slash burning, and herbicides and insecticides.[13] Guidelines and best management practices for controlling water pollution from forestry are provided in the *Oregon Forest Practices Act* which is enforced by the Oregon Department of Forestry. While there are no forest lands within the Medford UGB, the surrounding forest lands affect the quality of the surface water in the valley below.

The effects of urbanization on stormwater runoff are addressed by the federal *National Pollutant Discharge Elimination System* (NPDES) program, which has implications for the City of Medford. Under the *Clean Water Act*, the federal Environmental Protection Agency (EPA) established NPDES Phase I stormwater discharge standards for municipalities with populations of 100,000 or more. The NPDES requirements included a prohibition on non-stormwater discharges and a reduction in polluted stormwater discharges to the maximum extent possible. New rules established in 1999, known as NPDES Phase II, affect cities smaller than 100,000 persons, such as Medford. This permit program is intended to provide flexibility for cities. The Phase II program must include:

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site storm water runoff control
- Post-construction storm water management
- Pollution prevention for municipal operations

In addition, operators of construction sites that disturb more than one acre will be required to obtain NPDES permits. They will be required to filter sediment caused by erosion through methods such as filter fencing, inlet protections, and temporary mulching and seeding. Medford will have until 2003 to develop programs and regulations to comply with the new rules.

[13] *Jackson County Comprehensive Plan*, Jackson County Planning Department, 1989.

GROUNDWATER

Historically, the main consideration given to groundwater in land use planning was to assure adequate water supplies. Since groundwater is an important source of water for many residential, industrial, and agricultural uses, recent concerns involve the increasing incidences of pollution and contamination. Medford is fortunate to have a substantial supply of domestic water from the Big Butte Springs, with the Rogue River as a secondary source, and, subsequently, does not use the groundwater beneath the city for domestic use. However, there are many households in the unincorporated areas in and near the UGB that depend on domestic wells. It is therefore important that the City of Medford strive to maintain the quality of the groundwater resource that lies beneath the UGB.

Figure 5

Primary Contributors to the Contamination of Ground Water

Landfills: Buried wastes discharge leachate, the composition of which varies with the composition of the landfill. Leachate can be heavy in organic compounds, such as methane and benzene, or in trace elements and other contaminants from industrial waste.

Agriculture: Fertilizers and pesticides, composed principally of nitrogen and phosphorus, are carried through the soil to aquifers, and pose serious health problems when found in water supplies.

Urban Stormwater: Runoff from developed areas, especially streets, parking lots, and industrial and residential surfaces, often contains a wide variety of contaminants. Most stormwater is discharged into streams, but a significant amount goes directly into the soil. This source of ground water contamination should be regarded as a potentially important one in Medford.

Drain Fields: Nitrogen, sodium, and chlorinated organic compounds from household or community sewage effluent can be discharged into ground water through septic tank drain fields.

Mining: Mineral extraction and related operations discharge a variety of contaminants into both surface and ground water.

Spills and Leakage: Underground leakage and spills of petroleum products, various organic compounds, fertilizers, metals, and acids are potential hazards from commercial and industrial uses.

Source: *Landscape Planning: Environmental Applications*

Groundwater is contained in aquifers, underground geologic formations made up of permeable rock material. Aquifers function like natural underground storage reservoirs, constantly adapting to surface and groundwater withdrawals, infiltration, and recharge. Ground water occupies complex three-dimensional spaces that operate with fluctuating levels. It percolates into different zones of saturation, which occur at varying depths within the same aquifer or geologic formation. Groundwater becomes recharged or replenished by infiltration of rain, snowmelt, and surface water, or by underground seepage from streams, lakes, or rivers. Unlike surface water that is visible, and its quality easily monitored, groundwater quality is far more elusive. Substances and materials at the surface or just below it can reduce the quality of an underlying aquifer through infiltration. Infiltrating water can dissolve and transport contaminants to the aquifer.

Certain land uses have the greatest potential for contaminating ground water:

- Industrial facilities, including manufacturing, fuel and chemical storage facilities, railroad yards; urban complexes, including highway systems, landfills, utility lines, and sewage treatment plants; and automotive repair facilities

- Agricultural operations, including crop cultivation, feedlots, chemical storage facilities, and processing plants

Other activities, such as grading, construction, use of motor vehicles and equipment, use of pesticides and herbicides, sewer system leakage, etc. must also be regulated to protect groundwater. **Figure 5** discusses the primary contributors to the contamination of groundwater.

The low base flows of local streams reflect a lack of large producing aquifers in the region. The primary aquifer present in the Bear Creek Valley is south of Medford, toward Talent and Ashland, located in the alluvial deposits found on the valley floor. This aquifer is recharged by precipitation that infiltrates the land surface. Other aquifers are found in the northern portion of the valley, in the North Medford/Agate Desert area, and along the southwest margin of the valley, in the Hornbrook geologic formation.

Medford, located on alluvium rock underlain with recent deposits of sand, gravel, clay, and bedrock, has a shallow water-bearing zone, averaging less than 50 feet. Generally, the more shallow the aquifer, the greater the risk of contamination of the groundwater supply. Groundwater in the Bear Creek Valley generally flows in a northerly direction, and, consequently, there is a risk of contamination of sources north of Medford, where residents rely on private wells. Rural development served by private wells poses additional problems, including lowering the water table in the region. As noted in the report, *Bear Creek Valley 2050 Water Supply Plan, Phase I*, there are more than 26,000 wells in Jackson County, serving between 40,000 and 50,000 people. Nearly all of these wells provide water for domestic needs, with few used for agricultural irrigation.

Groundwater resources are addressed by *Statewide Planning Goal 5*, which requires protection of *critical groundwater areas* and *ground water-limited areas*, as designated by the Oregon Water Resources Commission. In addition, the watershed for Medford's Big Butte Springs, which produce approximately 26.4 million gallons per day (MGD), is identified as a state-certified *Drinking Water Protection Area* by the Oregon Health Department.[14] For service areas with populations greater than 10,000, such as the Medford Water Commission's, a Drinking Water Protection Area is considered a significant Goal 5 resource. The Big Butte Springs, through the Medford Water Commission, provide domestic water for several communities, including Medford, Central Point, and Jacksonville.

The Big Butte Springs Drinking Water Protection Area is the land surface that overlies the recharge area for the springs plus the underlying aquifer. The watershed contains 56,000 acres located in Jackson County approximately 30 miles northeast of Medford, seven miles east of Butte Falls on the westerly slopes of Mount McLoughlin. It is primarily under federal ownership, with smaller portions owned by the Medford Water Commission and private timber companies. Although outside the Medford UGB, the Medford Water Commission and the City of Medford participate with Jackson County in protecting this significant resource. The Water Commission is developing a watershed management program and protection strategy to safeguard water quality, based on an inventory of potential contaminant sources and an analysis that determined susceptibility to those contaminants.

[14]The state-certified *Drinking Water Protection Area Program* was previously known as the *Wellhead Protection Program.*

SURFACE WATER POLLUTION

Planning for environmental quality in Medford is a regional issue, and any thorough plan for improving surface water quality must involve other communities. Many communities in the region use surface water as a domestic water source. The Rogue River is a source for communities such as Shady Cove, Gold Hill, Rogue River, and Grants Pass. The Medford Water Commission uses Rogue River water as a secondary source of domestic water through the Duff Water Treatment Plant located just upstream of Medford's Regional Water Reclamation Facility. This source is primarily utilized during the drier summer months**.**

Sources of surface water pollution are identified as either *point* or *nonpoint* sources. *Point* sources are characterized by a concentrated outfall such as treated municipal sewage or industrial process water. *Nonpoint* sources are diffused sources of water pollution that emanate from large areas, and enter streams via stormwater, precipitation, inter-system seepage, air pollution, or agricultural runoff. The City of Medford operates the Regional Water Reclamation Facility (sewage treatment plant) which discharges reclaimed wastewater (a *point* source) into the Rogue River from its facility near Table Rock Road. It is located downstream of the Duff Water Treatment Plant. In addition to the City of Medford, the RWRF serves a number of other cities and unincorporated areas, from Jacksonville to Eagle Point. The facility treated an average daily dry weather flow in 1997 of 16.7 million gallons per day (MGD). Some wastewater is reused for on-site landscape irrigation and for a pilot agricultural reuse project, which grows Poplar trees and plants for pulp fiber and lumber. The facility has conducted a DEQ-approved Industrial Waste Pretreatment Program since 1983. Sixteen significant industrial users discharge to the facility, eight of which have specific federal requirements as "categorical" industrial users. The facility also has had a DEQ-approved Biosolids (sludge) Management Plan and program since 1988, conducted according to federal and state regulations, including the NPDES. The biosolids are "beneficially used" through application on local farmland as crop nutrients.

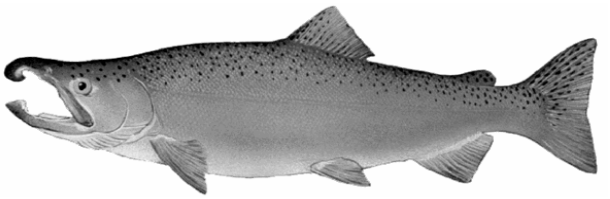
The magnitude of nonpoint pollution is more severe than scientists originally estimated, due to the size of the source areas, the many outfalls involved, and the sporadic nature of the flows. Consequently, nonpoint pollution does not lend itself to abatement using treatment or other conventional methods. Instead, nonpoint pollution abatement must be approached as an environmental management issue, focusing on the activities and conditions that produce the pollutants, and integrating long range planning strategies to develop solutions. The Oregon DEQ and DLCD have produced a guide entitled *Nonpoint Source Pollution Control Guidebook for Local Government*, June 1994, which provides an introduction to nonpoint pollution in a format designed for local planners, engineers, elected officials, citizens, etc.

One of the most serious impacts of urban development is the increase in the rate and amount of surface water runoff reaching streams and rivers.[15] As noted in the 1996 *Comprehensive Medford Area Drainage Master Plan, Volume II, Technical and Stormwater Management Appendices,* urban development, with its considerable impervious surfaces, modifies the natural runoff characteristics of a drainage system. Typically, peak flow, total flow, and flow velocity increases, resulting in less time to filter the runoff, and, therefore, reducing water quality. Untreated urban runoff contains pollution that subsequently flows into larger water bodies, continuing to pollute water downstream.

[15] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

Currently, Bear Creek and its tributaries in Medford (Larson, Lone Pine, Lazy, and Crooked Creeks) are considered *water quality limited* streams by the DEQ.[16] This designation is given to waters (primarily streams) in Oregon that do not meet established water quality standards, indicating a need for increased treatment of discharges.[17] Additionally, the temperature of Bear Creek at certain times of the year is too warm to meet requirements. One of the most significant sources of pollution in Bear Creek is the City of Ashland's municipal wastewater discharge.[18] In 1988, waterways upstream of the Medford UGB were studied by DEQ to assess water quality and the sources of nonpoint pollution (*Oregon Statewide Assessment of Nonpoint Sources of Water Pollution*). Waterways within the Bear Creek watershed considered *severely impaired* included portions of Wagner and Griffin Creeks. *Moderately impaired* waterways included Myer Creek, upper Wagner Creek, Coleman Creek, upper Griffin Creek, Willow Creek, Neil Creek, and the lower portion of Emigrant Creek.[19] Ashland Creek, a tributary of Bear Creek, is also considered *water quality limited*, because of ammonia and carbonaceous oxygen demand.

Since Bear Creek is a water quality limited stream, a *total daily maximum load* (TMDL) strategy has been developed to bring the Bear Creek basin into compliance with federal standards. The City of Medford is among the local agencies (designated management agencies - DMA's) contributing to the nonpoint source pollution of the Bear Creek basin. The Rogue Valley Council of Governments (RVCOG), through the Bear Creek Watershed Council, is facilitating the work of the DMA's to develop and implement a strategy to bring the basin into compliance with water quality standards. Groups such as the Bear Creek Watershed Education Partners and the Bear Creek Greenway Foundation are involving the public, including schools, in watershed education and cleanup programs to improve the quality of the region's waterways while educating the public about natural resources.



GOAL 5 AND THE *OREGON PLAN*

Statewide Planning Goal 5 provides another framework for improving water quality. Under the 1996 revisions to the OAR's that implement Goal 5, local governments are required to protect riparian corridors[20] and locally significant wetlands (defined later in the Wetlands section under

[16]Bear Creek violates standards for dissolved oxygen, fecal coliform, and phosphorus from its mouth through river mile 24, and violates standards for pH from its mouth through river mile 14.2.

[17]*Local Wetlands Inventory and Oregon Freshwater Assessment Method Analysis, City of Medford*, Brown and Caldwell and Woodward-Clyde Consultants, October 1995.

[18]*Comprehensive Medford Area Drainage Master Plan, Volume II*, Brown and Caldwell, September 1996.

[19]*Local Wetlands Inventory and Oregon Freshwater Assessment Method Analysis, City of Medford*, Brown and Caldwell and Woodward-Clyde Consultants, October 1995.

[20]A riparian corridor is a Goal 5 resource that includes the water area, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary. "Fish habitat" is those areas upon which certain fish depend to meet their requirements for spawning, rearing, food supply, and migration. "Riparian area" is the area adjacent to a river, lake, or stream of transition from an aquatic to a terrestrial ecosystem. Goal 5 states that, for waterways with an average annual flow of less than 1000 cubic feet per second (cfs), the setback requirement is 50 feet from top-of-bank, and, greater than 1000 cfs, the setback requirement is 75 feet from top-of-bank.

Determination of Significance) by adopting the requirements of a *safe harbor*, which prescribes certain protection standards, or by proceeding with an "ESEE" process. A safe harbor imposes certain development standards that ensure compliance with Goal 5 by a local jurisdiction, and does not require elaborate studies by the jurisdiction to justify the standards. It also reduces the risk or impact of litigation by involving the state. The ESEE process requires an in-depth analysis of the *economic, social, environmental, and energy* consequences of allowing, prohibiting, or limiting uses that conflict with each resource. The safe harbor for riparian corridors includes a structural setback requirement measured from the top of the bank along certain waterways, and a limitation on vegetation removal. The safe harbor for locally significant wetlands includes restrictions on grading, excavation, fill, and vegetation removal within the wetland area.

The changes in the Goal 5 rules aid in implementing salmon recovery measures on a local level and complement the provisions of the *Oregon Plan for Salmon and Watershed Restoration*. The Oregon Plan is the official local-state-federal program for restoring salmon and steelhead populations in Oregon's streams. Southern Oregon and Northern California are considered as having an "evolutionarily significant unit" of coho salmon, which were listed as *threatened* under the Endangered Species Act in 1997. Chinook salmon and steelhead have also been proposed for listing. The *Oregon Plan* was adopted by the 1997 Oregon legislature, and addresses both water quality and endangered species issues. Much of it focuses on local responsibility for the salmon recovery effort in order to retain state authority over management of Oregon's natural resources. As Medford implements the new Goal 5 rules, the water quality of Bear Creek and its tributaries will continue to improve, as will fish habitat.

STORM DRAINAGE

The use, management, and perception of open channel storm drainage systems within the urban environment changed considerably in the 1990s. Current views of stormwater planning, as noted in the *Drainage Master Plan*, advocate open systems that use mostly unaltered natural drainageways for conveying stormwater runoff, which can increase the potential for fish and wildlife habitat preservation. In addition, the vegetation in natural drainageways can filter pollutants from runoff. The quantity of pollutants removed varies with the type of vegetation. For example, herbaceous wetland plants are more effective in filtering and absorbing pollutants than woody vegetation. Woody shrubs and trees are more effective in bank stabilization than herbaceous plants, and therefore, more effective at preventing erosion.[21]

Storm drainage system improvements recommended by the *Drainage Master Plan* are intended to reduce the risk and associated costs of flooding, while aiding in water quality improvement. The document specifies the advantages of an innovative storm drainage system: *"Specific water quality facilities are not directly identified other than design of the detention ponds to perform a dual role: Flood protection and water quality treatment. However, a number of water quality treatment opportunities exist. Sedimentation facilities, vegetated swales, sand and compost filters, treatment wetlands, etc., can be added to the storm drainage system to improve water quality. Recently, stream bank restoration projects have been identified as having a significant water quality benefit. The city should start considering these types of facilities to meet future water quality objectives."*

[21] *Stormwater Related Natural Resources and Water Quality* Discharges, Draft Report, City of Eugene, Public Works Engineering Division, April 26, 1995.

Population density in a city or region affects the *per capita loading rate*, defined as the amount of stormwater pollution produced per person. The per capita loading rate proportionately decreases with higher residential densities. Large residential lots of one to two acres in size tend to be more damaging to water quality. This is because they typically have larger houses, more motor vehicles, and relatively large expanses of roads and drives, which increases the amount of water pollution on a per-person basis.[22]

Strategies to reduce and improve stormwater runoff should include preventive measures incorporated into site design. For example, impervious surface materials can be reduced, assigning priority to preservation of open space instead. Clustered development is one means of improving the ratio of impervious to permeable surface area, while incorporating natural features. Hillside areas are desirable for clustered development, to reduce the extensive grading and subsequent erosion that typically accompanies hillside development. Other examples of strategies to reduce impervious surface include the use of "Hollywood" driveways (those with two narrow strips of cement for vehicle wheels) in residential areas, and the use of structural setbacks along waterways. The use of on-site storm drainage detention basins is also an excellent means of improving stormwater quality.[23] For these reasons, Medford should promote clustered development that provides open spaces, and encourage on-site detention ponds, while continuing to discourage large lot development on the urban fringe.

The Conclusions and Goals, Policies, and Implementation Measures for the Natural Resources - Water Quality section are listed below in conjunction with those for the Wetlands and Wildlife Habitat sections.

[22] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

[23] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

WETLANDS

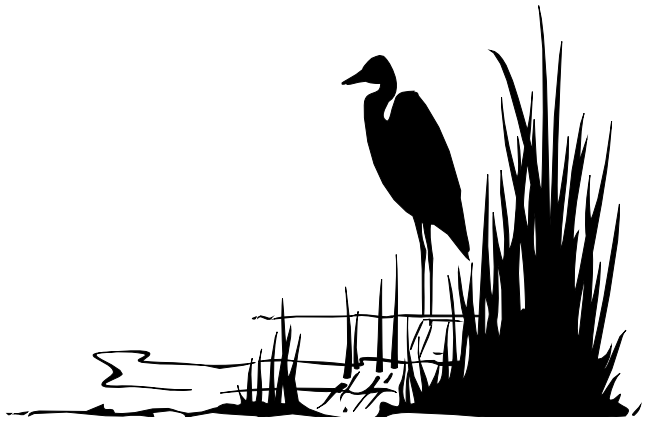
In the past, few standards regulated the planning, development, or preservation of wetlands in Oregon's urban areas. Further, variations from one locale to another across the state resulted in inconsistent policies for preservation or development. More recently, a renewed appreciation of wetlands has led to the development and enforcement of greater federal and state regulations to guide wetland planning in urban areas. There has been increased recognition of wetlands as:

- Important habitats necessary for the survival of many aquatic and terrestrial species
- Integral parts of the hydrologic system necessary for the maintenance of water supplies and water quality

FEDERAL AND STATE REGULATIONS

The principal federal law that regulates activities in wetlands is *Section 404* of the *Clean Water Act*. Section 404 restricts the discharge of wastes, including fill material, into the *waters of the United States*, which are broadly defined as coastal waters, rivers, streams, estuaries, and wetlands. The U.S. Army Corps of Engineers is responsible for administering Section 404. Wetlands are defined as "*those areas that are inundated or saturated with surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."*[24]

To be considered a *jurisdictional wetland*, or one regulated by *Clean Water Act* regulations, the wetland must contain wetland plants, hydric soils, and saturated or inundated substrate. Permits are required from the U.S. Army Corps of Engineers and the Oregon Division of State Lands (DSL) to fill or drain a jurisdictional wetland. If the activity cannot be justified, permits are not issued. If the activity is justified, the permits are likely to require *compensatory mitigation*, to replace the acreage and values of the wetland area lost.[25]



Planning efforts to satisfy federal and state wetland regulations are shifting to the local level. The Oregon Department of Land Conservation and Development (DLCD) has established the responsibilities that cities and counties have regarding wetlands under Goal 5. To comply with the wetlands requirements of Goal 5, local governments must conduct a Local Wetland Inventory (LWI) and adopt a "safe harbor" or similar ordinance that protects locally significant wetlands, and/or develop protections through an ESEE analysis process as described in the previous section.

[24] *Comprehensive Medford Area Drainage Master Plan*, September 1996.

[25] *West Eugene Wetlands Plan*, City of Eugene and Lane Council of Governments, December 1992.

In 1995, the City of Medford completed its first "*Local Wetlands Inventory (LWI) and Oregon Fresh Water Wetland Assessment Method Analysis*," which documented the presence, location and size of the wetlands in the UGB. The LWI and OFWAM analyses were updated and approved by DSL in 2002 (*Medford Local Wetland Inventory and Locally Significant Wetland Determinations*, 2002 by Wetland Consulting). See **Figure 6** for a general vicinity map of Medford area wetlands. The official LWI maps are available in the Medford Planning Department. A qualitative assessment of the wetlands was conducted according to the Oregon Freshwater Wetland Assessment Method (OFWAM)[26]. DSL is required to be notified of all applications to the City of Medford for development activities, including applications for plan authorizations, development permits, or building permits, and of development proposals by the City of Medford, that may affect any wetlands, streams, or waterways identified and/or mapped in the *Local Wetlands Inventory.*

The 2002 LWI inventoried and mapped 134 wetland sites in the UGB, and mapped, but did not inventory the waterways. The waterways were inventoried, mapped, and assessed in a separate process. See the *Medford Riparian Inventory and Assessment Bear Creek Tributaries*, 2002 by Wetland Consulting There was a total of 293 acres of wetlands inventoried, including created ponds in addition to the natural wetlands. *Palustrine forested* and *scrub-shrub* wetland plant communities are common along stream corridors, typically confined to a narrow strip along steep banked watercourses. Dominant tree species include black cottonwood, white alder, and Oregon ash. Understory shrubs include willow, choke cherry, wild rose, and snowberry. Himalayan blackberry vines, an invasive introduced species, often dominate understory areas, especially those that have been disturbed. The *palustrine emergent* wetlands are dominated by herbaceous plants such as cattails, rushes, sedges, and reed-canary grass in inundated areas, and teasel, tall fescue, buttercup, and velvet grass adjacent to the water.

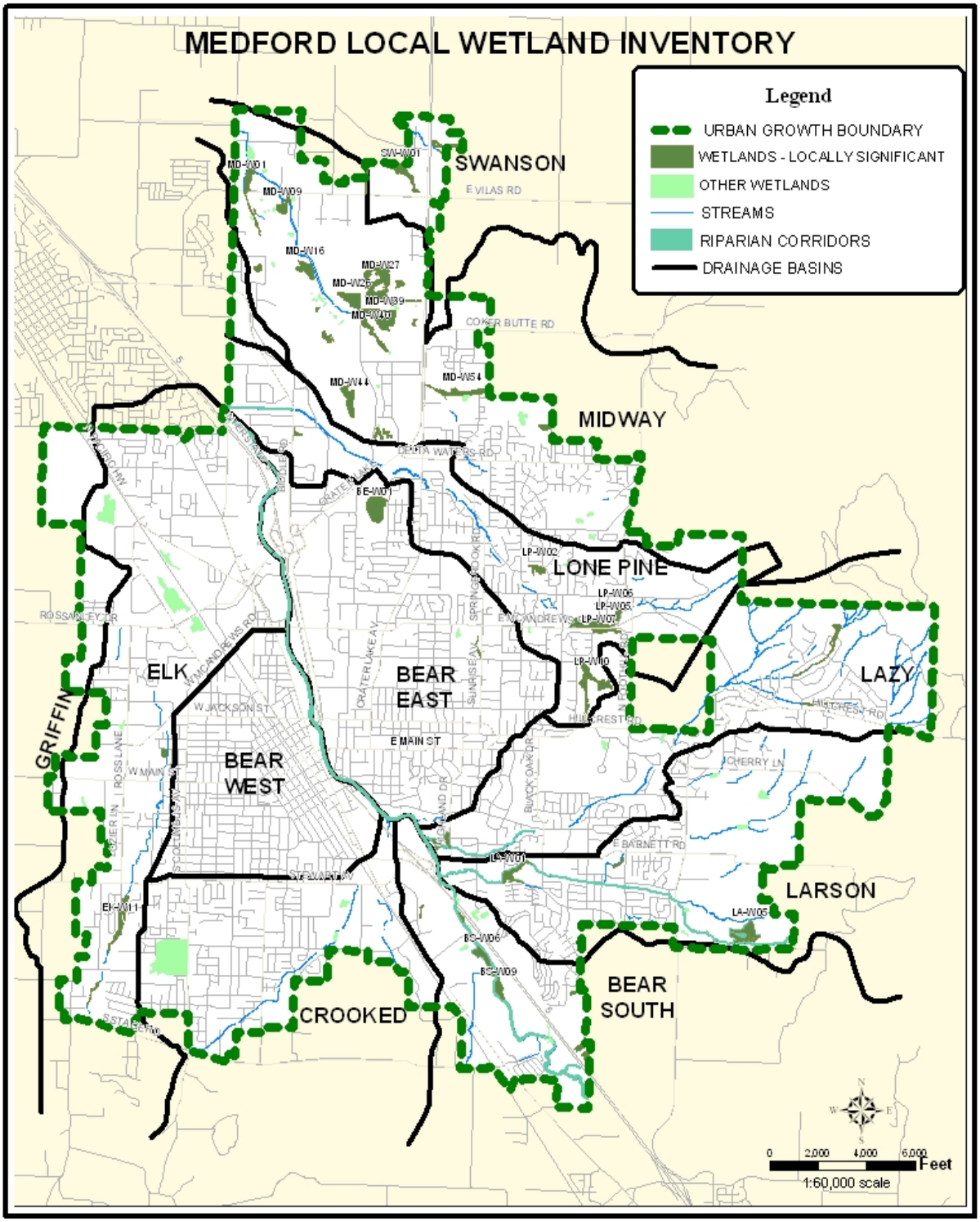
Vernal pools, which are rare rain-fed seasonal wetlands, have been found in the Agate Desert area north of the Medford UGB and in the northern portion of the UGB in and near the Airport in areas having Agate-Winslo soils. The hard pan underlying the soil restricts infiltration, causing prolonged inundation. An inventory and assessment of the vernal pools in the Agate Desert area was completed by DSL in 1997. Most historic vernal pools located within the Medford UGB have been severely altered or obliterated due to grading and vegetation alterations, although some may still be identified as wetlands.

Some threatened or endangered plant species are known to occur in conjunction with vernal pools in Jackson County, including Cooks (Agate Desert) lomatium and large-flowered wooly meadowfoam. Both are listed as Endangered Species by the state of Oregon and Candidate Species under the federal *Endangered Species Act*. Agate Desert lomatium (*loamtium cookii*), which is known to occur only in Jackson and Josephine Counties, has been identified on the grounds of the Rogue Valley International-Medford Airport, which is within the UGB.[27] The RVCOG is managing a cooperative effort, the Agate Desert Vernal Pools Project, initiated to develop a wetland conservation plan for the Agate Desert vernal pool area. Jackson County, the City of Medford, the Nature Conservancy, DSL, ODFW, the U.S. Army Corps, and the U.S. EPA are among the participating agencies.

[26] Statewide methodology used in the *Local Wetlands Inventory* for assessing and determining the significance of the wetlands in Medford.

[27] *Draft Environmental Assessment, Rogue Valley International-Medford Airport, Proposed Improvements*, March 1999, David Evans and Associates, Inc.

Figure 6: Medford Area Wetlands



The City of Medford owns property in the vicinity of the Water Reclamation Facility and Whetstone Creek, located outside the UGB near Antelope Road that contains vernal pools and other wetlands. Some of this land is potentially suitable as mitigation sites for wetland impacts caused by City infrastructure projects.

Determination of Local Significance

The LWI/OFWAM is a "first layer" planning tool for identifying the most valuable wetlands in the Medford UGB. OFWAM assessments of the wetlands are used in making a determination of *significance* according to state standards (OAR 141-86-350). In addition, other wetlands may be adopted by the City Council as *locally significant*. Using the OFWAM criteria, 45 of the inventoried wetlands in the Medford UGB were determined to be locally significant. . Nearly half are locally significant due to having a water quality function and being located within one-quarter mile of a "water quality limited stream". Several significant wetlands have direct surface water connections to Bear Creek and Larson Creek, which are habitat for "indigenous anadromous salmonids". See **Appendix C** for the inventory of locally significant wetlands.

Uses Conflicting with Wetland Protection

Occasionally, the protection of a locally significant wetland may conflict with other important community goals. After a sound ESEE analysis, the City Council may make a finding that a particular "conflicting use" is more important to the long term needs of the citizens than preservation of the wetland area. The most common conflicting uses have been critical links in the City's arterial and collector street system. In many cases, a street crossing can be accomplished without serious disruption of a wetland, such as along a riparian corridor. In other cases, fill and compensatory mitigation may be required if an alternative location is not available. The ESEE analysis will result in a determination that the identified conflicting use will be permitted, limited, or prohibited.

Wetland Mitigation

Under current federal and state laws, any wetland losses must be compensated through creation of new wetlands, restoration of former wetlands, and/or enhancement of existing wetlands. Mitigation efforts not only satisfy federal and state laws, but attempt to achieve a balance between competing land uses. The 1995 LWI recommended that *"an active land acquisition plan and schedule are required to acquire key locations for future wetlands mitigation. Without such a plan, many potential sites may be permanently lost."* A *Wetlands Mitigation Concept Plan* prepared for the City of Medford in 1996, presented methods for mitigating wetland losses. The 2002 LWI identified some potential mitigation sites within the UGB.

One means to achieve wetland preservation objectives is through the establishment of a regional wetland mitigation bank. Freshwater mitigation banking is addressed in the *Oregon Mitigation Bank Act of 1987*. Often, wetland loss compensation is conducted on a piecemeal basis as individual development projects are completed. As a result, many newly created wetlands are small, isolated, and of marginal value as wildlife habitat, a primary intent of wetland mitigation. In some circumstances, development is slowed by a lack of suitable wetland mitigation sites. As noted in the LWI, the most appropriate mitigation sites in the Medford UGB are those that are made up of dewatered hydric soils over five acres in size. They are often located near existing drainageways, including one in the undeveloped Southeast Medford area near Larson Creek, a primary tributary of Bear Creek, that could serve several functions, including water quality control and open space connections, possibly through the designation of conservation areas and greenways. The Bear Creek corridor is also being evaluated to determine if suitable mitigation sites are located along the waterway.

Refer to the *Wetlands Mitigation Concept Plan* for a more detailed description of the suggested wetland mitigation strategies.

WETLAND FUNCTIONS IN AN URBAN ENVIRONMENT

Wetlands in urban areas serve a variety of roles in achieving community needs and objectives, including the provision of educational and recreational opportunities. Locally significant wetlands are those that have been determined to serve one or more of the following functions: preservation/diversification of wildlife, maintenance of fish habitat, improvement of water quality, or hydrologic control.

The critical functions wetlands can provide within urban areas include, but are not limited to:

Stormwater Management

The use of open channels and wetlands in an integrated storm drainage system provides a better balance between stormwater conveyance and flood control needs, and environmental and community needs. The *Drainage Master Plan* recommends the development and implementation of a local wetlands management plan that incorporates flood control, water quality control, and principles of natural resource management. Such efforts, in the long term, will assist in reducing stormwater pollution, improving water quality, and creating pleasant urban open spaces and waterways.

Water Quality Improvements

Wetlands can contribute to the improvement of water quality. The vegetation in both natural and constructed wetlands functions as a biological filter in removing sediments, excessive nutrients, and other water pollutants from stormwater runoff resulting in cleaner surface water and improved aquatic habitat.

Improved Flood Control

Additional flood storage capacity can be gained by protecting existing wetlands, by creating new wetlands, and by widening and returning channels to their natural meandering patterns. Design conventions, such as widened channel bottoms, allow the resulting low flow channels to meander among wetlands, re-establishing the original stream bank habitat, and reducing the downstream impacts of stormwater runoff that originates in urban areas. Other flood storage improvements such as on-site detention ponds can provide multiple benefits, for example, provision of flood control, open space, and wildlife habitat.

Improved Plant and Animal Habitat

Greater protection of wildlife habitat is a priority of Goal 5, and wetland areas provide critical wildlife habitat. By protecting and restoring a variety of wetland types, and buffering them from the impacts of nearby development, diversity of habitats can be sustained and improved.

Recreation, Education, and Research

Trails, multi-use paths, and wildlife observation areas within a diverse system of wetlands and stream corridors can provide opportunities for public enjoyment of the natural environment. Wetland environments provide excellent opportunities for education and recreation, particularly if utilized by elementary and secondary schools. The completion of the Bear Creek Greenway from Ashland to Central Point and beyond is progressing, and encompasses many habitat types along Bear Creek, including wetlands. The Greenway is already used for educational purposes, combining classroom learning with field experience in environmental programs, such as those where students

adopt creek sections, plant trees, and release salmon fry. The Bear Creek Watershed Education Partners, a committee of the Bear Creek Watershed Council, is currently overseeing such programs.

Corridors and Connections

By providing greenways and open space along existing waterways and wetlands, a connected system could be established throughout the UGB, and ultimately linking communities in the Bear Creek Valley. Greenways provide corridors for wildlife movement and species interchange, as well as connections for human use. One example is the riparian corridor and proposed multi-use path along Larson Creek, which would connect the Southeast area with the Bear Creek Greenway.

WETLAND PROTECTION ORDINANCE

As noted above, to comply with Goal 5 requirements for wetland protection, specific regulations must be adopted in the Medford *Land Development Code*. Medford's proposed Wetland Protection ordinances would address locally significant wetlands and could address other wetlands. . In the case of some wetlands, a "safe harbor ordinance" may be adopted, which forbids disturbance of the wetland, but does not include buffer areas. In other cases, after the ESEE analysis is completed, ordinances that address permitting, limiting, or allowing conflicting uses would be adopted. These may include required buffers. When reviewing development permit or plan authorization applications for properties containing a Wetland Protection Area, the approving authority would consider how well the proposal satisfies the objectives of the ordinance. The objectives of Medford's proposed Wetland Protection Ordinance include:

- To implement the goals and policies of the "Environmental Element" of the Medford *Comprehensive Plan* and achieve their purposes.

- To protect and restore Medford's wetland areas, thereby protecting and restoring the hydrologic, ecologic, and land conservation functions these areas provide for the community.

- To protect fish and wildlife habitat, enhance water quality, control erosion and sedimentation, and reduce the effects of flooding.

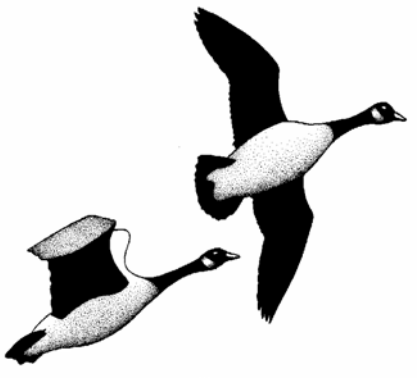
- To protect and restore the natural beauty and distinctive character of Medford's wetlands as community assets.

- To enhance the value of properties near wetlands by utilizing the wetland as a visual amenity.

- To enhance coordination among local, state, and federal agencies regarding development activities near wetlands.

The Conclusions and Goals, Policies, and Implementation Measures for the Natural Resources - Wetlands section are listed below in conjunction with those for the Water Quality and Wildlife Habitat sections.

WILDLIFE HABITAT



Statewide Planning Goal 5 emphasizes the importance of maintaining and improving Oregon's natural areas:

"This includes land and water that has substantially retained its natural character and land and water that, although altered in character, is important as habitat for plant, animal or marine life, for the study of its natural historical, scientific or paleontological features, or for the appreciation of its natural features."[28]

In OAR 660-16, *wildlife habitat* is defined as *"an area upon which wildlife depend in order to meet their requirements for food, water, shelter, and reproduction. Examples include wildlife migration corridors, big game winter range, and nesting and roosting sites."*[29]

FEDERAL AND STATE REGULATIONS

The federal *Endangered Species Act of 1973* prohibits any actions that would harm an endangered species. Such actions are called a "take," which is defined as *"to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect."* The definitions of harm and harass include taking any actions that would modify or degrade the habitat of the species if it significantly impairs or disrupts breeding, spawning, migrating, feeding, sheltering, etc. The *Oregon Endangered Species Act* (OESA), adopted in 1987, requires state agencies to develop programs for the management and protection of *endangered* species. It also requires state agencies to comply with adopted guidelines for *threatened* species. The OESA also covers some species that are not listed by the federal *Endangered Species Act*.

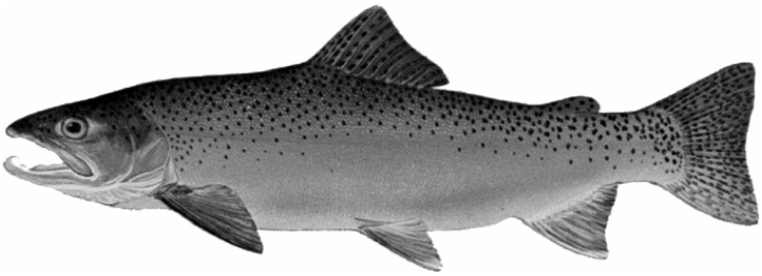
Local governments must utilize information from state and federal agencies, including the Oregon Department of Fish and Wildlife (ODFW), to inventory significant wildlife habitat under the prescribed Goal 5 process. Under the safe harbor provisions, a local government may determine that *significant* wildlife habitat occurs only under certain circumstances, and does not include fish habitat. (Fish habitat is addressed later under riparian corridor protections.) Jurisdictions are then required to develop plans to protect significant wildlife habitat. Significant wildlife habitat includes sites where the habitat performs a life support function or has more than incidental use by a wildlife species listed by the federal government as *threatened* or *endangered*, or by the state as *threatened*, *endangered,* or *sensitive*. It also includes documented nesting or roosting sites for osprey or great blue herons, and sites identified as habitat for a *wildlife species of concern* or *habitat of concern* by the ODFW. The Medford UGB has not been found to contain any of these types of wildlife habitats; however, should any be identified in the future, a protection plan will be formulated by the city.

[28] *Oregon's Statewide Planning Goals and Guidelines, 1995 Edition*, Oregon Department of Land Conservation and Development.

[29] *Oregon Administrative Rules*, 660-23-110, Oregon Department of Land Conservation and Development, September 1, 1996.

A wide variety of animal species exist in Medford's riparian, wetland, savanna (scattered trees and shrubs), grassland, and woodland environments. Agricultural and residential areas are also home to certain wildlife species. Southeast Medford contains some of the most natural stream, riparian, and wetland habitats within the city. Additionally, it has most of Medford's savanna, grassland, and woodland environments. Each of these habitats is significant to various species of mammals, fish, birds, reptiles, amphibians, and insects. The foothills above the Medford UGB provide habitat for black tailed deer, cougars, and coyote. While instream and wetland habitats are important, the dry land habitats, such as oak woodlands and open meadows, play an important role in the resident and transitory wildlife of the Bear Creek Valley. Through the various tributary streams, the surrounding forested uplands are connected to the Bear Creek riparian corridor, providing avenues for plant and animal dispersement and interchange.

An inventory of the wildlife in the Medford UGB and the types of habitat they are dependent upon is contained in **Appendix A.**



RIPARIAN CORRIDORS

A *riparian area* is defined as the area of transition from an aquatic ecosystem to a terrestrial ecosystem. A *riparian corridor* is the area within a boundary established along both sides of a waterway, including the riparian area and any associated wetlands. Goal 5 requires riparian corridor regulations to be applied to those waterways identified as being *fish-bearing streams*, and any other waterways having riparian areas determined to be significant. A fish-bearing stream is one inhabited anytime of the year by anadromous or game fish, or fish listed as *threatened* or *endangered* under federal or state *Endangered Species Acts*. According to ODFW, fish-bearing streams in the 2010 Medford Urban Growth Boundary (UGB) include Bear Creek, and portions of Elk Creek, Swanson Creek, Lone Pine Creek, Lazy Creek, Larson Creek, Gore Creek, and Crooked Creek. Due to their use by indigenous anadromous salmonids, these streams are considered "essential salmon habitat" by DSL. Medford's Riparian Corridor ordinance was adopted on June 1, 2000 to meet the requirements of Goal 5. See **Figure 7** for a map indicating the riparian corridors in the 2010 Medford UGB.

RIPARIAN INVENTORY AND ASSESSMENT: BEAR CREEK TRIBUTARIES

Medford completed an inventory of the tributaries to Bear Creek in the Medford UGB in June 2002. The purpose of the project was to inventory the riparian habitat along the streams and assess riparian area functions. The consultant assessed the function of the stream reaches for flood management, wildlife habitat, thermal (temperature) regulation, and water quality protection. A set of four drainage basin maps delineates the streams by "reach". Riparian reaches are segments of streams and adjacent riparian areas that have similar physical characteristics such as vegetation type, slope, geomorphic stream features (e.g., pool, riffle, or run), or land use. The riparian areas on the right and left sides of a stream are considered separate reaches. Land use changes, followed by changes in riparian vegetation, were the most common factors used to identify reaches. A minimum reach length of 300 feet was used.

The riparian function of each reach was assessed using Riparian Characterization Forms and Riparian Function Assessment Forms, which have multiple-choice questions related to its ability to provide flood management, wildlife habitat, thermal (temperature) regulation, and water quality protection. Each answer has an associated point score, and the total score for each of the four

functions indicates if the level for that reach is high (intact), medium (somewhat degraded) or low (severely degraded). A set of four function (flood management, wildlife habitat, thermal (temperature) regulation, and water quality protection) maps shows the level for each of the reaches. The document and maps are viewable or downloadable as a PDF from the City of Medford website.

BEAR CREEK

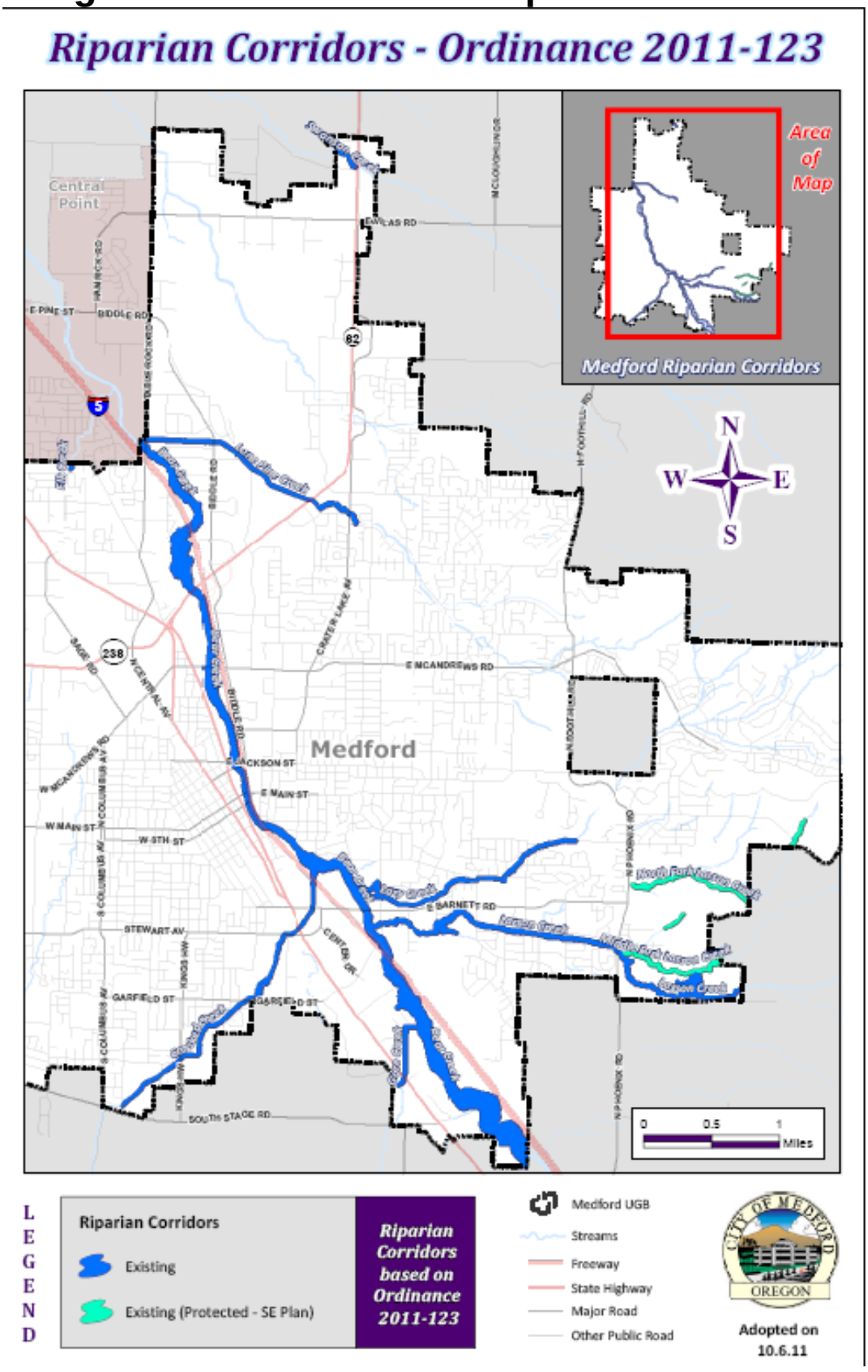
Bear Creek, which traverses north/south through the center of the Medford UGB, and its riparian areas provide a particularly valuable habitat for riparian mammals, reptiles, and amphibians, and a wide variety of migratory and resident bird species. Both anadromous and resident fish species are present in Bear Creek. However, the long range potential for preservation and maintenance of aquatic life is limited unless the water quality of Bear Creek is improved. Bear Creek, in the entire 2010 Medford UGB, is designated a Riparian Corridor. By implementing the provisions of Goal 5 for riparian corridors, fish populations found in Bear Creek, including winter and summer steelhead, Coho salmon, spring and fall Chinook salmon, cutthroat trout, and resident rainbow trout, will continue to improve. **Figure 8** suggests measures individuals and landowners can take to help improve instream salmon and habitats.

The Bear Creek Greenway, a linear park that also provides valuable habitat for wildlife, was first conceived in the 1960s. The ultimate goal of the Bear Creek Greenway Foundation is the completion of the Greenway from Ashland to the confluence with the Rogue River near Gold Hill. The multi-use path, which follows the creek within the Bear Creek Greenway, was designated as a National Scenic Trail in 1975, and is part of the Oregon Recreational Trail system. In the Medford area, the path, from South Stage Road to East Pine Street in Central Point near the Jackson County Expo (fairgrounds), is complete. Additional street and off-street segments extend it to Blackwell Road. With access points to the path at a number of majo30r arterial streets in Medford, the path serves as a primary means to travel by bicycle or foot in a north-south direction through central Medford.

The Bear Creek riparian corridor within the Medford UGB north of the new Interstate 5 South Interchange at Highland Avenue is highly developed to within 20 or 25 feet of the creek, but south of the interchange, contains significant wildlife habitat and is relatively undeveloped. Much of the corridor south of the interchange is in public ownership, including in the City's U.S. Cellular Community Park and several County-owned Greenway parcels.

* added for reference only, not to be included in Comprehensive Plan Amendment

Figure 7: Medford Area Riparian Corridors



Things You Can do to Help Restore Salmon Habitats

1) Plant native trees and shrubs along streams to help stabilize the banks and provide cooling shade for the water.

2) Use fencing to keep livestock from damaging stream banks.

3) Avoid operating heavy equipment in streams, which can ruin spawning beds, create sediment problems, and cause other long-term damage.

4) Limit impacts on waterways to only those essential to your operation. Consult with necessary agencies before you act. Oregon and federal laws prohibit diking, channelizing, and water diversions without a permit, and provide a clear set of operational guidelines. Dredging or removing material from rivers is also tightly regulated. **You may not place any artificial structure in a stream or river that blocks fish passage.**

5) Check with DEQ about responsible runoff management at your site. Construction can cause serious sediment problems, even well away from a waterway, if stormwater is not properly contained. State law requires larger earth-disturbing developments to go through a permitting process. While smaller operations may not need permits, they can still have impacts.

6) If you must use a septic tank, be sure it is properly designed, located, and well maintained. Poorly performing septic tanks can contaminate groundwater and nearby streams.

7) Dispose of household chemicals, such as used motor oil, antifreeze, pesticides, paints, etc., at approved collection facilities in your area. Call your local DEQ office for your disposal options.

Source: Oregon Department of Environmental Quality

LARSON CREEK

The Larson Creek stream system is another significant stream system within the UGB that has the potential to become a showcase anadromous fish-bearing stream system. Although needing enhancement, it still has the potential to return to a properly functioning condition. Many of the branches and tributaries of Larson Creek are intermittent streams that run low or under gravel during the summer months. Those that are not intermittent may be supplemented by irrigation return flows. Although impacted by urban development, the section of the creek between Bear Creek and North Phoenix Road contains some important riparian areas and wetlands, and is suitable for enhancement and restoration activities. A multi-use path has been planned along this section of the creek since the 1970s, although only small sections between Black Oak Drive and Larson Creek Drive have been constructed.

The three forks of Larson Creek that traverse the Southeast Area were once all fish-bearing streams that provided steelhead spawning and rearing habitat. A Medford Irrigation District (MID) canal along North Phoenix Road intercepted each fork, reducing or preventing fish passage. An improvement project has reconnected the South Fork with the Middle Fork just east of North Phoenix Road, enhancing fish passage. The canal in this area has been piped. Larson Creek is designated a Riparian Corridor from Bear Creek to North Phoenix Road,. In addition, the South Fork is designated a Riparian Corridor from North Phoenix Road, east to the 2010 Medford UGB.

Recognizing that Southeast Medford is significant to the overall health of Larson Creek, the Southeast Plan of the "General Land Use Plan Element" and the Southeast (S-E) Overlay Zoning District, adopted in 1998, provide for a "Greenway" designation applied to all three forks of the creek. The overlay district provides a 50-foot structural setback in most segments and restrictions on activities within the setback area. Riparian and instream enhancement activities are encouraged. The vegetative cover is also encouraged to remain as close to natural conditions as possible. Healthy, lush vegetation provides not only cover from fish predation and regulation of water temperature, but

also habitat for food sources (insects), and reduces stress by limiting disturbance to the fish. Multi-use paths are planned along forks of the creek, and small segments have been constructed as of 2010.

RIPARIAN CORRIDOR ORDINANCE

As noted in the "Water Quality" section, to comply with Goal 5 requirements for riparian corridors, specific regulations must be adopted in the Medford *Land Development Code*.

Per the Medford *Land Development Code*, the purposes of establishing riparian corridors are:

1. To implement the goals and policies of the "Environmental Element" and the "Greenway" General Land Use Plan (GLUP) designation of the *Medford Comprehensive Plan* and achieve their purposes.
2. To protect and restore Medford's waterways and associated riparian areas, thereby protecting and restoring the hydrologic, ecologic, and land conservation functions these areas provide for the community.
3. To protect fish and wildlife habitat, enhance water quality, control erosion and sedimentation, and reduce the effects of flooding.
4. To protect and restore the natural beauty and distinctive character of Medford's waterways as community assets.
5. To provide a means for coordinating the implementation of the Bear Creek Greenway and other greenways or creek restoration projects within the City of Medford.
6. To enhance the value of properties near waterways by utilizing the riparian corridor as a visual amenity.
7. To enhance coordination among local, state, and federal agencies regarding development activities near waterways.

When reviewing development applications for properties containing a riparian corridor, the approving authority must consider how well the proposal satisfies these objectives. As required by Goal 5, the ordinance provides for a riparian corridor boundary of 50 feet, measured from the top-of-bank along both sides of waterways with an average annual flow of less than 1,000 cubic feet per second (cfs) and identified as being fish-bearing streams, or other waterways having riparian areas determined to be significant.

To sustain and enhance Medford's existing wildlife habitats, both aquatic and terrestrial, it is important to identify and designate areas as riparian corridors, greenways, wetlands, and other open space preserves. These areas will not only sustain wildlife habitat, but also satisfy the requirements for its protection as mandated by Goal 5. Preserving the existing natural corridors is critical to the preservation and enhancement of wildlife for several reasons. For terrestrial wildlife, particularly those species that require large home ranges, connecting corridors are an essential habitat element, as they permit access into areas that may be otherwise too small to use if isolated. For less transient species, corridors are important in the long-term as they allow movement between populations, providing for genetic exchange and more healthy individuals.

SWANSON CREEK

A small portion of the Swanson Creek drainage basin is within the 2010 Medford UGB. Swanson Creek, located north of Vilas Road, is a tributary to Whetstone Creek, and is perennial due to irrigation return flows. Swanson Creek is designated a Riparian Corridor from the 2010 Medford UGB, east 0.38 miles to Highway 62.

ELK CREEK

The Elk Creek drainage basin in the 2010 Medford UGB contains Elk Creek and a single remnant segment of an unnamed tributary. All reaches of the Elk Creek drainage basin are perennial due to irrigation return flows. All of the streams and riparian areas in the basin have been modified by human activity, including placement of long stream segments into underground pipes, stream channelization, removal of woody vegetation, residential, commercial and industrial development, haying, grazing and mowing for fire control. The lower 1.5 miles of Elk Creek are piped. Elk Creek is designated a Riparian Corridor from Beall Lane (the 2010 Medford UGB), south 0.05 miles.

LONE PINE CREEK

The Lone Pine drainage basin contains Lone Pine Creek, and a number of unnamed tributaries in the upper portion of the basin. The lower reaches are perennial due to irrigation return flows. The upper reaches are intermittent. There are several large wetland areas along stream segments in the middle portion of the basin. Almost all of the streams and riparian areas in the basin have been extensively modified by human activity including placement of long stream segments into underground pipes, stream channelization, placement of stream segments in concrete* channels, removal of woody vegetation, residential development, agricultural cropping, mowing for fire control and grazing. Lone Pine Creek is designated a Riparian Corridor from Bear Creek, east 1.38 miles to Highway 62.

LAZY CREEK

The Lazy Creek drainage basin contains Lazy Creek, and a number of unnamed tributaries in the upper portion of the basin. The lower reaches are perennial due to irrigation return flows. The upper reaches are intermittent. There are three large wetland areas directly above the confluence with Bear Creek. The wetlands appear to contain the original channel of Lazy Creek prior to the excavation of a new channel at some time in the past. Almost all of the streams and riparian areas in the lower reaches of the basin have been extensively modified by human activity including placement of long stream segments into underground pipes, stream channelization, placement of stream segments in concrete channels, removal of woody vegetation, residential development, golf course development, and mowing for fire control.

The upper reaches have not been as consistently modified by human activity as the lower reaches; however, a number of the upper reaches have had extensive modification due to the placement of stream segments into underground pipes, removal of woody vegetation and residential development. The highest reaches in the Lazy Creek drainage basin are in the least developed landscapes in the Medford UGB, and have been impacted only through grazing activity and construction of dirt roads.

These areas have relatively undisturbed stream channels and riparian areas with intact native Oregon White Oak savanna plant communities.

The stream channel is usually a willow-dominated wetland within a narrow gully. The banks of the gully have Oregon Ash and willow, and Oregon White Oak grow at the top of the bank. Lazy Creek from is designated a Riparian Corridor Bear Creek, east 1.94 miles.

GORE CREEK

Gore Creek is located in the Bear Creek South drainage basin. It is perennial due to irrigation return flows. It has been extensively channelized, and its riparian areas have been modified by construction of apartments, warehouses, parking lots, agricultural cropping and grazing. The lowest reach near Bear Creek, once containing black cottonwood, willow and Oregon Ash, has been rerouted. Gore Creek is designated a Riparian Corridor from Bear Creek, southwest 0.82 miles to the railroad tracks.

CROOKED CREEK

The Crooked Creek drainage basin contains Crooked Creek and a single tributary, Hansen Creek. All of the reaches are perennial due to irrigation return flows. All of the streams and riparian areas in the basin have been modified by human activity including placement of long stream segments into underground pipes, stream channelization, removal of woody vegetation, residential and industrial development, haying, golf course development, and mowing for fire control. The lower one half mile of both Crooked and Hansen Creeks are piped. Riparian areas in this basin have limited woody vegetation. Crooked Creek is designated a Riparian Corridor from Bear Creek, southwest approximately 2.24 miles to South Stage Road (the 2010 Medford UGB).

NATURAL RESOURCES
WATER QUALITY, WETLANDS, AND WILDLIFE HABITAT
CONCLUSIONS

1. While the groundwater beneath the valley floor is not the domestic water source for the Medford planning area, it is a regionally important natural resource primarily due to its use as a domestic water source for individual wells.

2. Bear Creek and its tributaries are critically important natural resources, yet suffer from poor water quality due to forest and agricultural practices and urban point and non-point discharges.

3. The poor water quality of Bear Creek and its tributaries is partially attributable to non-point pollution from diffuse sources, such as stormwater, agricultural runoff, and septic system seepage. Non-point pollution sources can significantly damage water quality, yet are more difficult to pinpoint and treat than conventional point sources of water pollution.

4. Natural resource cleanup programs involving local schools, clubs, and civic organizations, such as those sponsored by the Bear Creek Watershed Council, are excellent means to engage the public in environmental education. The presence of waterways such as Bear Creek and Larson Creek, and various wetlands in Medford provides a platform for such programs.

5. The City of Medford recognizes wetlands as valuable urban resources that can provide water quality maintenance, stormwater detention, wildlife habitat, and open space. Medford's 2002 Medford *Local Wetlands Inventory and Locally Significant Wetland Determinations* by Wetland Consulting identified and assessed most of the wetlands, in the Urban Growth Boundary. The 2002 *Medford Riparian Inventory and Assessment Bear Creek Tributaries* by Wetland Consulting inventoried and assessed the waterways that are tributary to Bear Creek.

6. Occasionally, the protection of a locally significant wetland (one that has been determined to have significant value according to state criteria) must be balanced against other important community goals. An exceptional "conflicting use" may be more important to the long-term needs of the citizens than preservation of the wetland area.

7. The Medford UGB has been evaluated for potential wetland mitigation sites. Wetland mitigation involves the restoration, enhancement, or creation of wetlands to compensate for permitted wetland losses elsewhere. Restoration and enhancement of existing wetlands is the wetland mitigation most likely to be successful in Medford due to its ecologic and climatic characteristics.

8. Although Bear Creek and the Bear Creek Greenway contain Medford's most valuable fish and wildlife habitat, fish and wildlife habitat exists elsewhere within the Urban Growth Boundary. As of June 8, 2005, portions of the following streams have been identified by ODFW as fish bearing streams, and should be protected per Statewide Planning Goal 5 (OAR 660-023) through the imposition of Riparian Corridor Regulation. These streams, or portions thereof, include: Bear, Elk, Swanson, Lone Pine, Lazy, Larson, Gore, and Crooked Creeks.

NATURAL RESOURCES
WATER QUALITY, WETLANDS AND, WILDLIFE HABITAT
GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 4: To preserve and protect Medford's ground water resources and recharge zones.

Policy 4-A: The City of Medford shall ensure the protection of the Big Butte Springs domestic water source working in cooperation with Jackson County.

> **Implementation 4-A (1):** Continue to undertake efforts to protect the Big Butte Springs recharge area from improper use through implementation of a watershed management program.

See also the policies of the *Domestic Water* section of the "Public Facilities Element."

Policy 4-B: The City of Medford shall protect ground water recharge areas in the planning area by striving to restore and maintain the natural condition of watersheds, waterways, and flood plains.

> **Implementation 4-B (1):** Review the *Medford Land Development Code,* and propose amendments where necessary to assure that the amount of impervious surface in development projects is minimized and opportunities for permeation are maximized.

See also the policies of the *Wastewater Collection* section of the "Public Facilities Element."

Goal 5: To achieve and maintain water quality in Medford's waterways.

See also the goals of the *Storm Water Drainage* section of the "Public Facilities Element" and related policies and implementation strategies.

Policy 5-A: The City of Medford shall implement regulations that pertain to discharges into the Rogue River, Bear Creek, and their tributaries, such as the federal *Clean Water Act*.

> **Implementation 5-A (1):** Continue to actively participate in regional water quality monitoring and planning efforts.

Policy 5-B: The City of Medford shall implement measures to reduce polluted surface water runoff into the storm drainage system.

> **Implementation 5-B (1):** Implement the recommendations of the 1996 *Comprehensive Medford Area Drainage Master Plan,* or any updates, regarding surface water runoff quality.

> **Implementation 5-B (2):** Develop and impose design standards for filtering and slowing runoff from paved areas using such methods as vegetated swales, on-site detention ponds, or other technologies as they become feasible, to cleanse the water before entering primary waterways.

Implementation 5-B (3): Require the use of natural waterways for storm drainage wherever possible, to decrease flow speed and increase filtering prior to the runoff entering a primary waterway.

Implementation 5-B (4): Continue to assess storm drainage system development charges and utility fees to assist in the financing and maintenance of public storm drainage improvements, and periodically review for adequacy.

See also Implementation 2-B (2) of the Southeast Plan section of the "General Land Use Plan Element."

Goal 6: To recognize Medford's waterways and wetlands as essential components of the urban landscape that improve water quality, sustain wildlife habitat, and provide open space.

Policy 6-A: The City of Medford shall regulate land use activities and public improvements that could adversely impact waterways in the interest of preserving and enhancing such natural features to improve water quality and fish and wildlife habitat.

Implementation 6-A (1): Prepare amendments to the Medford *Land Development Code* for consideration by the City Council that adopt the riparian corridor "safe harbor" setback (50 feet from the top of the bank) for Bear Creek and other streams determined to contain fish habitat or significant riparian areas in compliance with Oregon Administrative Rules 660-23.

Policy 6-B: The City of Medford shall regulate land use activities and public improvements that could prevent meeting the federal performance standard of *no net loss* of wetland acreage.

Implementation 6-B (1): Prepare amendments to the Medford *Land Development Code* for consideration by the City Council to adopt "safe harbor" protections or protection developed through an ESEE (environmental, social, economic, and energy) analysis for locally significant wetlands, as defined, pursuant to Oregon Administrative Rules 660-23.

Policy 6-C: The City of Medford shall encourage the incorporation of waterways, wetlands, and natural features into site design and operation of development projects.

Implementation 6-C (1): Promote clustered development in order to avoid alteration of topographical and natural features, to reduce impervious surfaces, and to enhance the aesthetics of development projects. Investigate incentives for clustering development.

Policy 6-D: The City of Medford shall support the efforts of organizations such as the Bear Creek Watershed Council and the Bear Creek Greenway Foundation, which strive to improve the quality of Bear Creek and its tributaries with activities such as greenway formation, environmental education workshops, creek cleanup events, etc.

See also Policies 2-A and 2-B of the *Southeast Plan* section of the "General Land Use Plan Element."

Goal 7: To preserve and protect plants and wildlife habitat in Medford.

Policy 7-A: The City of Medford shall encourage the conservation of plants and wildlife habitat, especially those that are sensitive, rare, declining, unique, or that represent valuable biological resources, through the appropriate management of parks and public and private open space.

> **Implementation 7-A (1):** Develop a long range open space plan for consideration by the City Council that provides for an integrated system of parks, creekside greenways, wetlands, and paths/trails in Medford to enhance the biological diversity and long-term viability of natural resource areas. Coordinate the plan with the *Medford Parks, Recreation, and Leisure Services Plan*, the *Comprehensive Medford Area Drainage Master Plan*, and other relevant plans.
>
> **Implementation 7-A (2):** Develop and implement regional plans for greenways, wetlands, and linear parks with Jackson County, as wildlife often travel paths that cross jurisdictional boundaries.
>
> **Implementation 7-A (3):** Distinguish public greenways, waterways, wetlands, and parks with interpretive and informational signage regarding on-site natural resources.

Policy 7-B: The City of Medford shall strive to maintain, rehabilitate, and enhance Medford's waterways, using features such as gently sloped banks, natural riparian vegetation, and meandering alignment.

> **Implementation 7-B (1):** For those riparian areas within the planning area that are not subject to the safe harbor regulations, prepare amendments to the Medford *Land Development Code* using the Medford *Riparian Area Inventory and Assessment Bear Creek Tributaries*, 2002, by Wetland Consulting for consideration by the City Council, that adopt a setback or similar protection**.**
>
> **Implementation 7-B (2):** Ensure that improvements, such as multi-use paths and storm drainage facilities sited in or near riparian corridors, waterways, wetlands, or other fish and wildlife habitat, include protective buffers, preserve natural vegetation, and comply with the requirements of Oregon Administrative Rules 660-23.

Policy 7-C: The City of Medford shall strive to protect fish and wildlife habitat in accordance with Oregon Department of Fish and Wildlife's (ODFW) management plans.

SOILS

SOIL SURVEYS

Soil surveys, conducted by the U.S. Soil Conservation Service (SCS), are the most widely used sources of soil information. Surveys provide soil descriptions, soil distribution maps, and various data and guidelines on soil uses and limitations on a county-wide basis. In the past, soil mapping focused on suitability for crops, but has more recently taken a role in planning and architecture, focusing on the suitability of soils for roads and buildings. Understanding varying physical properties of soils, particularly composition, texture, and permeability, is important not only in siting facilities, but also in designing stormwater systems, and in determining long term soil stability.

SOIL CHARACTERISTICS

The soil characteristics in an area are critical in determining the nature of appropriate land development. The major features or properties used to describe soils are *composition* and *texture*. These properties can be used to determine permeability, bearing capacity, erodibility, and slope stability. The materials that make up soil (*composition*) are mineral particles, organic matter, water, and air. The relative amounts of the various mineral particles (clay, silt, sand, gravel) determine the soil *texture*.

The ability of the soil to move water downward is usually referred to as permeability, infiltration capacity, or percolation. Soils within the Medford UGB range from SCS Class B (moderate infiltration) to Class D (low infiltration). They range from deep, moderately-permeable soils in lower elevations (the most permeable soils are found near Bear Creek), to shallow soils of low permeability at intermediate elevations, and exposed bedrock (least permeable) in the foothills.[31] The latter, especially when combined with steep slopes, is prone to high stormwater runoff rates, an important factor to consider with the trend toward increased hillside development.

Soil permeability, bearing capacity, shrink/swell potential, erodibility, and stability are critical properties when making decisions regarding development. Given thorough consideration of the soils in the Medford UGB, most types of urban development can occur in most locations. In some areas, however, structural alterations are necessary to balance poor soil. In other areas, especially where development is anticipated to place heavy loads on the soil, excavation of the existing topsoil and replacement with more stable, compactible material is required. Construction techniques and materials must be suited to the type of soil to limit the potential for damage to structures. A foundation analysis conducted by a registered engineer is required by the City of Medford for projects on *expansive soils* to determine if corrective measures are necessary before construction. Highly expansive soils can cause structural damage to foundations and roads, and are less suited for development, primarily because they absorb water and swell, then shrink during drying.

[31] *Comprehensive Medford Area Drainage Master Plan, Volume II, Technical and Stormwater Management Appendices, Brown and Caldwell,* September, 1996.

AGRICULTURAL SOILS

Goal 3 of the *Statewide Planning Goals*, "Agricultural Lands," promotes the preservation and maintenance of agricultural lands, stating, *"Agricultural lands shall be preserved and maintained for farm use, consistent with existing and future needs for agricultural products, forest and open space and with the state's agricultural land use policy."*[32] It suggests that urban development be separated from agricultural lands by buffers or transitional areas of open space. To alleviate some problems inherent to having agricultural uses adjacent to urban development (vandalism, noise, dust, overspray), the City of Medford adopted an agricultural buffering ordinance in the 1980s.

Consideration of soil fertility, grazing suitability, climatic conditions, existing and future availability of irrigation water, land-use patterns, technological and energy inputs required, and accepted farming practices are criteria for classifying soils suited for agriculture.[33] In western Oregon, agricultural lands, as classified by the SCS Soil Capability Classification System, are predominantly Classes I - VI, considered suitable for farm use. Agricultural lands are ranked by Goal 3, with Class I soils assigned the highest priority for preservation, and Class VI the lowest. The City of Medford took an "exception" to Goal 3, and was permitted to include some agricultural lands within the UGB for urban development in 1990. One agricultural area, however, the 240-acre Hillcrest Orchard, was left out of Medford's UGB in 1990, and is completely surrounded by land inside the UGB.

According to a 1993 *Mail Tribune* series on growth in the Rogue Valley, urbanization has historically been the most critical factor affecting agriculture in the region.[34] Growth often infers utilizing prime agricultural land; however, Medford's future growth is being directed to the east, where the agricultural capability is lower, conserving the more fertile land to the west for agriculture. In the "Urbanization Element" of the Medford *Comprehensive Plan*, both the city and Jackson County acknowledge that protecting agricultural soils outside the UGB is an important priority, not only on a local level, but on a statewide level, and policies to maintain and buffer these lands have been adopted by both jurisdictions.

HILLSIDE DEVELOPMENT AND EROSION

Figure 9, *Slope Map for the Medford Area*, adapted from a geological hazard map prepared by the Oregon Department of Geology and Mineral Industries (DOGAMI) in 1977, illustrates the varying degrees of slope within the Medford UGB. Overall, west Medford is relatively flat, with slopes of 0 to 5%. Slopes increase toward the east to more than 15%, and become steeper into the foothills, where slopes of 30 to 50% or greater exist. The maximum slope advisable for urban development is usually less than 25%.[35]

[32] *Oregon's Statewide Planning Goals and Guidelines*, 5th Edition, Oregon Department of Land Conservation and Development, September 1, 1996.

[33] Ibid.

[34] "Growth's pains for farmers", *The Mail Tribune*, December 19, 1993.

[35] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

Figure 9
Slope Map for the Medford Area

Given a choice of sites on which to live, many people prefer hillier terrain with open views. While level or gently sloping sites are usually necessary for most industrial and commercial uses, hillsides in or near urban areas are popular for residential development. Hillside development is typically more expensive than development on level ground. The preparation of a site, grading for streets, and provision of sewer and water service is all more costly, as is the actual building construction. The costly nature of hillside development has serious implications in producing neighborhoods of mixed housing types and income levels. Additionally, emergency response situations, such as firefighting, are more difficult on steeper grades.

Slopes altered to suit urban development can also result in difficulties due to (1) the placement of structures and facilities on slopes that are already unstable, or (2) the disturbance of stable slopes, resulting in failure, accelerated erosion, and ecological deterioration of the slope environment.[36] Often, hillside soils consist of expansive clay and are characterized by instability. Landslides and soil erosion from development are particularly common in areas where the soils have low *shear resistance*, or the inability to withstand downward movement. Unstable ground exists in areas of east Medford south of Prescott Park on the slopes of Roxy Ann Peak, which was caused by earthflow or landslides that occurred before recorded history. Expansive clay soils, averaging four to five feet in depth, exist in this area, and extend toward the valley floor. In some areas where there has been earthflow or downslope "creep," the clay can be more than 20 feet in depth. The shrink-swell area, affected by fluctuations in moisture content, can extend up to eight feet beneath the surface.[37] As noted above, since expansive soil can cause structural damage to foundations, a foundation analysis is required for construction in this area.

Besides creating difficulties in structure, road, and utility construction, and in establishing a connected street system, hillside development can have profound effects on the quality of stormwater runoff. Urban development, particularly activities such as land clearing, deforestation, and the use of impervious materials, increases the rate of runoff and produces difficulties with maintaining or improving water quality.[38] **Figure 10** describes strategies to minimize erosion and environmental degradation in hillside development. The City of Medford regulates erosion through development permit and inspection processes. Prior to development, a drainage grading plan depicting existing and proposed drainage conditions must be prepared. In addition, the *National Pollutant Discharge Elimination System* (NPDES) permitting process implemented by the Oregon Department of Environmental Quality (DEQ) requires stormwater permits and erosion control plans for all construction sites of one acre or larger.

Soil erosion can result in land surface and stream bank deterioration, and the eroded materials can clog pipes, culverts, channels, ponds, and other drainage structures. If these factors ultimately reduce capacity, flooding can result. Additionally, *sediment loading* in receiving streams increases the turbidity, negatively impacting fish and other aquatic life.[39] Erosion and the effects of

[36] Ibid.

[37] *Geologic Hazards of the Roxy Ann Butte/East Medford Area*, Ferrero Geologic, Ashland, Oregon, 1995.

[38] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

[39] *Comprehensive Medford Area Drainage Master Plan*, Brown and Caldwell, September 1996.

Figure 10

Critical Questions for Planning Residential, Industrial, and Commercial Projects to Minimize Soil Erosion and Environmental Degradation

1) What percentage of the site exceeds 15% slope, and, of this area, how much is proposed for development? If developed, what percentage will be affected by construction?

2) What percentage of the site is forested or grassy, or shrub covered, and what percentage of ground cover will be destroyed as a result of the development?

3) What is the minimum distance between the proposed development zone, water features (wetlands, streams, ponds), and existing drainage facilities (storm sewers, stormwater retention ponds, and streams)?

4) What are the proposed erosion and sedimentation control measures for the construction and operational phases of the proposed project?

5) What is the anticipated length of the construction period, and which months of the year are proposed for land clearing, excavation and grading, construction of building and facilities, and landscaping? How does the proposed construction period relate to the seasonal pattern of rainfall, especially the heaviest months?

Source: *Landscape Planning: Environmental Applications*

development on soils are important planning issues, and land use regulations should strive to minimize the negative consequences and potential environmental degradation. The *Comprehensive Medford Area Drainage Master Plan* discusses management techniques for soil erosion and enforcement of drainage system standards. It suggests that the City develop an erosion control guidance document for new development.

Vegetation is critical in controlling soil erosion, particularly on steep slopes. Urban development often leads to removal of natural vegetation, leaving slopes exposed and more susceptible to stormwater runoff and erosion, and more visually barren. Vegetation interrupts raindrops, reducing their force as they hit the soil surface, and roots bind with soil particles, increasing the soil's resistance to the force of running water. Density of vegetation is probably the most important aspect of mitigating soil erosion. The heavier the vegetated cover, the lower the risk of soil loss to runoff.[40]

Specific design and construction techniques can be employed to lessen the impacts of developing on hillsides, such as:

- Adherence to the grading provisions of the *Uniform Building Code* for cuts and fills
- Construction of roads parallel to, rather than perpendicular to contour lines
- Retention of vegetative cover
- Designation of potential landslide areas for low intensity uses
- Use of house plans designed for hillsides

[40] *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

NATURAL RESOURCES - SOILS
CONCLUSIONS

1. Medford is located on Class I through IV soil capability types, with the best agricultural soil to the west of the Urban Growth Boundary. Consequently, Medford's growth is being directed to the east of the city, where greater slopes exist.

2. While the soils characteristic to Medford lend themselves to most types of development, the hillside development trend is increasing soil erosion potential, which can result in polluted runoff and decreased water quality.

3. Unstable ground exists in some areas of east Medford on the slopes of Roxy Ann Peak. Expansive clay soils exist in this area, which can cause structural damage to foundations if not properly constructed.

NATURAL RESOURCES - SOILS
GOALS, POLICIES, AND IMPLEMENTATION MEASURES

See also Policy 12 of the "Urbanization Element."

Goal 8: To minimize erosion and hazards relating to slope and soil characteristics by assuring that urban land use activities in Medford are planned, located, and conducted consistently with prevailing soil limitations.

Policy 8-A: The City of Medford shall guide new development, particularly within the foothills, by the soil characteristics and natural features of the landscape, and shall grant development permits only after a determination that potential problems relating to soil limitations, if any, have been identified, and will be adequately mitigated prior to development.

> **Implementation 8-A (1):** Continue to actively enforce the provisions of the *Uniform Building Code* (UBC), or adopted equivalent, relating to construction on soils requiring special construction techniques.
>
> **Implementation 8-A (2):** Prepare a hillside development ordinance for consideration by the City Council that requires subdivision and site design to be compatible with, and complementary to, sloping sites, and that preserves appropriate hillside open space and viewsheds.
>
> See also Implementation 2-B (3) of the Southeast Plan section of the "General Land Use Plan Element."

Policy 8-B: The City of Medford shall implement measures to minimize erosion and its resulting water pollution.

Implementation 8-B (1): Pursuant to the recommendations of the 1996 *Comprehensive Medford Area Drainage Master Plan*, publish erosion control guidelines in a manual that explains specific objectives to be achieved to aid developers and city staff. The manual should recommend erosion controls applicable to Medford's topography, soil types, and climate.

Implementation 8-B (2): Review the *Medford Municipal Code*, and propose amendments where necessary to assure that the effects of erosion from development activities on waterways and wetlands are mitigated. Require the use of "best management practices" in site design, grading, and erosion control.

Implementation 8-B (3): In foothill developments, require streets and utilities to be located along existing topographic contours wherever possible, and require streets and parking facilities to be kept at the minimum size necessary, to minimize erosion resulting from development activities, and to prevent sediment from entering the storm drainage system.

Goal 9: To assure that future urban growth in Medford occurs in a compact manner that minimizes the consumption of land, including class I through IV agricultural land.

Policy 9-A: The City of Medford shall target public investments to reinforce a compact urban form.

Policy 9-B: The City of Medford shall strive to protect significant resource lands, including agricultural land, from urban expansion.

See also Policy 12 of the "Urbanization Element."

ENERGY

The primary purpose of this section is to incorporate the significance of energy consumption and the fundamental principles of energy conservation into Medford's planning efforts. It is the intent to show that both the long and short-term benefits of energy conservation, and the use of renewable energy sources, are timely and cost-effective. Almost every aspect of land development affects energy-efficiency, from minute architectural details to broad considerations of urban density.

In 1976, *Goal 13: Energy Conservation* was added to the *Statewide Planning Goals*. This goal states: *"Land, and uses developed on the land, will be managed and controlled so as to maximize the conservation of all forms of energy, based on sound economic principles."* In addition, the *Oregon Municipal Policy Governing Energy* states *"Cities must provide leadership through the adoption of local laws that encourage energy conservation and the use of alternative, and renewable, resources."*

The League of Oregon Cities suggests that a city's land use policies:

- Encourage clustering of housing and services to avoid unnecessary travel
- Encourage energy efficiency by the vigorous enforcement of up-to-date building codes
- Encourage the use of waste heat recovery from industry
- Encourage the use of solar energy by guaranteeing solar access through appropriate ordinances

Further, the League recommends that *"Cities should develop planning and decision-making processes that relate energy to employment, the environment, urban conservation, and other public priorities."*[41]

TRADITIONAL ENERGY SOURCES

Medford, like most cities with limited planning areas, is an energy consumer. Although Medford-specific energy consumption data is not available, it can be assumed that the trends and distributions cited for the state are indicative of energy issues in Medford. About 40% of the energy Oregonians use is for transportation, 35% for industry, 15% for household use, and 10% for commercial, institutional, and other uses. Oil supplies half the energy used in Oregon, although Oregon has no oil resources or refineries. Electricity accounts for more than 20% of total energy used in Oregon; natural gas, less than 20%; and wood and other fuels supply 10%. For residential uses, transportation comprises more than half the energy used by a household, and space/water heating over one-third. The remaining residential energy use is through activities such as refrigeration, cooking, lighting, clothes drying, etc.

[41] *Report to the League Legislative Committee, Proposed Amendments*, League of Oregon Cities, September, 1996.

Electricity

In 1995, Oregonians used 45.7 billion kilowatt-hours of electricity. Industry and households each accounted for about 35% of the electricity, and commercial, institutional, and other uses utilized 30%. The electrical power system in Oregon is part of the Bonneville Power Administration's (BPA) regional network. More than half of Oregon's electricity is supplied by the Columbia River hydroelectric power system. Another one-third comes from coal-fired plants; 8% from gas-fired plants, and 3% from a nuclear power plant (Hanford). The BPA serves Oregon's 36 customer-owned and three investor-owned electric utilities. Investor-owned Portland General Electric and Pacific Power provide about 70% of the electricity that utilities supply in Oregon. In Jackson County, Pacific Power is the primary supplier of electricity.

A comprehensive review of the northwest energy system was undertaken in 1996, and recommendations from the review are expected to produce changes in the structure of the region's electrical power industry. New federal and state legislation will most likely follow. Once characterized as a monopoly, the emerging system, which will allow customers to choose their power supplier, will be more competitive, decentralized, and less price regulated. The intent of the review was to allow the northwest to shape the transition of the electrical power industry to assure that the region's natural resources are protected, that costs and benefits of a more competitive marketplace are distributed with greater equity, and that an adequate, efficient, economical, and reliable power system is maintained. In 1998, Portland General Electric and Pacific Power conducted pilot programs to learn how the mechanics of restructuring would work. Some customers were able to choose their supplier based on factors such as price and the environmental impacts of the electricity sources.

Natural Gas

More than 1.3 billion therms of natural gas were used in Oregon in 1995, with about 65% used by manufacturers, 30% used for home water and space heating, and 5% used by commercial, institutional, and other users, primarily for space and water heating. Natural gas in Medford is provided by Avista, one of the three natural gas utilities serving Oregon. Propane and butane, also natural gases, are distributed locally through a variety of independent outlets.

Compressed natural gas (CNG) is being utilized in the Rogue Valley as a cleaner burning alternative for motor vehicles. As noted in the Air Quality section, the Rogue Valley Transportation District operates much of its fleet of buses on CNG, and operates a CNG fueling station in Medford. Other agencies, such as Jackson County are acquiring fleet vehicles that operate on CNG.

Petroleum

Petroleum is available in many forms, including residual oil, distillate oil, gasoline, and diesel fuel. These petroleum products are not supplied by utilities, but through a multitude of private companies, distributors, and retail outlets. Residual oil is used primarily for large-scale commercial and industrial space and hot water heating, and for industrial process heat. Distillate oil is also used primarily for heat generation, though usually for smaller applications such as residential space heating. Gasoline and diesel fuel are used almost exclusively for vehicular purposes, mostly for street and highway transportation.

Of the various petroleum types, gasoline is by far the most heavily relied-upon fuel source, with private transportation consuming the greatest percentage. More than 80% of the oil used in Oregon is for transportation. The rest is used in manufacturing, agriculture, and for space heating. In 1995, Oregonians used more than 2.7 billion gallons of oil products, including gasoline, liquefied

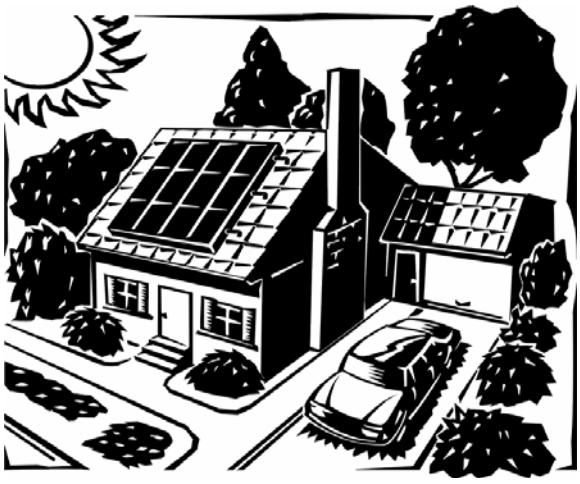
petroleum gases, kerosene and jet fuels. Gasoline accounted for more than half the oil use, which increased 18% between 1985 and 1995, similar to population growth.

ALTERNATIVE ENERGY SOURCES

Consumption of most types of energy, especially petroleum, has created numerous environmental problems in the United States and internationally. The oil crisis of the late 1970s brought alternative energy sources, such as solar, into the mainstream. In the 1980s, however, cheap energy costs and an abundant supply of fossil fuels placed alternative forms of energy on the back burner. Today, the options afforded by alternative energy sources have come to the forefront again, as the safety of nuclear energy is questioned, and the use of coal and petroleum is attributed to air pollution and global warming.

Often, conservation is the most readily available alternative to an increasing dependency on nonrenewable energy, and is one of the major ways to protect the environment. Since 1978, energy savings in Oregon have resulted from a variety of conservation efforts, including requiring energy standards for new buildings and providing state income tax credits, loans, and rebates for energy efficiency improvements. Conservation has also occurred in manufacturing processes and equipment, lighting and heating for schools and governmental agencies, transportation alternatives for commuters, more efficient home appliances, and home weatherization.

In addition to conservation, the City of Medford has several potential sources of renewable energy, including solar and convertible waste. Cogeneration, including waste to energy production, is an area of potential growth. Local wastes that can and are being used for cogeneration purposes include wood slash, agricultural, residential yard, and other biomass wastes. Historically, the reliance on burning wood for space heating purposes was a common practice in Medford and the Rogue Valley. More stringent air quality control measures and the increased use of natural gas and electricity for space heating have significantly reduced reliance on wood heating.



Solar Energy

The potential for solar energy use in Oregon is excellent, according to a study by the U.S. Department of Energy. *"Solar energy in Oregon cannot completely replace other fuels for space and/or water heating, but solar systems, both active and passive, can economically provide between 25 and 75 percent of space and/or water heating needs for many homes."*[42] Southern Oregon, from Grants Pass to the California border, and particularly Medford, has been identified as having among the best solar energy attributes of any area in the Pacific Northwest. Although Medford has a reputation for being prone to fog, climatological data suggests that the total number of foggy days in Medford represents only 14% of the year. The state offers a tax credit for homeowners and renters who install solar energy systems for space or water heating.

[42] *Jackson County Comprehensive Plan*, Jackson County Planning Department, 1989.

Wind Energy Generation

Oregon contains areas with significant wind energy generation potential, such as coastal and mountainous areas, where the winds are particularly strong and constant. Studies have shown that with today's technology, a network of wind turbine generators in the state could have a capacity of nearly three times that of Oregon's decommissioned Trojan Nuclear Plant, but at a lower cost. The newest wind generation facility, in Umatilla County, produces up to 24.9 megawatts. Medford's location in the broad floor of an inland valley results in virtually no wind turbine generation potential; however, there are other locations in Jackson County that may be suited to wind energy generation.

Convertible Waste Energy

Jackson County, like the Pacific Northwest, is well-endowed with substantial quantities of convertible wastes from several sources, including forestry, agriculture, municipal sewage, and solid waste. One example of a convertible waste facility in Jackson County is Biomass One, a White City business that produces electricity from wood waste - a clean, viable alternative to traditional waste disposal methods, such as landfills or open burning. Biomass One has a 25-megawatt, woodwaste-fired cogeneration plant that annually converts 355,000 tons of wood waste into steam and electricity. Most clean wood (free of dirt, rock, and metal) or wood-based waste material is accepted. The steam is sold locally for drying lumber and veneer, and the electricity is sold to Pacific Power for distribution to customers in the Rogue Valley. Biomass One produces enough power to satisfy the needs of more than 20,000 homes in the Rogue Valley. Lumber mills, although no longer as plentiful in Medford as they once were, also commonly utilize wood waste for producing energy.

Another example of a local facility that produces energy from waste is Medford's Regional Water Reclamation Facility, which uses cogeneration to generate electricity from waste methane gas. Landfills, such as the regional Dry Creek Landfill located northeast of the Medford UGB, have the potential for similar cogeneration facilities using methane.

ENERGY-EFFICIENT DEVELOPMENT PRACTICES

Land development regulations can promote energy conservation at the community level. Energy-efficient development techniques are wide-ranging in scope, cost, and effectiveness. Passive solar orientation, for example, is a relatively simple, low cost way to reduce the heating and cooling needs of a new building. Utilizing building insulation practices, such as outlined in the Oregon Energy Code, significantly improves the thermal efficiency of structures. Other options are more complex to design and implement, such as using mixed-use development to reduce the number and length of automobile trips.

In addition, reliance on wood products as the primary material in residential construction maintains dependency on a forest products industry that is becoming less able to meet demand, resulting in increased construction costs and reduced home affordability. Over-reliance on wood products may damage remaining forests, including siltation and pollution of streams and rivers, loss of fish and wildlife habitats, and reduced recreation potential. To address these issues, the conservation of this resource through the use of alternative building materials, consistent with safe construction practices, should be encouraged.

Below is a brief overview of development practices that save energy and address the requirements of State Planning Goal 13.

Reducing Heating and Cooling Needs

The energy required to heat and cool buildings is determined in part by the amount of insulation, and the design of buildings and sites with respect to the climate. Sun, cold winds, warm breezes, vegetation, and topography affect a building's heating and cooling needs, and can be utilized to reduce such needs. The orientation and arrangement of buildings with respect to the sun and wind, and the use of landscaping are examples of actions that can be taken to moderate climate extremes, create a more comfortable living environment, and save energy.

Some options for reducing heating and cooling needs are:

Natural Solar Heating

- Design developments so that buildings are oriented to the path of the sun. This includes designing streets to run from east to west; the long axis of lots to run from north to south; and the long axis of buildings to run from east to west.

- Develop south-facing slopes. South-facing slopes are warmer in winter than slopes facing other directions.

- Facilitate the use of solar energy systems by assuring that access to sunlight is protected. The arrangement and height of structures and vegetation affects the location of shadows that may block sunlight to solar collectors.

Natural Cooling

- Use landscaping to shade buildings, parking lots, streets, and other paved areas. This prevents overheating of buildings in summer, and lowers summer air temperatures near the pavement.

- Design developments to take advantage of cooling breezes. The placement of vegetation and the arrangement of buildings can channel breezes through buildings. This is especially effective in areas subject to high summer air temperatures such as Medford.

Wind Protection

- Use windbreaks (trees, hedges, fences, earthworks) to protect buildings from winter winds. Windbreaks reduce the infiltration of cold air into buildings.

- Arrange buildings so that they protect one another from the wind. Often such an arrangement is compatible with taking advantage of summer breezes, in that winter and summer wind directions differ.

Building Insulation

- Increase a building's thermal efficiency through use of proven insulation methods.

Reducing Private Automobile Transportation Needs

The amount of energy used to move people and goods in a community is determined in large part by patterns of development. *"The spatial relationships of individual buildings and entire neighborhoods - their density and the degree to which different kinds of uses are integrated -*

determine in part how far and by what means people travel."[43] Compact development with a mixture of different land uses, where goods, services, jobs, residences, and recreation are closer together, reduces travel needs and increases the feasibility of public transportation.

Some means to reduce automobile transportation needs are:

Density

- Develop and re-develop at increased densities, especially near activity centers, public transportation, and in areas with existing sewer, water, and street capacity.

- Use clustering to shorten distances within developments.

- Develop vacant parcels that are located within existing development (urban infill).

Integrating Uses

- Combine different types of land uses within developments and neighborhoods.

- Develop multiple-use buildings. Large complexes with residential, lodging, entertainment, office, and commercial uses under one roof are an example. This can also be done on a smaller scale - an apartment building with a few shops, for example.

- Provide convenience shopping and service facilities in residential neighborhoods. Convenience stores in residential areas provide an alternative to driving long distances for minor purchases.

Bicycling - Walking - Public Transit

- Provide facilities that encourage bicycling and walking. Walkways, landscaping, and other amenities can encourage people to walk or bicycle.

- Locate higher density residential development near existing public transportation. Provide amenities and facilities that encourage public transportation use, such as shelters for waiting and walkway connections from residential areas.

[43] *Energy-conserving Development Regulations: Current Practices*, Report Number 352, American Planning Association, August, 1980.

NATURAL RESOURCES - ENERGY CONCLUSIONS

1. Medford is an energy consumer rather than an energy producer, utilizing primarily imported, nonrenewable energy sources, with the greatest share used for transportation.

2. Conservation is the most readily available and cost effective alternative to the increasing dependency on non-renewable energy sources.

3. Of the possible local sources of renewable energy, solar energy has the greatest potential for supplying a portion of Medford's energy needs, particularly residential needs, because it is cost effective and locally abundant.

4. Other renewable energy sources in the region include cogeneration from convertible waste, such as woodwaste and methane, which produce electricity and steam. The City of Medford's Regional Water Reclamation Facility produces electricity from methane gas.

5. The City of Medford requires new construction to comply with standards set forth in the Oregon Energy Code.

NATURAL RESOURCES - ENERGY GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 10: To assure that urban land use activities are planned, located, and constructed in a manner that maximizes energy efficiency.

Policy 10-A: The City of Medford shall plan and approve growth and development with consideration to energy efficient patterns of development, utilizing existing capital infrastructure whenever possible, and incorporating compact and urban centered growth concepts.

> **Implementation 10-A (1):** Ensure that the extension of urban services is consistent with policies contained in the "Public Facilities Element" of the Medford *Comprehensive Plan* regarding energy efficiency.
>
> **Implementation 10-A (2):** Develop a design manual showing examples of energy conservation in subdivision planning, site layout, landscaping and building design.
>
> **Implementation 10-A (3):** Provide examples for developers to follow which reduce motor vehicle transportation needs by using mixed uses, urban infill projects, etc.

Policy 10-B: The City of Medford shall encourage energy conservation, including the adoption and implementation of programs leading to improved weatherization/insulation of new and existing structures.

> **Implementation 10-B (1):** Continue to participate in residential and non-residential weatherization programs.

Policy 10-C: The City of Medford shall encourage the use of energy efficient building materials and techniques in new public and private construction and remodeling, in accordance with building safety standards.

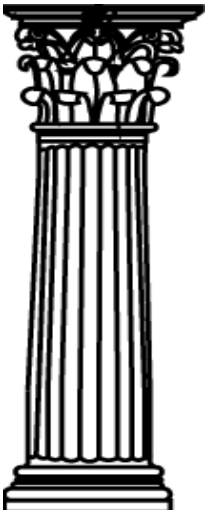
Policy 10-D: The City of Medford shall encourage the use of solar energy, recognizing it as a viable alternative to traditional energy sources.

> **Implementation 10-D (1):** Develop for consideration by the City Council, amendments to the *Land Development Code* that require consideration of passive solar energy techniques in subdivision design, including house orientation, street and lot layout, vegetation and protection of solar access.

Policy 10-E: The City of Medford shall strive to make all city facilities and operations as energy efficient as possible.

> **Implementation 10-E (1):** Continue to utilize opportunities for cogeneration technology in public facilities.
>
> **Implementation 10-E (2):** Investigate the conversion of the city-owned vehicle fleet to use alternative fuel sources such as compressed natural gas and electricity.

ARCHAEOLOGICAL AND HISTORIC RESOURCES



This section of the "Environmental Element" discusses Medford's archaeological and historic resources, and presents the pertinent Conclusions and Goals, Policies, and Implementation Measures.

In addition to natural resources, archaeological and historic resources are required to be addressed and inventoried in comprehensive plans by Goal 5 of the *Statewide Planning Goals*. State law defines *archaeological areas* as those *"characterized with evidence of an ethnic, religious, or social group with distinctive traits, beliefs, and social forms"*; and defines *historic areas* as *"lands with sites, structures, and objects that have local, regional, statewide, or national historical significance."* An example of a historic resource with national significance located in the Medford area is the Applegate Trail, which was an alternate route along the Oregon Trail that brought 45,000 emigrants to Oregon in the 1800s. The Applegate Trail is designated as a National Historic Trail.

A strong commitment to archaeological and historic preservation exists at the federal, state, county, and local levels. In Oregon Revised Statute 358.605, the state legislature makes the following findings:

"The Legislative Assembly declares that the cultural heritage of Oregon is one of the state's most valuable and important assets; that the public has an interest in the preservation and management of all antiquities, historic and prehistoric ruins, sites, structures, objects, districts, buildings, and similar places, and things, for their scientific and historic information, and cultural and economic value; and that the neglect, desecration, and destruction of cultural sites, structures, places, and objects results in an irreplaceable loss to the public.

The Legislative Assembly finds that the preservation and rehabilitation of historic resources are important as a prime attraction for all visitors; that they help attract new industry by being an influence in business relocation decisions; and that rehabilitation projects are labor intensive, with subsequent benefits of payroll and energy savings, and are important to the revitalization of deteriorating neighborhoods and downtowns.

It is, therefore, the purpose of this state to identify, foster, encourage, and develop the preservation, management, and enhancement of structures, sites, and objects of cultural significance within the state in a manner conforming with, but not limited by, the provisions of the National Historic Preservation Act of 1966."

PREHISTORIC RESOURCES

While there is a high probability that prehistoric resources exist within the Medford Urban Growth Boundary (UGB), little is known about their exact locations. Historically, the lower Bear Creek Valley was inhabited by the Upland Takelma Native American Tribe. Prehistoric resources are likely to be found near Bear Creek, above the normal winter flood levels. This area has been somewhat protected from disturbance due to the city's Riparian Corridor Ordinance district and Jackson County's Bear Creek Greenway. Much of the Bear Creek Greenway is already in public ownership,

particularly outside the city's core. The little archaeological survey work completed in the Medford UGB is primarily the result of public facility and road construction. Most identified prehistoric sites in the general vicinity are located outside the UGB.

ARCHAEOLOGICAL ISSUES IN DEVELOPMENT

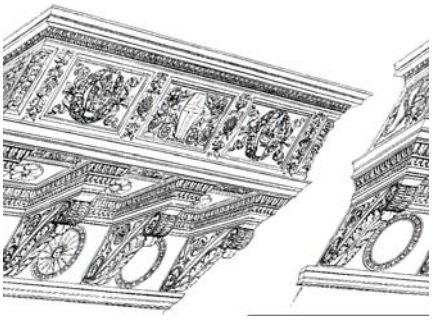
Since available information indicates the existence of archaeological resources, but is currently inadequate to identify the location, quality, or quantity of the resources, the inventory of such resources required by Goal 5 can be postponed. According to Goal 5, however, the City must express its intent, through plan policies, to address such resources in the future, including a time-frame for this review. Special implementing measures are not appropriate nor required until adequate information is available to enable review and adoption of such measures.

Development of land in the Medford UGB could disturb surface or subsurface archaeological resources. Pursuant to Oregon state law, a person may not knowingly and intentionally excavate, injure, destroy, or alter a prehistoric site or object, or remove an archaeological object from private lands, unless that activity is authorized by a state permit. State guidelines strongly recommend that those considering development on previously undisturbed private lands contact the Oregon State Historic Preservation Office (SHPO) and the appropriate Native American tribes to determine whether archaeological sites and/or objects are likely to be present. This contact reduces the chance that a project will be delayed due to discovery of archaeological resources. Before excavating a known site or removing objects, a person is required to satisfy the state archaeological permit process. The requirements differ slightly if the actions are to occur on public rather than private land.

For development on private land, permits are **not** required for the following:

- For exploratory excavation to determine the presence of an archaeological site;
- For those persons who unintentionally discover an archaeological object exposed by the forces of nature, and who retain the object for personal use, except sacred objects, human remains, funerary objects, or objects of cultural patrimony; and,
- For collecting of an arrowhead from the surface of private land, if collecting can be accomplished without the use of any tool.

In state law, an archaeological site is defined as a *"geographic locality that contains archaeological objects and the contextual associations of those objects with each other, or with biotic or geological remains or deposits."* Examples of archaeological sites include shipwrecks, lithic quarries, house pit villages, camps, burials, lithic scatters, homesteads, and town sites. An archaeological object or artifact is defined as an *"object that is at least 75 years old, comprises the physical record of an indigenous or other culture, and is the material remains of past human life or activity that has archaeological significance."* Examples of archaeological objects include monuments, symbols, tools, facilities, technological by-products, and dietary by-products. Excavation is defined as *"breaking the ground surface to remove any artifact, or to remove an embedded artifact, feature or non-artifactual material in an archaeological site for the purposes of anthropological research."*



HISTORIC RESOURCES

The archaeological record is a continuum that includes materials from prehistoric and historic times. There are many potential historic archaeological sites within the Medford UGB. Under Goal 5 and its implementing Oregon Administrative Rules, OAR 660-23-200, comprehensive plans must foster and encourage the preservation, management, and enhancement of significant historic resources. State law requires the city to designate "significant" historic resources, and protect them through local review of proposed exterior alterations and demolitions. Such regulation must occur through adopted land use ordinances. Historic resources can be buildings, structures, objects, districts, or sites. Designation is a decision by the city declaring that a historic resource is significant. A historic resource listed on the National Register of Historic Places (National Register) or located within a National Register historic district is considered to have "statewide significance." The city must protect historic resources having statewide significance whether or not they have been officially "designated" by the city. In addition, the state, counties, cities, school districts, and other governmental units owning historic resources are required to conserve such resources, and assure that they are not inadvertently transferred, sold, substantially altered, or allowed to deteriorate. Many of Medford's significant historic resources are under such public ownership.

FEDERAL AND STATE HISTORIC PRESERVATION PROGRAMS

Listing on the National Register of Historic Places honors properties significant in local, state, or national history. The Oregon SHPO manages the nomination process, and, although anyone can submit a nomination, properties cannot be listed without the consent of the owner. In the case of historic districts, if a majority of owners object, the nomination will not proceed. The SHPO also provides technical assistance and advice on matters concerning prehistoric and historic resources regardless of their designation status. The SHPO administers several tax incentive programs that are available to National Register properties. Within historic districts, all properties deemed to contribute to the historic character of the district are potentially eligible for these benefits.

One program, the Special Assessment of Historic Property, offers a fifteen-year "freeze" of the assessed value of a property if interior and exterior rehabilitation meeting certain standards occurs. See **Figure 11** for the state policy regarding Special Assessments. Fully depreciable properties, generally commercial properties and residential properties in which the owner does not reside, are eligible for a second fifteen-year term if seismic reinforcement, energy code, or Americans with Disabilities Act (ADA) compliance measures that respect the historic character of the building are undertaken.

Properties with special assessments must be open for public viewing one day each year, and they must display a plaque identifying the property as historic and receiving a public benefit. The Medford City Council reviews applications for the special assessment program relative to the public benefit, and makes recommendations to the SHPO. In 1997, 49 historic properties in the City of Medford were participants in this program. A second incentive program, the Federal Historic Rehabilitation Tax Credit, is available only to fully depreciable buildings. It offers an income tax credit equal to 20 % of the cost of qualifying rehabilitation work over a five-year period.

HISTORIC PRESERVATION ORDINANCE

The City of Medford acknowledged the importance of historic preservation by adopting a Historic Preservation Ordinance in 1986. The ordinance created a Historic Preservation Overlay, and provided for Historic Review of proposed exterior alterations and demolitions in designated historic areas by a Historic Commission.

Special Historic Assessments

O.R.S. 358.475 Policy

The Legislative Assembly hereby declares that it is in the best interest of the state to maintain, preserve and rehabilitate properties of Oregon historical significance. Special assessment provides public benefit by encouraging preservation and appropriate rehabilitation of significant historic properties. These historically significant portions of the built environment contain the visual and intellectual record of our irreplaceable cultural heritage. They link us with our past traditions and values, establish standards and perspectives for measuring our present achievements and set goals for future accomplishments. To the extent that Oregon's special assessment program encourages the preservation and appropriate rehabilitation of significant historical property, it creates a positive partnership between the public good and private property that promotes economic development; tourism; energy and resource conservation; neighborhood, downtown and rural revitalization; efficient use of public infrastructure; and civic pride in our shared historical and cultural foundations.

The purposes of Medford's Historic Preservation Overlay are to:

- Affect and accomplish the protection, enhancement, perpetuation, and improvement of such buildings, structures, objects, sites, and districts that represent elements of Medford's cultural, social, economic, political, or architectural history;
- Safeguard Medford's historic, aesthetic, and cultural heritage as embodied in such buildings, structures, objects, sites, and districts;
- Complement the *National Historic Preservation Act* and *National Register of Historic Places* designations;
- Stabilize and improve property values of such buildings, structures, objects, sites, and districts;
- Foster civic pride in the beauty and noble accomplishments of the past;
- Protect and enhance Medford's visitor and tourist attractions, and support and stimulate business and industry;
- Promote the use of such buildings, structures, objects, sites, and districts for the education, pleasure, and public welfare of the residents of Medford;
- Further the provisions of *Statewide Planning Goal 5*; and,
- Implement and supplement the *Medford Comprehensive Plan*.

The primary duties of the Medford Historic Commission are to:

- Review and investigate any historic resources in the City of Medford that may have historic significance, and initiate proceedings and consider applications to adopt or remove Historic Preservation Overlays.

- Consider proposed exterior alteration and/or new construction within Historic Preservation Overlays.

- Consider proposed demolitions or relocations within Historic Preservation Overlays, and authorize either delayed or immediate issuance of a demolition or relocation permit.

- Study proposed *Comprehensive Plan* and *Land Development Code* amendments relating to historic preservation, and submit recommendations regarding such proposals to the Planning Commission and City Council.

- Institute and support programs and projects that further the historic policies of the City of Medford.

HISTORIC DESIGNATION

Many of the significant historic resources within the city (the "1-A" inventory) were placed within the Historic Preservation Overlay early in 1987. These properties are on the National Register, and most are also under the special assessment program. A number of additional properties were approved by the City Council in 1995 for designation. A list of "potentially significant" historic resources in the city (the "1-B" inventory) was compiled in 1982 by a subcommittee of the Citizens Planning Advisory Committee (CPAC). The 1-B resources required additional evaluation to determine significance. In 1995, some of the 1-B resources were also approved for designation. An inventory of Medford's historic resources is contained in **Appendix B**.

Changes to state law in 1995 required that property owners be permitted to refuse local designation as a significant historic resource anytime before adoption by the local decision-making body, and be permitted to remove their property from local designation. A revised Historic Preservation Ordinance for the City of Medford is proposed to address the changes in state law, as well as to clarify the review process.

Medford's Historic Preservation Overlay finds that a historic resource has significance if it:

- Is associated with a person, group, organization, or event that made a significant contribution, or is illustrative of the broad patterns of cultural, social, political, economic, or industrial history of the city, region, state, or nation; or,

- Retains sufficient original design, craft work, or material in its original setting to serve as an example of a particular architectural period, building type, or style having design or artistic quality; or,

- Is a rare or unique surviving example of a development type, architectural style, or structural type significant to the city's history; or,

- Significantly contributes to the historic character, identity, and continuity of the street, neighborhood or city, or is a visual landmark; or,

- Represents a noteworthy work of a developer, architect, builder, or engineer noted in the history or architecture of the region; or,

- Significantly contributes to the character and identity of a grouping (ensemble) of resources that, together, share a distinct and intact historic identity.

HISTORIC REVIEW

State law requires the city to evaluate "conflicting uses" relating to significant historic resources. The most common conflicting uses are typically either improper exterior alterations or demolition of the resource. Medford's Historic Preservation Ordinance addresses the issue of conflicting uses through the required review of proposals for alteration or demolition in designated historic areas by the Medford Historic Commission. The ordinance provides general criteria to be used in this review process; however, preparation of design guidelines for the Historic Preservation Overlay would provide property owners and the Historic Commission with additional guidance to achieve consistency and predictability in the review process. Such guidelines, if prepared, should be consistent with the *Secretary of the Interior's Standards for Rehabilitation.*

HISTORIC RESOURCES IN MEDFORD

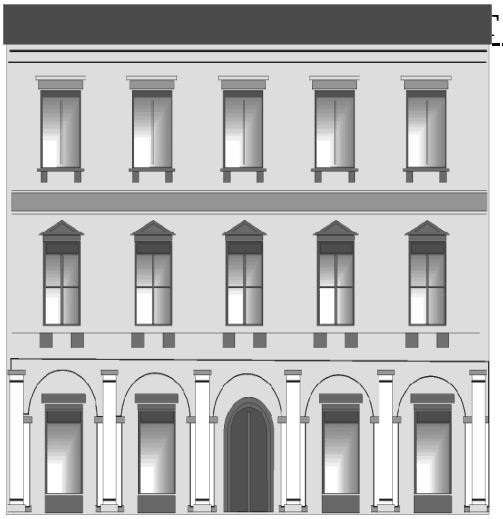
In addition to the many individual properties in the city on the National Register, four historic districts have been formed and listed on the National Register. These are described below.

South Oakdale Historic District

The South Oakdale Historic District, which was on the city's original 1-A inventory of significant historic resources, was entered on the National Register in 1979. The area predominantly consists of well-maintained historic homes on both sides of South Oakdale Avenue, between West Tenth Street and Stewart Avenue. The district contains 60 individual parcels of land. The oldest home is from 1884, and 26 homes have historic significance. The 1931 Art Deco-style Medford Senior High School building (now South Medford High School) and the 1928 Romanesque Revival-style Sacred Heart Catholic Church are also included in the District.

Geneva-Minnesota Historic District

The Geneva-Minnesota Historic District was listed on the National Register in 1993. This district consists of 34 homes constructed between 1911 and 1924, primarily of the Craftsman, Bungalow, and Period Revival styles. It represents one of Southern Oregon's most intact early 20th century residential areas, including a unique roadbed on Geneva Street, and original raised-concrete retaining walls along both Geneva and Minnesota Streets. The roadbed is paved with a surface made of cement slurry mixed with crushed rock referred to as "hassam" that has endured since 1911. A cobblestone-like design was impressed onto the surface.



Medford Downtown Historic District

The Medford Downtown Historic District was listed on the National Register in 1998. Downtown Medford, the historic commercial core of the city, contains many historic properties that provide some of the city's most attractive urban features. A historical survey was conducted in two phases in 1994-1995 in preparation for creation of the Historic District. The survey is reported in a document entitled *Survey of Historic and Cultural Resources, City of Medford, Oregon, Downtown Commercial Area* which was funded in part by state and federal historic preservation grants

A 1993 document, *Medford, Oregon: Historic Context 1846-1946*, provided the historic framework for the analysis and evaluation of the identified resources in the survey. The Historic Context document was produced by the City of Medford in conjunction with the Southern Oregon Historical Society and the Oregon SHPO. It identified the top priority for survey/inventory work in Medford as the "Original Town" area, which comprises the historic commercial core and surrounding neighborhoods. It noted that commercial development and road expansions, as well as inappropriate remodeling, are the primary threats to the older neighborhoods in Medford.

The Medford Downtown Historic District is bounded by Riverside Avenue, Fourth Street, Oakdale Avenue, and Eighth/Ninth Streets, including more than 35 blocks with 193 structures or sites. Although predominantly commercial, the district also contains numerous residential structures, evidence of its past and continuing mixed-use nature. All structures built within the historic period (1884-1948) were documented in the downtown commercial area survey. Such surveys rank resources as "primary," "secondary," or "non-contributing." Those ranked as primary (having high significance and integrity, and a substantial role in the historic landscape) were approved by the City Council in 1995 for addition to the 1-A inventory.

The district falls within Medford's "City Center" *Comprehensive Plan* designation, and within the Central Business (CB) overlay zoning district. According to the Medford *Land Development Code*, the purpose of the CB overlay is to *"recognize the unique and historic character of the downtown area as an asset to the community, and to provide standards and criteria necessary for its continued development and redevelopment as a vital part of this community."* A plan prepared in 1994 for Medford's downtown, the *Downtown City Center Vision Plan*, found that the:

> *"Downtown City Center should be enhanced and developed in a manner that places priority on its older architecture. These structures give the area its visual uniqueness, and must be valued as an economic resource - their visual appeal can, and should, be used to attract tenants and users to the downtown city center. This emphasis on preservation is critical in the downtown central district... As new infill development and redevelopment is completed in each of the (downtown) districts, the new construction should be undertaken with a sensitivity and respect for the existing historic fabric of the downtown city center."*

The accompanying *Medford City Center Design Concept* document states that:

> *"Respectful rehabilitation of the architectural fabric of the City Center should be encouraged. Downtown Medford possesses great built resources that reflect several*

economic booms, several stylistic periods, and represent the work of significant local architects. (New) treatments should respect the traditional organizing characteristics of later 19th and early 20th Century commercial retail buildings."

In response to these studies, the Medford Urban Renewal Agency has begun the process of establishing design guidelines for the downtown, which extends beyond the boundaries of the Historic District, to further regulate building alterations and new construction. These guidelines would assist in the city's Site Plan and Architectural Review and Historic Review processes by assuring that alterations and new construction within the downtown are compatible with the existing historic character. Often a hodgepodge of incompatible facades exist within a single block.

Hillcrest Orchard Historic District

The Hillcrest Orchard Historic District is located in a 240-acre block of land that is entirely surrounded by the Medford UGB, although outside the UGB. It was placed on the National Register in 1984. One of the oldest local orchards, the first fruit trees were planted in 1897, although most of the buildings were built between 1917 and 1926. The historic district encompasses a complex of Period Colonial-style buildings that include a main house, barns, packing house, office, wagon shed, garages, guest house, tennis courts, and a recreation building with an indoor pool. The complex was built to serve as the summer home of the Parsons family, who bought the orchard in 1908. Most of the buildings were designed by Frank Clark, who continued on to design many of the Bear Creek Valley's distinctive homes and buildings. The orchard continues to be a commercial farm producing a variety of pears. Due to its location outside the Medford UGB, this historic district is not subject to Medford's Historic Preservation Ordinance.

OTHER HISTORIC RESOURCES

The Historic Context document identified a number of other historic interest areas outside the "Original Town" area of Medford, such as the "Old East Side" and "Siskiyou Heights." The architecture represented in these areas includes Vernacular, Queen Anne, Period Tudor, Italianate, Spanish Colonial, Bungalow/Craftsman, and Period Colonial Revival styles. Streets such as Queen Anne Avenue, Oregon Terrace, East Main Street, Berkeley Way, and Reddy Avenue contain many of the city's residential historic resources. Additional single sites are scattered throughout the city in areas that were once agricultural, such as on Kings Highway south of Stewart Avenue. There are other significant historic resources located in the Medford UGB, but outside the present city limits, such as the Bear Creek Orchards Packing House on South Pacific Highway and the Oak Grove School on Jacksonville Highway. Resources having primary historic significance are also located in the city's Prescott Park, which is on Roxy Ann Peak. Although under the city's ownership, the park is immediately outside the Medford UGB. The historic park facilities, which include a spring house, picnic shelter, and restrooms, were constructed in 1936 by the Civilian Conservation Corps (CCC).

A county wide property tax base (Historical Fund) provides funds utilized throughout the county to support historic preservation efforts and museums. The Southern Oregon Historical Society, located in the Southern Oregon History Center in downtown Medford, is one of the larger historical organizations in the county. The History Center is located in a historic building, the 1948 Moderne style J. C. Penney's Building, which was occupied by the retailer for 38 years.

ARCHAEOLOGICAL AND HISTORIC RESOURCES CONCLUSIONS

1. A commitment to archaeological and historic preservation exists at the federal, state, county, and local levels.

2. There is a probability that the Medford Urban Growth Boundary contains archaeological resources; however, current information is inadequate to identify the location, quality, and quantity of the resources. Special implementing measures are not appropriate or required until adequate information is available to enable review and adoption of such measures.

3. Development of land in the Medford Urban Growth Boundary that has been vacant or in agricultural use could disturb surface or subsurface archaeological resources.

4. Medford has categorized inventoried historic resources as those designated as significant (1A), and those that have not been designated, but are potentially significant (1B).

5. There is a probability that the Medford Urban Growth Boundary contains significant historic resources. To more fully protect these resources, survey of the remainder of the Urban Growth Boundary is needed, to evaluate whether additional sites should be designated as significant or potentially significant.

6. Medford's Historic Preservation Ordinance and Overlay aid in preserving and protecting significant historic resources from inappropriate exterior alterations or demolition through required review of such proposals by the Medford Historic Commission.

ARCHAEOLOGICAL AND HISTORIC RESOURCES GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 11: To preserve and protect archaeological and historic resources in Medford for their aesthetic, scientific, educational, and cultural value.

Policy 11-A: The City of Medford shall strive to identify and preserve archaeological resources and sites, and promote actions to prevent intentional and unintentional disruption or destruction of such resources.

Implementation 11-A (1): When adequate information becomes available to identify the location, quality, and quantity of Medford's archaeological resources, prepare an inventory. Special implementing measures are not appropriate or required until adequate information is available to enable review and adoption of such measures.

Implementation 11-A (2): Where probable cause for discovery of cultural or archaeological resources exists, such as indicated by a records search, or where resources have been discovered near the project site, encourage sponsors of development projects to contact the Oregon State Historic Preservation Office.

Implementation 11-A (3): When cultural or archaeological resources, as defined by state law or the state archaeologist, are discovered during clearing, grading, or construction in the city, require project operations to cease until the state archaeologist is contacted, as required by state law.

Policy 11-B: The City of Medford shall encourage and facilitate the preservation of Medford's significant historic resources by continuing to update and implement the Historic Preservation Ordinance in the *Land Development Code*.

Implementation 11-B (1): Regularly assure that city staff, such as the Planning and Building Safety Departments, are aware of historic preservation ordinances and policies, and provide training for staff in departments directly involved with historic structures.

Implementation 11-B (2): Evaluate the zoning of significant historic resources to determine if conflicts are likely based on the present use and/or permitted and conditional uses. Review the zoning of historic districts to determine if the zoning district standards, such as setbacks, density, public improvement design, parking, lot size, etc., are compatible with the historic character of the historic districts.

Implementation 11-B (3): Assure that new development located adjacent to historic resources and/or districts is reviewed for compatibility with the historic resources.

Implementation 11-B (4): Review proposed public development or improvement projects for their affect on any historic resources.

Implementation 11-B (5): Prepare a written yearly report for the Planning Commission and City Council of the activities of the Medford Historic Commission, such as grant activity, surveys, hearings, special assessments, and new site designations and listings.

Implementation 11-B (6): Identify and evaluate historic resources on city-owned or controlled properties, and prepare historic preservation plans where appropriate. Identify underutilized historic buildings or sites for potential reuse as public facilities.

Policy 11-C: The City of Medford shall continue to maintain an official inventory of significant historic resources located in the city where the Historic Preservation Overlay of the *Land Development Code* applies.

Implementation 11-C (1): Include in the Historic Preservation Overlay, all properties in the city listed on the *National Register of Historic Places*, including all properties within National Register historic districts.

Policy 11-D: The City of Medford shall support and promote seismic retrofit of vulnerable historic buildings, as well as modification of historic buildings for accessibility to disabled persons.

Policy 11-E: The City of Medford shall continue to recognize the downtown City Center as the historic core of the city, and its historic attributes shall be a factor when developing programs for the downtown area.

Implementation 11-E (1): Prepare and implement design guidelines for Site Plan and Architectural Commission and Historic Commission review of properties in the downtown to assure that exterior alterations and new construction are compatible with the historic character. (See the "Facade Treatment Recommendations" of the 1994 *Medford City Center Design Concept* for an example.)

Policy 11-F: The City of Medford shall continue to encourage historic preservation efforts and cooperate with citizens and organizations undertaking such efforts.

Implementation 11-F (1): Continue to apply for historic preservation grants to carry out survey and inventory work, and support the grant applications of others when affecting property in the Medford Urban Growth Boundary.

Implementation 11-F (2): Investigate development of an awards program for exemplary rehabilitation of historic buildings.

Implementation 11-F (3): Investigate the concept of a historic easement program.

DISASTERS AND HAZARDS

This section of the "Environmental Element" discusses potential disasters and hazards in Medford, *including natural* and *human-caused*, and the city's emergency management efforts, and presents the conclusions, goals, policies, and implementation strategies pertinent to these factors.

EMERGENCY MANAGEMENT PLANNING

The City of Medford has an *Emergency Management Plan* (EMP) to guide efforts in mitigating, preparing for, responding to, and recovering from major emergencies and disasters. The EMP is part of a *Comprehensive Emergency Management Program* that coordinates federal, state, and local governmental agencies in an operating partnership. The responsibility for maintaining the EMP is borne by the city's Emergency Management Coordinator though the Emergency Management Planning Team. The Coordinator is responsible for all emergency planning activities, including periodic reviews of the Plan, planning and conducting disaster training exercises, coordinating mitigation efforts, and assisting in acquisition of state and/or federal assistance for these efforts.

All disaster mitigation and preparedness activities are coordinated by the Emergency Management Planning Team, which consists of the City Manager and various department heads, including the Fire Chief, Police Chief, Public Works Director, Building Safety Official, and the Emergency Management Coordinator. The City of Medford's primary Emergency Command Center (ECC) is located in the City Hall Lausmann Annex at 200 South Ivy Street, with a backup ECC in the Jackson County Building, 10 South Oakdale Street. The city responds to disasters within the city, within Medford Rural Fire Protection District #2, and at other city-owned facilities when the response will benefit the City.

Mitigation and preparedness planning include advance preparations to minimize public risk from potential disasters, to reduce the likelihood of a major emergency or disaster, and to reduce the anticipated damage. Mitigation can reduce loss of life and property damage through land use regulations and construction practices. Identifying the types, magnitude, and probability of hazards to which an area is susceptible over a significant length of time (hazard risk analysis) is necessary, as well as assessing the degree of hazard risk that the jurisdiction finds acceptable. The cost of mitigating certain risks may be more than a community can afford. Risk standards should be formally adopted as public policy by the local legislative body through comprehensive planning, land development ordinances, permit review, and fire/building safety codes.

NATURAL DISASTERS AND HAZARDS

Goal 7 of the *Statewide Planning Goals*, "Areas Subject to Natural Disasters and Hazards," requires land use planning in Oregon to consider known areas of natural disasters and hazards. It requires plans to be based on an inventory of such natural hazard areas. Although one of the State of Oregon's main focuses is on flooding, other natural hazards have the potential to disrupt life and commerce in Medford, including earthquakes and wildfires. (Landslides and soil-related problems were discussed previously under "Soils.")

FLOODING

Over the past 50 years, major floods occurred in the Rogue Valley in 1955, 1962, 1964, 1974, and, more recently, in 1997. These floods threatened public health, safety, and welfare by destroying or isolating structures, disrupting transportation systems, polluting water supplies, and destroying basic public facilities, such as sewerage and electric services. Recent incidences of record rainfall and flooding across Oregon have renewed concerns about the potential for flooding in the Medford UGB, and have rekindled interest in preparing for potential floods. To minimize the hazards posed by floods, the City of Medford should continue to implement the recommendations of the *Comprehensive Medford Area Drainage Master Plan* through revisions to Medford's *Comprehensive Plan* and *Land Development Code,* in addition to implementing state and federal regulations.

Floodplain Mapping

The sale of federal flood insurance in Medford, through the *National Flood Insurance Act of 1968*, was authorized in 1974. The Federal Emergency Management Agency (FEMA) developed a 100-year or *base flood* for use in mapping floodplains as part of the national flood insurance program. Federal law requires the first floor of a new building to be *at* or *above* the 100-year flood level, while Oregon law is more restrictive, requiring the first floor of a new building to be one foot *above* the line. Stricter development restrictions can be imposed by cities and counties, such as zoning restrictions that limit vulnerable land uses in floodplains, and programs developed to inform property owners of the hazards posed by waterways. Specialists in natural hazards planning note that the 100-year designation is only a tool, and does not guarantee that flooding will occur only within this floodplain designation.

Floodplains can be delineated according to topography, vegetation, soils, or the extent of past floods.[44] When defined according to geomorphic features, the floodplain includes the low-lying land along the stream, the outer limits of which may be marked by steep slopes or valley walls. See **Figure 12** for a graphic representation of a floodplain as defined by FEMA. The *regulatory floodway* is the lowest part of the floodplain where most frequent flood flows occur. This area is not eligible for federal flood insurance. The *floodway fringe* is the area that would be lightly inundated by a 100-year flood, and is eligible for flood insurance if flood proofing has been undertaken. Of all the features of a river valley, the floodplain is the most important from a planning standpoint for three reasons. First, excluding the stream channel itself, the floodplain is the lowest part of the stream valley, and consequently, prone to flooding. Second, floodplain soils are often poorly drained because of the high water tables and saturation by flood waters. Third, floodplains are formed by incremental erosion and deposition that accompany the meandering of streams through valleys.

As a prerequisite to obtaining federal flood insurance, the City of Medford was required to identify flood hazard areas, and to control development in floodplains. In Medford, flood hazard areas are located along Bear Creek and most other waterways. Federal Insurance Rate Maps (floodplain

[44] *Landscape Planning: Environmental Applications,* William M. Marsh, 1991.

maps) are available in the Medford Building Safety Department. In 1974, the City Council established a review process to assure that proper construction methods and utility locations were undertaken in flood hazard areas. For example, new and replacement water and sanitary sewer systems are required to be designed to minimize or eliminate the infiltration of flood waters into the systems, and discharge from the systems into flood waters.

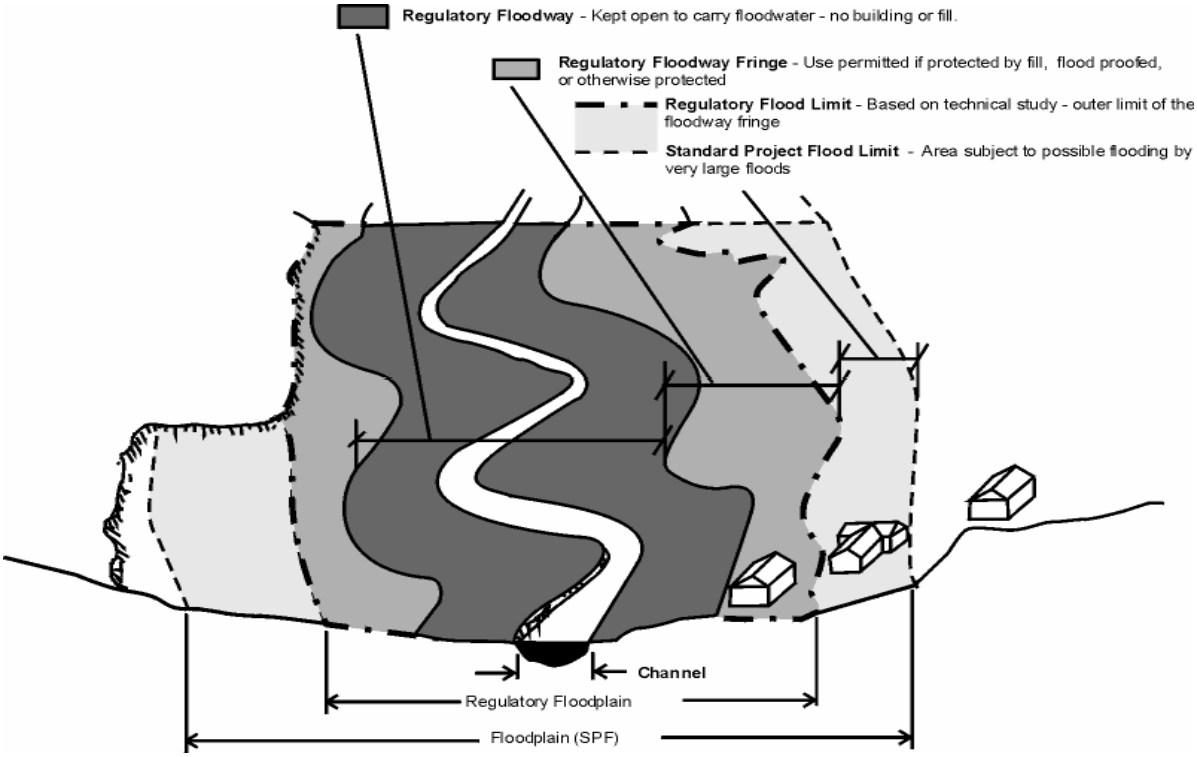


Figure 12
U.S. National Flood Insurance Program
100-Year Floodplain

Source: *Landscape Planning: Environmental Applications*, 2nd Edition, William M. Marsh, 1991.

While floodplain maps are helpful, Oregon's short recorded weather history and changing climatic conditions make flood estimating unpredictable. Additionally, the state's expanding population and fast rate of development continue to alter the landscape and natural waterways.[45] As a result, many floodplain maps are outdated. A FEMA expert noted in a 1997 *Oregonian* article, that many watersheds in Oregon have changed since floodplains were mapped, and, that *"(n)ew houses and pavement in the place of fields and woods mean quicker runoff into streams. 'We're seeing a lot more urban flooding than was occurring in past decades.'"*

[45]Ibid.

Medford is similar to many Northwest communities located in valleys prone to flooding that were formerly used for agriculture. As the FEMA expert noted, *"Many streams in rural areas weren't seen as priorities when maps were being drawn and weren't included in the studies. Now communities have sprouted on former pastures. In addition to areas that need to be restudied, there are many areas that we have not yet studied at all. So just because you don't live in an area that we say is subject to a 100-year flood, it may mean that we haven't gotten around to studying it."*[46] The State of Oregon has requested that FEMA place a high priority on updating Oregon's floodplain maps.

Flood Damage Reduction

The City of Medford is one of the few Oregon communities to take part in the Community Rating System (CRS) program, which is intended to aid in reducing flood losses, to facilitate accurate insurance ratings, and to promote awareness of flood insurance. The program provides flood insurance premium discounts as an incentive for cities to develop extra flood protection measures beyond what the national program requires. Communities can qualify for up to a 45% discount. In 1999, Medford qualified for a 5% discount in premiums. The discount is based on a point system. A high number of additional points can be earned through such activities as collecting and maintain flood data, protecting open space, stormwater management, higher regulatory requirements, and acquisition/relocation or retrofitting of flood prone properties or structures.

The *Medford Municipal Code* section entitled "Flood Damage Prevention" states: *It is the purpose of these sections to minimize public and private losses due to flood conditions in specific areas by methods and provisions designed for:*

(1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
(2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(3) Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
(4) Controlling filling, grading, dredging, and other development which may increase flood damage; and
(5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

While Medford's infrastructure handled the most recent (1997) flood well, there was damage in some areas along Bear Creek and Larson Creek, emphasizing the continuing need to update and refine the city's floodplain regulations. Development and redevelopment should be highly scrutinized when located in floodplains. The proposed riparian corridor and wetland building setback requirement will aid in reducing future flood damages to structures and improvements. Existing and proposed requirements for on-site detention of stormwater will aid in regulating storm water flows during peak events.

[46] Ibid.

Some of the recommendations of the Oregon Office of Emergency Management *Interagency Mitigation Team Report* made in response to the 1997 floods in Oregon include the following:

- Strengthen the public facility planning review process to encourage consideration of stormwater system limitations and coordinate plans with a regional perspective, including upstream and downstream communities. Systems often become inadequate because of growth beyond anticipated levels (i.e., increased amount of impervious surface increases runoff). This growth often occurs without subsequent increases to stormwater capacity or recognition of system limitations.

- Water storage through various means, such as creation of wetlands, retention areas, detention basins, and dams can assist in flood control. Encourage flood control projects and development of local flood mitigation plans. These plans should incorporate regional concerns and should consider the watershed as a whole. Encourage the establishment of drainage management plans.

- Where appropriate, allow rivers to reclaim floodplain areas, allowing waterways room to naturally meander and expand. This can be accomplished using conservation easements, land acquisition, riparian trust, and creating wetlands and retention/detention areas, especially in headwater areas.

EARTHQUAKES

While historically, California has been perceived as the most earthquake-prone state in the west, recently seismologists and geo-scientists have recognized that Oregon, as well as the entire Pacific Northwest, may be subject to earthquakes of substantial magnitude. Oregon had not experienced a substantial earthquake for almost a century until 1993, when the state suffered three significant quakes: the first near Salem, in Scotts Mill (magnitude 5.6 on the Richter scale), and two earthquakes later in Klamath Falls (magnitudes 5.9 and 6.0) felt in Medford. Researchers in geo-science have also become more aware of the potential for moderate earthquakes in Oregon, and, during the last decade, have noted the likelihood of an earthquake of great magnitude striking offshore.

Earthquakes that occur in Oregon are typically crustal, intra plate, or great subduction earthquakes. *Crustal* earthquakes are most common, and occur along relatively shallow faults, normally within 10 miles of the earth's surface. *Intraplate* earthquakes occur at greater depths, approximately 20 to 40 miles beneath the surface. *Great subduction* earthquakes occur along an offshore fault that parallels the Oregon and Washington coasts.[47]

[47] *Earthquakes Hazard Maps for Oregon, 1996,* Oregon Department of Geology and Mineral Industries, Donald Hull, State Geologist and I. P. Madin and M.A. Mabey.

The 1993 Salem and Klamath Falls earthquakes were crustal earthquakes, which occur along short, shallow faults that are commonly visible at the earth's surface. Historically, these earthquakes have rarely exceeded magnitude 6.0, but the historic record is too short to provide a true representation of the probable threats of crustal quakes. Many geo-scientists maintain that, while rare, faults exist in Oregon that could produce earthquakes as large as magnitude 6.5 to 7.0.[48] Crustal earthquakes are relatively common in the Portland area and the northern Willamette Valley, off the southern coast of Oregon, in northeastern Oregon, and in scattered areas throughout southeastern Oregon. In areas east of the Cascades, the majority of the earthquakes originate in crustal faults.

Intraplate earthquakes occur within the remains of the ocean floor that has been subducted beneath North America. It is believed that this type of earthquake could occur anywhere beneath the Coast Range or the western Willamette Valley with a magnitude as large as 7.0 to 7.5.[49] In 1949, and later in 1965, intra plate earthquakes severely rocked Washington's Puget Sound region.

Great subduction earthquakes occur worldwide in subduction zones, where continent-sized pieces of the earth's crust are shoved deep into the earth, and are consistently the most powerful type of earthquake recorded, often registering magnitude 8.0 or 9.0. The Cascadia Subduction Zone, a 750-mile fault located off the West Coast, from British Columbia to Northern California, has not experienced any large earthquakes during the short 200-year recorded history of earthquakes. However, a variety of studies over the past decade indicate that these earthquakes occurred repeatedly in the past, every 350 to 500 years.[50] According to available evidence, the last major subduction zone earthquake occurred off the Oregon coast approximately 300 years ago. According to seismologists, should the entire subduction zone rupture, a magnitude 9.0 earthquake would result, similar to a 1960 Chilean subduction zone earthquake that resulted in nearly 5,000 deaths. **Figure 13** indicates earthquakes 5.0 or greater on the Richter Scale felt during Oregon's brief recorded history.

Western Oregon is the most likely region of the state to be severely affected by substantial earthquakes in the future, particularly near the southern coastal town of Brookings. State geologists maintain that "*Brookings and the entire coast are the most likely to have peak ground acceleration because of the subduction zone.*"[51] The Cascadia Subduction Zone houses the oceanic Juan de Fuca Plate, which plunges under the continental North American Plate approximately 60 to 150 miles offshore.[52] The North American and Juan de Fuca plates are in constant motion, and, if the plates lock up as they move past each other, the stored energy released could result in an earthquake of magnitude 8.0 or 9.0.[53]

[48]Ibid.

[49]Ibid.

[50]Ibid.

[51]Ibid.

[52]"Experts Deliver Earthshaking News", *The Oregonian*, Richard Hill, April 23, 1996.

[53]"Quakes: Mapping the Hazards", *The Oregonian*, Richard L. Hill, November 14, 1996.

Because the Cascadia Subduction Zone could produce a very large earthquake affecting nearly all of western Oregon, land use planning and development must incorporate principles of earthquake preparedness and up-to-date seismic construction standards. Medford was rated by the Oregon Department of Geology and Mineral Industries at approximately 26-28 on a scale of potential damage from earthquakes, with zero being the lowest possible score and 115 being the highest. Moving westward, the potential for damage increases dramatically. Grants Pass, only 29 miles northwest of Medford, received a rating of 36, and Brookings, the highest at 85.

Figure 13
Earthquakes Centered or Felt in Oregon
Magnitude 5.0 or Greater on the Richter Scale

Sep. 20, 1993	An earthquake of magnitude 6.0 centered about 10 miles northwest of Klamath Falls caused light damage to buildings.
Sep. 20, 1993	An earthquake of magnitude 5.9 centered 15 miles northwest of Klamath Falls closed some highways and bridges.
Mar. 25, 1993	An earthquake of magnitude 5.6 centered near Woodburn rocked most of the state, and caused damage to bridges and the State Capitol Building in Salem.
Feb. 13, 1981	An earthquake of magnitude 5.5 centered near Mount St. Helens shook the Portland area.
May 30, 1968	An earthquake of magnitude 5.1 hit the Adel-Warner Lakes area near Lakeview in south central Oregon.
Apr. 29, 1965	An earthquake of magnitude 6.5 centered between Seattle and Tacoma, Washington was felt in the Portland area.
Oct. 1, 1964	An earthquake of magnitude 5.3 hit Portland's Sauvie Island in the Columbia River.
Nov. 5, 1962	An earthquake of magnitude 5.5 centered in Vancouver, Washington, was the largest quake then recorded in the immediate vicinity of Portland.
Dec. 16, 1953	An earthquake of magnitude 5.6 hit the Portland area.
Apr. 13, 1949	An earthquake of magnitude 7.1 centered between Olympia and Tacoma, Washington caused damage in Portland.
Jul. 16, 1936	An earthquake of magnitude 6.1 was centered in the Milton-Freewater area.
May 13, 1916	An earthquake of an estimated magnitude of 5.7 was centered in Richland, Washington.
Mar. 7, 1893	An earthquake of an estimated magnitude of 5.7 was centered in Umatilla.
Feb. 4, 1892	An earthquake of an estimated magnitude of 5.6 hit the Portland area.
Oct. 12, 1897	An earthquake of an estimated magnitude of 6.7 shook the Gresham area.
Nov. 23, 1873	An earthquake of an estimated magnitude of 6.3 was centered in the Crescent City, California area.

Since 1993, when the Seismic Zone rating of Oregon was revised from Zone 2 to Zone 3, new buildings in Oregon have been required to meet more stringent seismic construction standards; however, local jurisdictions can designate seismic standards for existing structures. State and local government buildings and facilities are required to be inspected and meet higher standards. In 1995, the Oregon Legislature created a task force to examine and develop recommendations concerning the threat of earthquakes to structures. The task force recommendations address unreinforced masonry buildings, where the greatest amount of upgrading is required to meet current standards. Downtown Medford, like the downtowns of many Oregon cities, is especially prone to earthquake damage, due to the large number of these structures.

WILDLAND FIRES

Nationally, more and more homes are being constructed in or adjacent to wildland areas. A desire for a rural or suburban living environment on the fringe of urban areas has increased the risks in what is termed the urban/wildland interface. The interface is the area where residential development comes into contact with areas of natural vegetation that can contribute to rapid fire spread and additional fuel loading. Although Medford has few of these types of areas, the hazard will increase as the City grows farther into the eastern foothills. Some of the fire protection problems that can occur in urban/wildland interface areas include use of combustible exterior construction materials, inadequate access for fire apparatus, lack of fire protection water, lack of residential sprinkler systems, inadequate fuel breaks around structures, driveways that are not clearly addressed, and lack of knowledge by property owners regarding how to act when a fire threatens.

Areas within the Medford UGB that could be susceptible to wildland fires include the far eastern section of the community on the southern and western slopes of Roxy Ann Butte, and generally in the area east of North Phoenix Road wherever steep slopes and thick natural vegetation exist. The City of Medford, Jackson County, and the Oregon Department of Forestry respond in these areas according to the location of the fire and mutual aid agreements.

Wildland fires often require special equipment, such as four-wheel drive vehicles, to reach inaccessible areas that are typical of wildland areas. The City has specialized equipment designed specifically for wildland terrain, including four and six-wheel drive vehicles; and employs a combination of standard fire fighting equipment with forces of fire fighters on the ground to fight wildland fires effectively. Jackson County has identified areas outside UGB's where the interface exists, prepared a program to inform the public of the special conditions that may threaten public safety and property, and adopted interface fire protection principles into enforceable codes.

OTHER HAZARDS

Although Goal 7 addresses natural disasters and hazards, human caused hazards, such as noise and airport hazards, also have the potential to disrupt the livability of a community, threaten human health and well-being, or harm the environment.

NOISE

The most common noise sources in Medford are transportation-related and include automobiles, trucks, motorcycles, railroads, and aircraft. Motor vehicle noise is a pressing concern because it often occurs in areas sensitive to noise exposure, such as residential areas, and continues to increase with urban growth and increasing numbers of motor vehicles. Other urban sources of noise include air conditioners, lawn mowers, leaf blowers, radio/stereo/television equipment, sports arenas, schools, and similar entertainment and commercial activities. Construction noise sources, such as diesel engines and air compressors, can generate noise for extended periods with intermittent high noise levels.

Sound is measured in terms of its loudness and pitch. The loudness or magnitude of sound is commonly measured in decibels (dB); the pitch, or frequency is normally expressed in Hertz (Hz) or cycles per second. For human beings, the audible spectrum ranges between 20 and 20,000 Hz, and from zero to 140 dB. An illustration of this scale, along with common noise situations and their impacts is provided in **Figure 14.**

Figure 14
Loudness Range of Common Sounds
Measured at Source or Indicated Distance

Sound Source	dB	Typical Response
Sonic Boom	140	Painfully Loud
Jet Takeoff (200 feet)	120	Limits of Amplified Speech
Auto Horn (3 feet)	110	Maximum Vocal Effort
Shout (0.5 feet)	100	Very Annoying
Heavy Truck (50 feet)	90	Annoying
Pneumatic Drill (50 feet)	80	Telephone Use Difficult
Freeway Traffic (50 feet)	70	
Air-conditioning Unit (20 feet)	60	
Living Room	50	Quiet
Library	40	
Soft Whisper	30	Very Quiet
Leaves Rustling	10	Just Audible
	5	Threshold of Hearing

SOURCE: Environmental Quality, the First Annual Report (Washington, D.C.: CEQ, August 1970)
NOTES: dB=decibel

FEDERAL AND STATE NOISE REGULATIONS

The *Federal Noise Control Act of 1972* placed a number of noise-related programs under the authority of the Environmental Protection Agency (EPA). The EPA's major roles consist of regulating aircraft noise (with the Federal Aviation Administration), product noise, and interstate railroads and motor carrier noise.

Oregon's *Noise Control Act of 1971* gave the Oregon Department of Environmental Quality (DEQ) authority to adopt standards for motor vehicles, industry, motor raceways, airports, and commerce. The standards establish motor vehicle noise emission limits and set ambient noise limits for commercial and industrial operations. The standards vary according to time of day and proximity to *noise sensitive properties*. DEQ becomes involved in noise problems when it receives a citizen complaint about a noise source under DEQ authority.

NOISE REDUCTION STRATEGIES

Vehicle-Related Noise Reduction Techniques

In Medford, high vehicle-related noise is associated with Interstate 5 and Highway 62, as well as high-volume arterial streets. There are a variety of means a city can undertake to reduce motor vehicle-related noise impacts. These may include:

- Enforcement of vehicle noise emission standards
- Proper location of truck routes
- Limitation of traffic volume on certain street types
- Requirements for fencing, walls, berms, landscaping, etc., along certain street types

Airport-Related Noise Compatibility
Airport-related noise compatibility is discussed below under "Airport Hazards."

Building and Site Design
Noise can be attenuated through proper building design. For example, windows, vents, and other openings can be positioned away from a noise source such as a freeway. Buildings located close to noise-producing uses can be built with thicker walls or insulation, and proper windows. Similarly, sources of noise within a development, such as air conditioners, can be designed and located to direct noise away from noise sensitive areas. Site design is one of the most effective means of protecting dwelling units in a noisy environment. As an illustration, if a project is proposed adjacent to a freeway, the building layout can effectively attenuate noise by placing the dwelling units as far away from the noise source as possible, with the non-dwelling buildings, parking, and driveways located between the dwellings and the noise source.

Noise Ordinance
Medford's Noise Ordinance, located in the *Land Development Code,* regulates the level of commercial and industrial noise, based on the proximity to noise sensitive properties. The ordinance was prepared in the 1980s to comply with DEQ standards and procedures. Some noise sources are exempt from the ordinance, such as construction and landscape maintenance, but are subject to other sections of the *Medford Municipal Code*. Review of the Noise Ordinance is necessary to determine if revisions are needed.

Bufferyards
Medford's *Land Development Code* requires bufferyards which use setbacks, fencing/walls/berms, and vegetation to mitigate potential adverse impacts between adjacent land use types. Bufferyard standards are intended to minimize potential conflicts caused by nuisances, such as glare and noise. The width of the bufferyard, as well as the types and numbers of trees and shrubs contained in the bufferyard, and the type and height of fencing are dependent upon the zoning of the abutting properties.

Agricultural Buffering
Medford and Jackson County jointly implement policies and regulations to minimize the potential adverse impacts of urban development on abutting agricultural uses. An integral part is the mitigation of noise generated by agricultural machinery such as tractors, sprayers, and crop-dusters. The required buffer is intended to reduce noise complaints from residents of new abutting development. Deed declarations are required for those properties abutting agricultural uses, to recognize the right to use accepted farming practices. The agricultural buffering ordinance is in the Medford *Land Development Code*.

AIRPORT HAZARDS

The Rogue Valley International-Medford Airport encompasses more than 925 acres in the northern portion of the City. It is the major airport serving southwestern Oregon and the far northern part of California. Use of the facilities continues to increase steadily, although in 1998, the airport was

operating at about 50% of capacity. The 1986 *Airport Master Plan and Noise Compatibility Study for the Medford-Jackson County Airport*, Coffman Associates, studied land uses surrounding the airport as related to hazards and noise. Most of the actions recommended by the study to address incompatible land uses have been completed by the airport, which is managed by Jackson County.

Most of the safety hazards associated with airports are related to takeoffs and landings. In 1985, the Airport constructed an aircraft rescue and firefighting station with room for seven firefighters. It is located near the terminal, with three engines having a response time of two to five minutes.

Airport approach and departure paths are critical areas in terms of land use compatibility. The FAA has adopted Federal Aviation Regulations regarding *"objects affecting navigable airspace and safety zones."* Safety zones consist of Runway Protection Zones (formerly Clear Zones), Runway Safety Areas, and Runway Object-Free Areas. The Runway Safety Areas and Object-Free Areas are located within the airport proper, but Protection Areas often extend beyond the boundaries of an airport, although the FAA recommends that airports own as much of the Protection Areas as possible. For most of the Protection Areas identified in the 1986 Airport Master Plan, the airport undertook a noise compatibility program that prioritized the areas for purchase, and then acquired them. The *Medford-Jackson County Airport Master Plan Update, 1993*, prepared by Airport Technology and Planning Group, Inc. identified the "Imaginary Surfaces" used to determine potential obstructions to air navigation. The plan identified the existing obstructions within these areas, such as trees, buildings, antennas, navigation aids, etc.

Prior to annexation to the City of Medford, the airport was governed under several Jackson County zoning districts. These included the Airport Development - Mixed Use (AD-MU) zoning district which restricts residential uses, and limits light and glare; the Airport Approach (A-A) Overlay Zone, which also prohibits electrical interference, and the Airport Concern (A-C) Overlay Zone, which limits height and requires residential deed restrictions (Avigation Easements) recognizing the existence of the airport and its inherent noise.

Within the City of Medford, the airport and its environs are generally designated and zoned for industrial uses. The City adopted an Airport Approach (A-A) Overlay Zone in 1991. The area encompassed by the A-A Overlay Zone, the "Approach Surface," is one of the FAA "Imaginary Surfaces" noted above. The A-A Overlay Zone prohibits places of assembly, and restricts light, glare, and other causes of impaired visibility. Avigation easements are required for plan authorizations and other development approvals for properties located within the A-A Overlay Zone. An Airport Radar (A-R) Overlay Zone was adopted in 1992. It prohibits objects in excess of 40 feet in height, and requires all construction to be reviewed and approved by the FAA. The airport, which previously had no radar, installed a $23 million radar system in 1995 located near Crater Lake Highway. The A-R Overlay Zone generally encompasses an area extending east of the airport to Crater Lake Highway, and south of Vilas Road to the westerly extension of Coker Butte Road.

While local governments must strive to assure land use compatibility with airport operations, airports usually take on the responsibility of minimizing their noise impacts. Airports can often affect noise impacts through a variety of means, including proper airport design, runway use, curfews, takeoff, climbing, and landing procedures, noise monitoring, etc. The FAA has guidelines for land use compatibility related to airport-generated noise. Most land uses are considered incompatible with noise levels exceeding 75DNL[54], and residential development is considered

[54]DNL - Yearly day-night average sound level noise contour - a method for measuring noise generated by an airport.

incompatible with noise levels exceeding 65DNL.

The 1986 noise compatibility study established the runway noise contour lines for the Medford Airport. These were updated in 1999 as part of the environmental assessment by David Evans and Associates for a runway expansion project. (See **Figure 15** for the year 2000 noise contours.) In Medford, the airport has few residentially designated areas nearby, although the Central Point UGB is in close proximity to the northwest. The residential areas most impacted by airport noise (within the 65DNL contour) are located between Corona Avenue and Crater Lake Avenue, north of Johnson Street in Medford, and the area west and north of the intersection of Table Rock Road and Vilas/Hamrick Road in the Central Point UGB.

Since residential and other noise-sensitive development should be well-separated from airports, new development must be coordinated with future airport expansion plans to prevent conflicts as flights increase. Future designation of residential areas by the City of Medford, City of Central Point, and Jackson County must be coordinated with the Airport Master Plan to avoid conflicts with flight patterns, hazard areas, and expansion areas. The 1986 study recommended that no new residential development be allowed inside the 65DNL, and that new residential development inside the 60 DNL be required to attain, through construction techniques, a maximum indoor noise level of 45DNL.

DISASTERS AND HAZARDS CONCLUSIONS

1. The Medford Urban Growth Boundary contains streams and waterways that have a history of flooding occasionally.

2. The *National Flood Insurance Program* is available in communities that implement comprehensive floodplain regulations to reduce flood damage. As a participant in this program, Medford adopted regulatory provisions to minimize flood losses through development controls such as building codes and development regulations that place restrictions on new construction or improvements to flood-prone structures.

3. According to seismologists, the likelihood of an earthquake of serious magnitude in the Northwest is high. Medford is at risk for potential earthquake damage because many older buildings have not been built or upgraded to current earthquake standards. Medford's emergency management planning recognizes this possibility.

4. The threat of wildland fires within the Medford Urban Growth Boundary is relatively slight, but will increase as development abuts or increases in areas prone to wildland fire dangers, such as steep slopes, dense natural vegetation, etc.

5. The threat of loss of life and/or property damage in areas that may be impacted by wildland fires can be reduced through the use of less combustible construction material, adequate fire response apparatus, availability of fire protection water, adequate fuel breaks surrounding structures, appropriate road widths to accommodate fire fighting vehicles, and response and evacuation plans that are understood by the residents of these areas.

6. The most common noise sources in Medford are transportation-related, and include automobiles, trucks, motorcycles, railroads, and aircraft. Motor vehicle noise is a pressing concern, because it often occurs in areas sensitive to noise exposure, such as residential areas, and continues to increase with urban growth and increasing numbers of motor vehicles.

7. The City of Medford has adopted noise reduction strategies in the *Land Development Code* to mitigate the harmful effects of noise, including a noise ordinance, which regulates the level of commercial and industrial noise based on the proximity to noise-sensitive properties; bufferyards, which use setbacks, fencing/walls/berms, and vegetation to mitigate adverse impacts between adjacent land use types, and agricultural buffering, in which Medford and Jackson County jointly implement policies to minimize the impacts of urban development on abutting agricultural uses.

8. Airports can adversely impact residential and other sensitive development through noise and accident hazards. Future airport expansion plans could create land use conflicts as flights increase.

DISASTERS AND HAZARDS
GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal 12: To protect the citizens of Medford from the potential damage caused by hazards such as flooding, earthquakes, noise, wildfires, and airport hazards.

Policy 12-A: The City of Medford shall assure that hazard mitigation standards are formally adopted as public policy through comprehensive planning, land development ordinances, permit review, and fire/building safety codes.

Implementation 12-A (1): Continue to conduct hazard risk analysis, including identifying the types, magnitude, and probability of hazards which the Medford Urban Growth Boundary is susceptible to over the long term, including assessing the degree of risk that the citizens find acceptable.

Policy 12-B: The City of Medford shall ensure that the potential impacts of flooding are adequately analyzed when considering development projects.

Implementation 12-B (1): Maintain and, when necessary, update the city's requirements for development in floodplains, consistent with federal and state regulations, and the *Uniform Building Code* (UBC).

Implementation 12-B (2): Adhere to the policies outlined in the *Medford Comprehensive Drainage Master Plan* to minimize flood losses through development controls.

Implementation 12-B (3): Encourage the re-mapping of flood-prone areas in Medford using data from the most recent flood(s) of record.

Implementation 12-B (4): Consider flood hazards when installing public improvements such as parks and paths in flood-prone areas. Design these amenities to withstand a certain flood level.

See also the Policies of the *Storm Water Drainage* section of the "Public Facilities Element."

Policy 12-C: The City of Medford shall continue to utilize building and development standards to mitigate the potentially damaging effects of earthquakes. New construction is required to meet the standards of seismic zone 3 of the *Uniform Building Code* (UBC).

Policy 12-D: The City of Medford shall strive to upgrade all city-owned buildings and facilities to meet earthquake standards.

Policy 12-E: The City of Medford shall continue to update and enforce noise attenuation strategies.

Implementation 12-E (1): Periodically review the city's noise ordinances for adequacy.

Policy 12-F: The City of Medford shall strive to minimize the loss of life and property resulting from wildland fires within the Urban Growth Boundary.

Implementation 12-F (1): Undertake efforts to educate the public in wildland fire safety.

Implementation 12-F (2): Develop and adopt fire safety performance standards for development in those areas identified as being at risk of wildland fires.

Policy 12-G: The City of Medford shall designate future residential areas in coordination with the *Rogue Valley International-Medford Airport Master Plan* to minimize conflicts with flight patterns, hazard areas, and airport expansion areas.

APPENDIX A
WILDLIFE HABITAT
MEDFORD URBAN GROWTH BOUNDARY

HABITAT TYPES

Commercial (C): Areas with business buildings and associated surfaced and fenced land, usually classified as commercial on city and county zoning maps.

Residential (Rs): Areas generally with more than one dwelling per two hectares (five acres), using 20-hectare (50-acre) plots for averaging.

Agricultural (A): Areas generally of parcels more than two hectares (five acres) in size managed for commercial agriculture within the prior six years, excluding timber production and open range grazing. Usually in river valleys.

Grassland (G): Open grassland with no trees (not agricultural).

Savanna (S): Grassland or rocky shrub land with scattered trees.

Woodland (W): Conifer, deciduous, or mixed forest.

Riparian (Rp): Terrestrial habitat within 20 meters (66 feet) of permanent streams, lakes, or intermittent water courses or basins that contain water at least six months of the year.

Riparian habitat also contains the following **aquatic** habitats:

Intermittent (I): Water courses and basins that contain water six to eleven months of the year, including grasslands or agricultural fields that are flooded six to eleven months per year.

Streams (St): Water channels less than ten meters (33 feet) wide.

Rivers (Rv): Water channels more than ten meters (33 feet) wide.

Lakes (L): Water basins or reservoirs more than two hectares (five acres) in size.

WILDLIFE INVENTORY

Terrestrial Species

Birds

Common Name	*Habitat*	*Common Name*	*Habitat*
Turkey vulture	A, G, S, Rp, W	Northern mockingbird	Rs, A, G, S, W
Cooper's hawk	Rs, S, G, S, Rp, W	Townsend's solitaire	G, S, A, W
Northern goshawk	Rp, W	Western bluebird	G, S, W
Sharp-shinned hawk	A, G, S, Rp, W, Rs	Mountain bluebird	G, S, W
Northern Harrier	A, G, S, Rp	Blue-gray gnatcatcher	S, Rp, W
Rough-legged hawk	A, G, S, Rp, W	Golden-crowned kinglet	S, Rp, W, Rs
Red-tailed hawk	A, G, S, Rp, W	Ruby-crowned kinglet	S, Rp, W, Rs
Swainson's hawk	S, Rp, W	Bohemian waxwing	Rp, Rs, S
Common nighthawk	C, Rs, A, G, S, Rp, W	Cedar waxwing	Rs, A, S, Rp, W
Golden eagle	G, S, Rp, W	Northern shrike	G, S, Rp
Bald eagle	S, Rp, W	Loggerhead shrike	G, S, Rp
Prairie falcon	G, S, Rp	European starling	C, Rs, A, G, S, Rp, W
Black-shouldered kite	G, S, Rp, A	Solitary vireo	Rp, W, Rs
American kestrel	Rs, A, G, S, Sp	Warbling vireo	Rp, W, Rs
Blue grouse	Rs, A, G, S Rp, W	Hutton's vireo	W, Rs, Rp
Ruffed grouse	S, Rp, W	Nashville warbler	Rp, W, S
California quail	Rs, A, G, Rp	Yellow warbler	Rs, Rp
Mountain quail	S, Rp, W	Yellow-rumped warbler	Rs, Rp, W, S
Ring-necked pheasant	Rs, A, G, Rp	Townsend's warbler	Rp, W, S
Band-tailed pigeon	S, Rp, W	Black-throated gray warbler	Rp, W, Rs
Rock dove	C, Rs, A, G, S, Rp, W	MacGillivray's warbler	Rp, W, Rs
Mourning dove	Rs, A, G, S	Orange-crowned warbler	Rp, W, Rs
Western screech owl	Rs, A, G, S, Rp, W	Wilson's warbler	Rs, Rp, W
Great horned owl	Rs, A, G, S, Rp, W	Western meadowlark	Rs, A, G, S, Rp
Short-eared owl	A, G	Red-winged blackbird	C, Rs, A, S, Rp, W
Barn owl	A, G, S, Rp, W	Say's phoebe	G, S, Rp, W
Northern spotted owl	Rp, W	Western wood-peewee	Rp, W
Northern saw-whet owl	S, Rp, W	Common poorwill	G, S

Common Name	*Habitat*	*Common Name*	*Habitat*
Northern pygmy owl	G, Rp, W, R	Horned lark	R, S
Burrowing owl	A, G, S	Barn swallow	Rs, A, Rp
Long-eared owl	S, Rp, W	House sparrow	C, Rs, A, G, S, Rp, W
Peregrine falcon	A, G, S, Rp	Tri-colored blackbird	Rs, A, G, S, Rp
Vaux's swift	G, S, Rp, W, C, Rs	Brewer's blackbird	C, Rs, A, S, Rp, W
Anna's hummingbird	Rs, S, Rp	Yellow-headed blackbird	A, G, Rp
Rufous hummingbird	Rs, A, G, S, Rp	Northern oriole	Rs, Rp, W
Allen's hummingbird	G, S, Rp, W	Western tanager	Rs, A, Rp, W
Black-chinned hummingbird	Rs, S, Rp	Savannah sparrow	S, Rp, A, G
Calliope hummingbird	W	Lark sparrow	G, S, Rp, A
Merlin	G, S, Rp, W, Rs	Chipping sparrow	Rs, A, G, S, Rp, W
Northern flicker	Rs, A, S, Rp, W	Harris's sparrow	G, s, Rp, Rs
Acorn woodpecker	Rs, A, S, Rp, W	White-crowned sparrow	Rs, A, G, S, Rp
Lewis' woodpecker	Rs, A, S, Rp, W	Golden-crowned sparrow	G, S, Rp, Rs, A
Hairy woodpecker	Rs, A, S, Rp, W	Black-throated sparrow	S
Downy woodpecker	Rs, A, S, Rp, W	Black-chinned sparrow	S
Pileated woodpecker	Rp, W	White-throated sparrow	Rs, A, G, S, Rp
Red-breasted sapsucker	Rs, A, S, Rp, W	Fox sparrow	A, Rp, W, Rs
Hammond's flycatcher	Rp, W	Song sparrow	A, S, Rp, W
Ash-throated flycatcher	G, S, Rp, W	Lincoln's sparrow	Rs, A, S, Rp
Willow flycatcher	Rp, W	Brown-headed grosbeak	Rs, A, Rp, W
Western flycatcher	Rp, W	Evening grosbeak	Rp, W, Rs
Dusky flycatcher	Rp, W	Purple finch	Rs, A, S, Rp, W
Olive-sided flycatcher	Rp, W	Cassin's finch	S, Rp, W, Rs
Cordilleran (western) kingbird	Rs, A, G, S, Rp	House finch	Rs, A, S, Rp, W
Eastern king bird	Rs, A, S, Rp	American goldfinch	Rs, A, G, S, Rp
Black phoebe	Rp, W	Lesser goldfinch	Rs, A, G, S, Rp
Cliff swallow	Rs, A, Rp	Pine siskin	S, Rp, W, Rs
Violet-green swallow	Rs, A, Rp	Lazuli bunting	S, Rp, W
Tree swallow	Rs, A, Rp, W	Rufous-sided towhee	Rs, A, Rp, W, S
Mountain chickadee	S, Rp, W, Rs	California (brown) towhee	Rs, A, Rp, W, S
Chestnut-backed chickadee	S, Rp, W, Rs	Dark eyed junco	Rs, A, G, S, Rp, W
Northern rough-winged	Rp, W	Plain titmouse	S, Rp, W, Rs

Common Name	*Habitat*	*Common Name*	*Habitat*
swallow			
Purple martin	Rs, A, Rp	Bushtit	S, Rp, W, Rs
Steller's jay	Rs, A, S, Rp, W	White-breasted nuthatch	S, Rp, W, Rs
Scrub jay	Rs, A, S, Rp, W	American crow	C, Rs, A, G, S, Rp, W
Black-billed magpie	A, S, Rp	Black-capped chickadee	S, Rp, W, Rs
Vesper sparrow	G, S	Common raven	A, S, W

Mammals

Common Name	*Habitat*	*Common Name*	*Habitat*
Virginia opossum	Rp, W, S, G, Rs	Deer mouse	Rs, A, S, Rp, W
Trowbridge's shrew	W	Pinon mouse	S
Pacific shrew	Rp, W	House mouse	C, Rs
Vagrant shrew	Rp	Western jumping mouse	G, Rp
Shrew mole	Rp, W	Pacific jumping mouse	G, Rp
Broad-footed mole	A, G, S, W	California red-backed vole	W
Townsend's mole	A, G, S, W	California meadow vole	A, G, Rp
Pallid bat	Rs, A, S, Rp, W	Townsend's vole	A, G, Rp
Townsend's big-eared bat	Rs, A, S, Rp, W	Oregon vole	S, Rp, W
Silver-haired bat	Rs, A, W	Porcupine	S, W
Hoary bat	W	Red fox	A, G, S
Big brown bat	Rs, A, S, Rp, W	Gray fox	S, W
Brazilian free-tailed bat	Rs, A, S, Rp, W	Coyote	A, G, S, Rp, W
Fringed myotis	Rs, A, S, Rp, W	Black Bear	S, Rp, W
Long-eared myotis	Rs, A, S, Rp, W	Raccoon	Rs, A, S, Rp, W
Long-legged myotis	Rs, A, S, Rp, W	Ringtail	S, Rp, W
California myotis	Rs, A, S, Rp, W	Long-tailed weasel	A, S, Rp, W
Small-footed myotis	Rs, A, S, Rp, W	Ermine	A, S, Rp, W
Yuma myotis	Rs, A, S	Badger	A, G, S
Little brown myotis	Rs, A, S, Rp, W	Striped skunk	Rs, A, G, S, Rp, W
Brush rabbit	Rs, A, Rp, W	Spotted skunk	S, Rp, W
Black-tailed jackrabbit	A, G, S	Mountain lion	S, W
Mountain beaver	Rp, W	Bobcat	S, Rp, W

Common Name	*Habitat*	*Common Name*	*Habitat*
Yellow-pine chipmunk	S , Rp, W	Black-tailed deer	S, Rp, W

Reptiles

Common Name	*Habitat*	*Common Name*	*Habitat*
Western fence lizard	Rs, A, S, W	Rubber boa	S, Rp, W
Sagebrush lizard		Common garter snake	Rs, A, S, Rp, W
Southern alligator lizard	Rs, A, S, Rp, W	Western terrestrial garter snake	Rp
Northern alligator lizard	Rs, A, S, Rp, W	Northwestern garter snake	Rp
Western skink	Rs, A, S, Rp, W	Ring-necked snake	Rp, W
Harvest mouse	A, G	Sharp-tailed snake	Rp
Common king snake	G, S, Rp	Striped whip snake	G, S
Mountain king snake	G, S, Rp	Racer	Rs, A, S, Rp, W
Western rattlesnake	Rp	Gopher snake	Rs, A, G, S, Rp, W

Amphibians

Common Name	*Habitat*	*Common Name*	*Habitat*
Western toad	Rs, A, S, Rp, W	Spotted frog (threatened)	Rp
Pacific tree frog	Rs, A, Rp, W	Long-toed salamander	Rs, A, G, S, Rp, W
Foothill yellow-legged frog	Rp	Pacific giant salamander	Rp, W
Red-legged frog	Rp	Del Norte salamander	Rp, W
Bull frog	Rp	Black salamander	Rs, A, G, S, Rp, W
Tailed frog	Rp	Clouded salamander	Rp, W
Cascades frog	Rp	Rough-skinned newt	Rs, A, Rp, W
Ensatina	Rp		

Aquatic Species

Birds

Common Name	*Habitat*	*Common Name*	*Habitat*
Western grebe	Rv, P, L	Least sandpiper	Rp, I, Rv, P, L
Horned grebe	Rv, P, L	Western sandpiper	Rp, Rv, P, L

Common Name	*Habitat*	*Common Name*	*Habitat*
Pied-billed grebe	Rv, L	Greater yellowlegs	Rp, I, P, L
Eared grebe	Rv, P, L	Long-billed dowitcher	Rp, I, P
Tundra swan	Rp, Rv, L	Dunlin	Rp, I, P, L
Canada Goose	Rp, Rv, L	Sanderling	Rp, I, P
White-fronted goose	Rp, I, Rv, P, L	Wilson's phalarope	Rp, I, St, Rv, P, L
Northern pintail	Rp, I, St, P, Rv, L	Red-necked phalarope	Rp, I, St, Rv, P, L
American widgeon	Rp, I, St, Rv, P, L	Common snipe	Rp, I, Rv, P, L
Northern shoveler	Rp, I, St, Rv, P, L	California gull	Rp, I, Rv, P, L
Blue-winged teal	Rp, I, St, Rv, P, L	Ring-billed gull	Rp, I, Rv, P, L
Cinnamon teal	Rp, I, St, Rv, P, L	Bonaparte's gull	Rv, L
Green-winged teal	Rp, I, St, Rv, P, L	Forester's tern	Rv, P, L
Wood duck	Rp, I, St, Rv, P, L	Caspian tern	L
Canvasback	Rv, L	Black tern	L
Ring-necked duck	Rv, P, L	Belted kingfisher	Rp, Rv, L, P
Lesser scaup	Rv, L	American dipper	Rp, St, Rv
Common goldeneye	Rp, St, Rv, P, L	Marsh wren	Rp
Barrow's goldeneye	Rv, L	American pipit	Rp, St, L
Bufflehead	St, Rv, P, L	American bittern	Rp, Rv, L
Ruddy duck	St, Rv, P, L	Redhead	Rv, P, L
Common merganser	Rv, P, L	Osprey	Rp, Rv, L
Hooded merganser	St, Rv, P, L	Great egret	Rp, P, L
Double-crested cormorant	Rv, L	Great blue heron	Rp, Rv, P, L
Mallard	Rp, I, St, Rv, P, L	Green-backed heron	Rp, Rv, P, L
Gadwall	Rp, I, St, Rv, P, L	Black-crowned Night-Heron	Rp, P, L
Virginia rail	Rp, P	Black-bellied plover	L
Sora	Rp, P, L	Spotted sandpiper	Rp, I, Rv, P, L
American Coot	Rp, I, St, Rv, P, L	Pectoral sandpiper	Rp, I, P, L
Semi-palmated plover	Rp, I, P	Baird's sandpiper	L

Mammals

Common Name	*Habitat*	*Common Name*	*Habitat*
Water shrew	Rp	Muskrat	Rp, St, Rv, P, L
Marsh shrew	Rp	Mink	Rp, St, Rv, P, L

Beaver	Rp, St, Rv, P, L	River otter	Rp, St, Rv, P, L

Reptiles

Common Name	*Habitat*	*Common Name*	*Habitat*
Western pond turtle (threatened)	Rp, St, Rv, P, L	Western aquatic garter snake	Rp, I, St, P

Amphibians
(Also See Terrestrial Species)

Common Name	*Habitat*	*Common Name*	*Habitat*
Long-toed salamander	St, P, L	Pacific tree frog	Rp, I, St, P
Pacific giant salamander	Rp, St, Rv, L	Foothill yellow-legged frog	Rp, St
Del Norte salamander	Rp	Red-legged frog	Rp, St
Black salamander	Rp	Bullfrog	Rp, St, Rv, P, L
Clouded salamander	Rp, St	Tailed frog	Rp, St, Rv
Dunn's salamander	Rp, I	Cascades frog	Rp, I, St, P, L
Rough-skinned newt	Rp, I, P, L	Spotted frog	Rp, St, Rv, P, L
Western toad	Rp, P, L	Rough-skinned newt	Rp, I, St, Rv, P, L

10/89, Dr. Stephen Cross, (Mammals, Reptiles, Amphibians); Otis D. Swisher (Birds),Department of Biology, SOU, Ashland

APPENDIX B
HISTORIC RESOURCES INVENTORY
MEDFORD URBAN GROWTH BOUNDARY

1A LIST
SIGNIFICANT HISTORIC RESOURCES
CITY OF MEDFORD

See the Historic Resources Inventory Data Base List
Copies Available in the Medford Planning Department

1A LIST
SIGNIFICANT HISTORIC RESOURCES (PARTIAL)
CITY OF MEDFORD

Not updated with the Medford Downtown Historic District unless previously listed on the National Register. See the Historic Resources Data Base List for the full 1A list.

HISTORIC NAME	ZONE	ADDRESS
A.J. Fredenburg House	C-SP/H	243 South Holly Street
Acme Hardware Building	C-C/CB	1 West 6th Street
Adkins-Childers Building	C-C/CB	226 East Main Street
Alfred Evan Reames House	C-S/P	816 West 10th Street
Barnum (Grand) Hotel	C-C/CB/H	216 North Front Street
Bates Candy Warehouse	C-G/CB	160 North Fir Street
Bates Barber Shop	C-C/CB	126 West Main Street
Beck Apartments	C-C/CB	24 South Grape Street
BPOE (Elks) Lodge	C-C/CB/H	202 North Central Avenue
C. Fridiger Building	C-C/CB	111 North Central Avenue
~~Cargill Court Apartments~~ *delisted*		~~331 West 6th Street~~
C.A. Winetrout Building (Crater Lake Motors)	C-C/CB	29 West Main Street
C.E. “Pops” Gates House	SFR-6	1307 Queen Anne Avenue
Central Fire Hall/City Hall	C-C/CB	110 East Sixth Street
Charles Sweeney House	C-S/P	2336 Table Rock Road
Childers Building-Dreamland Ballroom	C-C/CB	417 East Main Street
Clara Barkdull Building	C-C/CB	117 North Central Avenue
Clemons-Brandon House	C-C/CB	211 North Ivy Street
Cooley Building - Craterian Theater	C-C/CB	23 South Central Avenue
Corning Court Ensemble	C-S/P	5, 6, 11, 15, & 16 Corning Court
Crater Lake Garage	C-C/CB	123 South Front Street
Daniel L. McNary	C-C/CB	243 North Ivy Street
Davis Building	C-C/CB	30 North Central Avenue
Davis Cornwall Building-North	C-C/CB	127 South Bartlett Street
De Voes Confectionary	C-C/CB	2 North Oakdale Avenue

Derrick's Cafeteria	C-C/CB/BC	17 South Riverside Avenue
Dillon Hill House		1307 Kings Highway
Dr. E.B. Pickel Rental House	C-C/H	815 West Main Street
Dr. John F. Reddy House	SFR-4	122 Oregon Terrace
Edgar Hafer House	C-C/CB/H	426 West 6th Street
Evelyn Apartments	C-C/CB	107 North Ivy Street
Fehl Building	C-C/CB	332 West 6th Street
First National Bank Building	C-C/CB	120 East Main Street
Florence Graves House	C-C/CB	220 North Oakdale Avenue
Fluhrer Bakery Building	C-C/CB/H	29 North Holly Street
Fluhrer Pastry Plant	C-G/CB	125 West 4th Street
Frank Clark-Jackson House	SFR-4/H	1917 East Main Street
Garnett-Cory (Liberty) Building	C-C/CB/H	201 West Main Street
Getchell Building	C-C/CB	115 West Main Street
Halley Block	C-C/CB	26 South Central Avenue
Hamilton Patton House	SFR-4	245 Valley View Drive
Hamlin Building (East)	C-C/CB	130 East Main Street
Hamlin Building (West)	C-C/CB	128 East Main Street
Haskins Drug Store	C-C/CB	214 East Main Street
Hight Realty	C-C/CB	221 North Central Avenue
Holly Apartments	C-C/CB	135 North Holly Street
Holly Theater	C-C/CB	226 West 6th Street
Holly Court Apartments	C-C/CB	240 North Holly Street
Home Telephone & Telegraph	C-C/CB	218 West 6th Street
Hoover-Cooper Building	C-C/CB	232 East Main Street
Hotel Medford Sample Rooms	C-C/CB	23 North Ivy Street
Hubbard Brothers Hardware-Woods Blk.	C-C/CB	335 East Main Street
Huggins & Robinson Auto	C-C/CB	32 South Bartlett Street
J.C. Penney's	C-C/CB	102 North Central Avenue
J.H. Thorndike House	C-C/CB	221 North Holly Street
Jackson County Courthouse	C-S/P	10 South Oakdale Avenue
Jackson County Bank Building	C-C/CB	2 North Central Avenue

James W. Bass House	C-C/CB	215 North Ivy Street
Jerome Building - Auto Parts & Supply	C-C/CB/BC	3 South Riverside Avenue
Jerome Building - Eastside Pharmacy	C-C/CB/BC	3 South Riverside Avenue
John F. White Building	C-C/CB	207 West Main Street
Johnson-Childers Building	C-C/CB	318 East Main Street
Kay Building	C-C/CB	34 South Fir Street
Leverette Block	C-C/CB	117 South Central Avenue
Library Park (Alba Park)	C-SP/CB	North Holly & West Main Streets
McAndrews-Barnum Block (West)	C-C/CB	315 East Main Street
McAndrews-Barnum Block (East)	C-C/CB	317 East Main Street
Medford Carnegie Library	C-SP/CB/H	413 West Main Street
Medford Plaza Apartments NOT ON NATIONAL REGISTER	C-SP/CB	235 South Oakdale Avenue
Medford Central Market	C-C/CB	127 North Central Avenue
Medford IOOF Cemetery	SFR-6	Siskiyou Boulevard
Medford Furniture & Hardware Building	C-C/CB	29 North Central Avenue
~~Medford Hotel~~ *delisted*		~~406 West Main Street~~
Meeker-Stang Building	C-C/CB	231 East Main Street
Meydinski-Palmer Building	C-C/CB	134 East Main Street
Moore Annex-Pottenger Building	C-C/CB	123 West Main Street
P.T. Young/Humphrey Motors	C-C/CB/BC	33 South Riverside Avenue
Pacific Telephone & Telegraph	C-C/CB	145 North Bartlett Street
Pacific Greyhound Bus Depot	C-C/CB	212 North Bartlett Street
Pacific-Record Herald Building	C-C/CB	324 West 6th Street
Palm Rental Store	C-C/CB	20 South Fir Street
Palm (Goldy) Building	C-C/CB	107 East Main Street
Palm-Niedermeyer Building	C-C/CB	132 West Main Street
Pinnacle Packing Plant # 3	C-G/CB	220 North Fir Street
Presbyterian Church	C-C/CB	85 South Holly Street
Raymond H. Toft House	C-C/CB	243 North Holly Street
Richfield Station	C-C/CB	145 North Central Avenue
Root-Slover House	C-C/CB	203 North Holly Street

Roots-Banks House	C-C	11 North Peach Street /1000 W. Main
Safeway/Littrell Building	C-C/CB	313 East Sixth Street
Sam Jennings Building	C-C/CB	229 North Riverside Avenue
Schuler Apartment Building	C-C/CB	38 North Oakdale Avenue
Shone-Charley House	MFR-20/H	305 North Grape Street
Sophenia Ish (Ashpole) House		902 West McAndrews Road
Southern Pacific Rail Passenger Depot	C-C/CB	147 North Front Street
Sparta Building	C-C/CB	12 North Riverside Avenue
St. Mark's Church	C-C/CB	212 North Oakdale Avenue
Stewart Building	C-C/CB	237 East Main Street
Tayler-Phipps Building	C-C/CB	221 East Main Street
Thomas Building No. 2 (Oregon Rooms)	C-C/CB	225 West Main Street
U.S. Post Office - Courthouse	C-C/CB/H	310 West 6th Street
Vawter-Brophy Building	C-C/CB	209 East Main Street
Warner, Wortman & Gore Building	C-C/CB	307 East Main Street
Weeks & Orr Furniture	C-C/CB	114 West Main Street
West Side Feed & Sale Stable	C-C/CB/H	29 South Grape Street
Wilkenson-Swem Building	C-C/CB/H	217 East Main Street
Woodman of the World	C-C/CB	143 North Grape Street

SOUTH OAKDALE HISTORIC DISTRICT

	C-SP/H	326 South Oakdale Avenue
	C-SP/H	358 South Oakdale Avenue
	C-SP/H	408 South Oakdale Avenue
	C-SP/H	412 South Oakdale Avenue
	SFR-10/H	418 South Oakdale Avenue
	SFR-10/H	426 South Oakdale Avenue
	SFR-10/H	503 South Oakdale Avenue
	SFR-10/H	504 South Oakdale Avenue
	SFR-10/H	507 South Oakdale Avenue
	SFR-10/H	511 South Oakdale Avenue
	SFR-10/H	512 South Oakdale Avenue

SFR-10/H	518 South Oakdale Avenue
SFR-10/H	519 South Oakdale Avenue
SFR-10/H	522 South Oakdale Avenue
SFR-10/H	608 South Oakdale Avenue
SFR-10/H	609 South Oakdale Avenue
SFR-10/H	610 South Oakdale Avenue
SFR-10/H	611 South Oakdale Avenue
SFR-10/H	615 South Oakdale Avenue
SFR-10/H	616 South Oakdale Avenue
SFR-10/H	619 South Oakdale Avenue
SFR-10/H	620 South Oakdale Avenue
SFR-10/H	701 South Oakdale Avenue
SFR-10/H	704 South Oakdale Avenue
SFR-10/H	705 South Oakdale Avenue
SFR-10/H	706 South Oakdale Avenue
SFR-10/H	707 South Oakdale Avenue
SFR-10/H	710 South Oakdale Avenue
SFR-10/H	714 South Oakdale Avenue
SFR-10/H	715 South Oakdale Avenue
SFR-10/H	718 South Oakdale Avenue
MFR-20/H	800 South Oakdale Avenue
SFR-10/H	810 South Oakdale Avenue
SFR-10/H	815 South Oakdale Avenue
SFR-10/H	822 South Oakdale Avenue
SFR-10/H	900 South Oakdale Avenue
SFR-6/H	907 South Oakdale Avenue
SFR-10/H	912 South Oakdale Avenue
SFR-6/H	922 South Oakdale Avenue
SFR-6/H	989 South Oakdale Avenue
SFR-6/H	995 South Oakdale Avenue
SFR-6/H	1001 South Oakdale Avenue
SFR-6/H	1002 South Oakdale Avenue

SFR-6/H	1006 South Oakdale Avenue
SFR-6/H	1009 South Oakdale Avenue
SFR-6/H	1010 South Oakdale Avenue
SFR-6/H	1013 South Oakdale Avenue
SFR-6/H	1018 South Oakdale Avenue
SFR-6/H	1019 South Oakdale Avenue
SFR-6/H	1100 South Oakdale Avenue
SFR-6/H	1101 South Oakdale Avenue
SFR-6/H	1108 South Oakdale Avenue
SFR-6/H	1113 South Oakdale Avenue
SFR-6/H	1114 South Oakdale Avenue
SFR-6/H	1120 South Oakdale Avenue
SFR-6/H	1121 South Oakdale Avenue
C-SP/H	517 West 10th Street
SFR-10	511 Dakota Avenue
SFR-10	516 Belmont Avenue

GENEVA-MINNESOTA HISTORIC DISTRICT

C-S/P	801 East Main Street
C-S/P	815 East Main Street
C-S/P	8 Geneva Street
SFR-6	15 Geneva Street
SFR-6	16 Geneva Street
SFR-6	19 Geneva Street
SFR-6	21 Geneva Street
SFR-6	22 Geneva Street
SFR-6	27 Geneva Street
SFR-6	28 Geneva Street
SFR-6	31 Geneva Street
SFR-6	32 Geneva Street
SFR-6	35 Geneva Street

SFR-6	38 Geneva Street
SFR-6	101 Geneva Street
SFR-6	104 Geneva Street
SFR-6	105 Geneva Street
SFR-6	108 Geneva Street
SFR-6	109 Geneva Street
SFR-6	112 Geneva Street
SFR-6	113 Geneva Street
SFR-6	Geneva Street Roadbed
SFR-6	813 Minnesota Avenue
SFR-6	819 Minnesota Avenue
SFR-6	821 Minnesota Avenue
SFR-6	822 Minnesota Avenue
SFR-6	826 Minnesota Avenue
SFR-6	828 Minnesota Avenue
SFR-6	829 Minnesota Avenue
SFR-6	830 Minnesota Avenue
SFR-6	831 Minnesota Avenue
SFR-6	832 Minnesota Avenue
SFR-6	836 Minnesota Avenue
SFR-6	839 Minnesota Avenue
SFR-6	31 Crater Lake Avenue
SFR-6	35 Crater Lake Avenue
SFR-6	101 Crater Lake Avenue
SFR-6	103 Crater Lake Avenue
SFR-6	107 Crater Lake Avenue

1B LIST
POTENTIALLY SIGNIFICANT HISTORIC RESOURCES
CITY OF MEDFORD

NOT LISTED ON THE HISTORIC REGISTER OR IN A HISTORIC DISTRICT

	HISTORIC NAME	ZONE	ADDRESS
*	American Fruit Growers Warehouse	C-G/CB	102 South Fir Street
	David Holmes House	SFR-4	6 North Modoc Avenue
	Earhart House		945 North Riverside Avenue
	H. Fluhrer House		Portland Avenue
	Hiron Tripp House	C-S/P	11 Tripp Street
*	J.F. Erickson House	C-S/P	231 South Holly Street
	Jackson School	SFR-10	630 West Jackson Street
*	Lewis C. Jenkins House	C-S/P	205 South Holly Street
*	Older Tire Service - Firestone Tire & Rubber		202 South Riverside Avenue
	Powers House & Carriage House	SFR-10	101 Portland Avenue
	Roberts House	SFR-4	1815 Crown Avenue
	Sheppard-Muirhead House	SFR-4	2003 Hillcrest Road
*	Smith-Dynage Lumber Co.	C-G/CB	102 South Fir Street
*	Stoddard-Evanson Duplex	C-S/P	240 South Grape Street
*	Thomas Apartment House	C-S/P	108 South Grape Street
	United Grocers Warehouse		40 East Tenth Street
*	W.G. Gannaway House	C-S/P	232 South Grape Street
*	William Ulrich Rental	C-S/P	141 South Holly Street
*	Wilson Court Apartments	C-S/P	122 South Grape Street
	"Stone" House	SFR-6	1202 East Main Street

* Listed on the *"Survey of Historic & Cultural Resources - Downtown Commercial Area - Phase I and Phase II"* as a primary resource.

SIGNIFICANT HISTORIC RESOURCES
MEDFORD URBAN GROWTH BOUNDARY

HISTORIC NAME	ADDRESS
Robert Vinton Beall House	1253 Beall Lane
Bear Creek Orchard Packing House	2518 South Pacific Highway
Leonard Carpenter House	2895 Hillcrest Road

SIGNIFICANT HISTORIC RESOURCES
NEAR MEDFORD URBAN GROWTH BOUNDARY
(LISTED ON THE NATIONAL REGISTER)

HISTORIC NAME	ADDRESS
Prescott Park Facilities (City of Medford Owned)	Roxy Ann Butte
Frederic E. Furry House	1720 North Phoenix Road 371W33 1000 1,500 feet Southwest of Coal Mine Road - North Phoenix Road Intersection
Hillcrest Orchard Historic District	3285 Hillcrest Road
John W. Merritt Store and Residence	117 East Pine Street, Central Point 372W10AA 200
Conro Fiero House (Mon Desir Restaurant)	4615 Hamrick Road, Central Point 372W01B 4000 West of Table Rock Road

APPENDIX C

Medford Local Wetlands Inventory and Locally Significant Wetland Determinations

The document *"Medford Local Wetlands Inventory and Locally Significant Wetland Determinations, September 2002"* prepared by Wetland Consulting of Portland, Oregon was adopted by the Medford City Council on April 17, 2003. This document was prepared and adopted pursuant to Goal 5 of the Oregon Statewide Planning Goals and the Oregon Revised Statutes (ORS). The Locally Significant Wetlands are considered "Goal 5 Significant Resources".

The contents of the document, including the Local Wetland Inventory (LWI) maps, are on file in the City of Medford Planning Department. The Local wetland Inventory Maps are also available for viewing on the City of Medford website (www.ci.medford.or.us) under the Planning Department.

The document contents include:

APPENDIX C - Medford Local Wetlands Inventory and Locally Significant Wetland Determinations - Continued

Tables

Figures

Appendices

APPENDIX D
ENVIRONMENTAL AGENCIES, LAWS AND REGULATIONS

Biology, Water Resources, Wetlands

Oregon Department of Fish and Wildlife (ODFW)
District Office
1495 Gregory Road
Central Point, OR 97502

Oregon Division of State Lands (DSL)
775 Summer Street NE
Salem, OR 97301
(503) 378-3805

Oregon Department of Environmental Quality (DEQ)
Western Region - Medford
201 West Main Street #2D
Medford, OR 97504
(541) 776-6010

Federal Endangered Species Act (1973)
50 CFR 402
Requires the protection of federally-designated threatened and endangered animal and plant species. Avoidance of taking individuals or jeopardizing populations is required. Agencies are required under Section 7 to consult with appropriate federal resource agencies before taking action.

Oregon Endangered Species Act (1987)
OAR 603-73... and 496 et seq.
Establishes a program for the protection and conservation of wildlife and plant species that are threatened or endangered. Requires state agencies to inventory populations on state lands and establish protection and conservation programs.

Waterway Habitat Policies
ORS 496...506... and 635...
Various Oregon statutes that charge Oregon Department of Fish and Wildlife with the protection of fish and wildlife habitat.

Executive Order 11990 and U.S. DOT Order 5660.1A (1977)
23 CFR 777
Declares that it is the policy of the federal government to avoid new construction in wetlands and to minimize their destruction.

Clean Water Act (1972, 1977, 1987)
33 USC 1251, 1342, & 1344 and 33 CFR 230 and 40 CFR 131

This umbrella legislation covers the protection of waters of the U.S. including wetlands. It establishes various programs, such as the National Pollution Discharge Elimination System (NPDES), an indirect source control program, the 404 Process, and permitting programs for controlling pollution and fill in wetlands and deep water habitat.

Oregon Removal-Fill Law
ORS 196.800-196.990
Regulates the removal of material from the beds and banks of, and the filling of the waters of the state.

Oregon Freshwater Wetland Compensatory Mitigation Rules
OAR 141-85-005 through 141-85-690
Regulates the removal of material from the beds and banks of, and filling of the waters of the state, including wetlands. Requires a review for avoidance, need, and mitigation of effects of fills and removals, particularly in wetlands.

Executive Order 11988 and Location and Hydraulic Design of Encroachments on Floodplains
FHPM 6-7-3-2 (1984)
Requires Federal agencies to avoid adverse impacts associated with the occupancy and modification of floodplains. They must further avoid support of floodplain development wherever there are practicable alternatives.

Executive Memorandum on Environmentally Beneficial Landscaping (1977, 1979)

Oregon Standards and Criteria for Stream-Road Crossings
ORS 498.351 and ORS 509.605

Cultural, Social, Land Use, Aesthetics

Oregon State Historic Preservation Office (SHPO)
1115 Commercial Street NE
Salem, OR 97310-5001
(503) 378-5001

Executive Order 11593 and National Historic Preservation Act (1971)
36 CFR et seq. and 36 CFR 66
Establishes national policy to identify and protect cultural resources, and historic and archaeological sites. Requires agencies to inventory significant properties and address impacts. Requires concurrence of State Historic Preservation Officer and the President's Advisory Council on Historic Places before commencing with actions that may cause impact.

Native American Graves Protection and Repatriation Act (1990)
43 CFR 10
Gives rights to lineal descendants and Native American tribes regarding human remains, funerary objects, sacred objects, or objects of cultural patrimony with which they are affiliated. This and other legislation give a high degree of control to Native Americans over archaeological site mitigation and protection.

Oregon Statewide Planning Goals (1973) and Land Use Planning Program
Oregon Department of Land Conservation and Development (DLCD)
Establishes Oregon's land use planning program. Requires the identification of certain land use categories and natural resources, and the development of mechanisms for their protection. Also requires the development of agency land use coordination agreements that spell out how state agencies will pursue their missions while fulfilling the goals of the land use program.

Noise, Air Quality, and Hazardous Materials

Jackson County Health and Human Services - Environmental Health Services
1005 East Main Street, Bldg. A
Medford, OR 97504
(Air Quality) (541) 776-7318
(Open Burning Advisory) (541) 776-7007
(Wood Burning Advisory) (541) 776-9000

Rogue Valley Inspection and Maintenance (I & M) Testing Station
3030 Biddle Road
Medford, OR 97504

Abatement of Highway Traffic and Construction Noise
Federal High Way Administration (FHWA) FHPM 7-7-3
Establishes FHWA policies on noise analysis, disclosure, and mitigation. Supplies noise abatement criteria. Directs the sharing of information with local government officials for use in planning and design.

Clean Air Act, (1970, last amended 1990), EPA/DOT Conformity Guidance, Air Quality Conformity and Priority Procedures for Use in Federal-Aid Highway and Federally-Funded Transit Programs (1984)
42 USC 7401 et seq., FHPM 7-7-9
The Clean Air Act established a national policy on controlling air pollution. The 1990 Amendments to the Clean Air Act attempt to limit air pollution through changes to industrial operations, advanced control technologies, and community action.

Oregon Air Pollution Control Laws
OAR 340-20-710 et seq.