Chapter 2

Resource

Management

2030 COMPREHENSIVE PLAN UPDATE

Section 2.1 Introduction

Background

Resource lands are essentially available assets. In 1973 Oregon passed legislation with the intent of providing statewide protection to many of Oregon's land use resources. At that time, farming and wood products were the primary economic drivers for the State, so farm and forest lands were specifically noted for protection and are often referred to as resource lands. Other resources were also identified. The structure for protecting Oregon's lands is provided by five of the 19 Statewide Planning Goals and the associated Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR). This chapter includes resources protected through the Statewide Goals.

Farm lands are protected by Statewide Goal 3, Agricultural Lands, ORS 215 and OAR 660-033. Goal 3 requires all counties to inventory and protect farm lands. The ORSs and OARs further define which land should be designated farm land and what uses are permissible. The State regulations for managing farm lands are comprehensive and complex.

Forest lands are protected by Statewide Goal 4, Forest Lands, various sections of ORS and OAR 660-006. The Goal again requires all counties to inventory forest lands and adopt policies that will conserve forest lands for forest uses.

Statewide Goal 5, Natural Resources, Scenic and Historic Areas and Open Spaces, establishes a process for inventorying and evaluating more than a dozen natural and cultural resources. The process is defined in OAR 660-016 and OAR 660-023. If a resource is found to be significant, local government can protect it, allow uses that conflict with it, or find a balance. These are often referred as Goal 5 resources.

Two additional goals are associated with resource protection but do not apply to specific lands. Statewide Goal 6, Air, Water and Land Resources Quality, requires compliance with Federal and State regulations regarding air, water and land quality. Statewide Goal 13, Energy, requires land to be managed and controlled to maximize the conservation of energy based on sound economic principles. These two goals protect our air, water, land and environment.

Purpose

The concept of sustainability is that resources used today should be managed so that there are still resources available for future generations. Sustainability encourages balancing economic, environmental and social concerns. The Deschutes County Comprehensive Plan has long acknowledged this through policies that require new development to consider the carrying capacity of environment.

The purpose of the Resource Management chapter is to effectively manage Deschutes County's agricultural, forest, natural and cultural resources to meet the needs of today while retaining their value for future generations. These resources include:

Resource Lands

- Agricultural lands (Section 2.2)
- Forest lands (Section 2.3)

Other Resources

- Goal 5 Overview (Section 2.4)
- Water Resources (Section 2.5)
- Wildlife (Section 2.6)
- Open Spaces, Scenic Views and Sites (Section 2.7)
- Energy Resources (Section 2.8)
- Environmental Quality (Section 2.9)
- Mineral and Aggregate Resources (Section 2.10)
- Historic and Cultural Resources (Section 2.11)

Key Issues

This chapter generated considerable discussion during the public outreach for the 2008-2011 Plan update. There was strong community support for protecting the natural resources that define Deschutes County, including its water and wildlife. Yet there was also concern expressed over the intrusive nature of government regulations. There is an inherent tension between resource protection and private property rights. A regulation written to protect a riparian area does so by restricting the uses allowed on that property. Often there is limited agreement over whether or how much regulation is necessary.

Chapter 2 provides recommendations to protect State and locally defined community resources that are important to the local economy and region's quality of life. Yet, the policies in this chapter also acknowledge that sometimes the appropriate government action is to create incentives or remove obstacles.

Section 2.2 Agricultural Lands

Background

Protecting farm lands and the economic benefits of agriculture is one of the primary goals of the Oregon land use system. Statewide Planning Goal 3 establishes farmland identification and protection standards which must be met by local governments. The Goal requires farm lands to be preserved for farm uses, consistent with existing and future needs for agricultural products, forest and open space. Additional criteria for Goal 3 can be found in Oregon Revised Statute (ORS) 215 and in Oregon Administrative Rule (OAR) 660-33. These criteria spell out in considerable detail which lands shall be designated as farm lands and what uses are permissible.

The main concept is that local governments must inventory and protect farm lands though the use of Exclusive Farm Use (EFU) zones that provide primarily for the continuation of commercial-scale agriculture, including farm operations, marketing outlets and the agricultural support system. To provide a science based method of identifying farm lands, Statewide Goal 3 defines agricultural lands primarily through soil classifications. However, other lands can, and often must, be classified for farming based on the criterion 'suitable for farm use' or being near agricultural lands.

Excerpt from Statewide Planning Goal 3

> *"Agricultural Land … in eastern Oregon is land of predominantly Class I, II, III, IV, V and VI soils as identified in the Soil Capability Classification System of the United States Soil Conservation Service, and other lands which are suitable for farm use taking into consideration soil fertility, suitability for grazing, climatic conditions, existing and future availability of water for farm irrigation purposes, existing land-use patterns, technological and energy inputs required, or accepted farming practices. Lands in other classes which are necessary to permit farm practices to be undertaken on adjacent or nearby lands, shall be included as agricultural land in any event.*
>
> *More detailed soil data to define agricultural land may be used by local governments if such data permits achievement of this goal.*
>
> *Agricultural land does not include land within acknowledged urban growth boundaries or land within acknowledged exceptions to Goals 3 or 4."*

Besides Statewide Goal 3, farming is protected in Oregon by "right-to-farm" law (ORS 30.930-047). This law protects commercial farms from nuisance suits brought about by generally accepted farming practices, such as noise, dust or odors.

County Agricultural Designations

Farm land designations in Deschutes County have been and continue to be highly controversial. In designating farm lands in the late 1970s, the County was hampered by the limited availability of soil maps. Where soil maps existed those were consulted, but the County also included irrigated lands and lands receiving farm deferrals for the previous five years. Ultimately, seven separate agricultural areas were identified, each specifying minimum lot sizes. In general, non-urban, non-forest, undeveloped and uncommitted lands were determined to be farm lands.

Despite designating many agricultural areas by default, the 1979 Resource Element noted that based on agricultural determinants of soils, water, climate and economics, profitable farming in the County remained difficult. The findings for protecting non-profitable agricultural land noted the aesthetic value of farm land, the costs and hazards of allowing local development and the economic importance of rural open space.

In 1992 a commercial farm study was completed as part of the State required periodic review process. The study concluded that irrigation is the controlling variable for defining farm lands in Deschutes County. Soil classifications improve when water is available. Seven new agricultural subzones were identified based on the factual data provided in the 1992 study and minimum acreages were defined based on the typical number of irrigated acres used by commercial farms in that particular subzone (with the exception of the Horse Ridge subzone).

Like the 1979 Resource Element, the 1992 farm study noted the challenges of local commercial farming. The high elevation (2700-3500 feet), short growing season (88-100 days), low rainfall and distance to major markets hamper profitability. The 1992 study resulted in minimum lot sizes that are smaller than the State requirement of 80 acres for farm land and 160 acres for range land. These minimum lot sizes are unique in Oregon and were acknowledged as in compliance with Goal 3 by the Oregon Land Conservation and Development Commission. In general, County farm designations are effectively protecting farm lands while allowing limited land divisions.

Deschutes County Agricultural Sub-Zones

As noted above, the County maintains a unique set of farm sub-zones based on the average number of irrigated acres for each type of farm land as determined in the 1992 farm study. Irrigated land divisions in each sub-zone must result in parcels that retain the acreages shown in Table 2.2.1.

Table 2.2.1 - Exclusive Farm Use Subzones

Subzone Name	*Minimum Acres*	*Profile*
Lower Bridge	130	Irrigated field crops, hay and pasture
Sisters/Cloverdale	63	Irrigated alfalfa, hay and pasture, wooded grazing and some field crops
Terrebonne	35	Irrigated hay and pasture
Tumalo/Redmond/Bend	23	Irrigated pasture and some hay
Alfalfa	36	Irrigated hay and pasture
La Pine	37	Riparian meadows, grazing and meadow hay
Horse Ridge East	320	Rangeland grazing

Source: Deschutes County 1992 Farm Study

Irrigation Districts

As shown in the 1992 farm study, irrigation and irrigation districts are instrumental factors for Deschutes County agriculture. Irrigation districts in Oregon are organized as Special Districts under ORS Chapter 545. The districts are created for the purpose of delivering water to their patrons. As such they are effectively non-profit water user associations. In addition to irrigation, these districts also supply a number of other uses, including municipal, industrial, and

pond maintenance. However, by and large the districts exist for the purposes of delivering irrigation.

Seven districts, which withdraw their water supply from the Deschutes River Basin, have formed an intergovernmental unit called a "board of control" under ORS 190.125. This organizational structure allows the districts to work together as a unit in implementing water conservation projects, providing educational resources, utilizing equipment and for other joint purposes. A key goal for the Deschutes Basin Board of Control is to preserve agricultural uses in those areas where irrigation improves soils to class VI or better.

The six irrigation districts listed below serve residents or have facilities within Deschutes County and are members of the Deschutes Basin Board of Control.

Arnold Irrigation District

The present Arnold Irrigation District was first organized as the Arnold Irrigation Company on December 27, 1904 and became official on January 9, 1905. As of 2010 the district manages approximately 65 miles of canals, ditches and pipes in an area of approximately 18,560 acres.

Central Oregon Irrigation District

The Central Oregon Irrigation District (COID) was established in 1918. The District provides water for approximately 45,000 acres within an 180,000 acre area in Central Oregon. More than 700 miles of canals provide agricultural and industrial water to irrigate Terrebonne, Redmond, Bend, Alfalfa and Powell Butte areas. In addition, COID provides water to the City of Redmond and numerous subdivisions. In Bend, many parks and schools receive water through the COID system. COID is also the managing partner in the operation of the 55,000 acre foot Crane Prairie Reservoir, located on the east side of the Central Cascades.

North Unit Irrigation District

The North Unit Irrigation District (NUID) was organized in 1916. As part of the Reclamation Act of 1902, Congress approved the Deschutes Project and in 1927 began construction of the project under the direction of the U.S. Bureau of Reclamation. The project was completed in 1949 allowing NUID to serve nearly 50,000 acres. Today NUID is the second largest irrigation district in Oregon, serving approximately 59,000 acres in Jefferson County. NUID maintains facilities in Deschutes County, including Wickiup Dam, Bend Headworks and the North Unit Irrigation Canal. NUID has a long-standing relationship with the U.S. Bureau of Reclamation as a result of the Deschutes Project.

Swalley Irrigation District

The Swalley Irrigation District was organized as the Deschutes Reclamation and Irrigation Company (DRIC) in 1899. In 1994 the shareholders of the DRIC voted to incorporate as an irrigation district and took the name of Swalley Irrigation District. The District has 28 miles of canals and laterals providing water to 667 customers.

Three Sisters Irrigation District

The Three Sisters Irrigation District (formerly Squaw Creek Irrigation District) was founded in 1917 from the Squaw Creek Irrigation Company and the Cloverdale Irrigation Company. They were founded in 1891 and 1903 respectively, making Three Sisters Irrigation District one of the oldest such districts in Oregon. The District serves approximately 175 water users over approximately 7,568 acres.

Tumalo Irrigation District

Originally known as the Tumalo Project, Tumalo Irrigation District started in 1904. In 1922 the Project reorganized as an irrigation district under Oregon state laws. The District serves approximately 60 square miles, irrigating approximately 8,093 acres, and has over 80 miles of canals, laterals and ditches serving 635 landowners.

Deschutes County Agriculture 2007 - 2009

The following statistics provide a snapshot of farming in Deschutes County.

Source: County GIS data

- Approximately 36% of the County or more than 700,000 acres are designated as Agriculture on the Comprehensive Plan map. Of that acreage, 69% is public, primarily Federal ownership leaving approximately 224,000 acres privately held.
- 160,078 acres of privately owned farm lands in the County receive special tax assessment for farm use.
- Of the acres receiving farm tax assessments, 44,221 are irrigated.
- In 2008 there were 3,725 agricultural parcels less than five acres.

Source: Oregon State University Extension Oregon Agricultural Information Network, Deschutes County Agricultural Commodity Sales for 2009 (preliminary estimate)

- $19,792,000 in agricultural sales, a drop from the 2008 preliminary estimate of $25,991,000. This follows slight upturns in sales between 2006-2008.
- 62% of agriculture sales are in crops and 38% in livestock. The primary crops are hay and alfalfa hay while the primary livestock is cattle. The biggest downturns for 2009 are non-alfalfa hay and cattle.

Source: United States Department of Agriculture, National Agricultural Statistics Service 2007 Census of Agriculture

- There are 1,405 farms in Deschutes County residing on 129,369 acres
- Average farm size 92 acres
- Approximately 24% of farms are under 10 acres and 78% are under 50 acres
- Total net cash farm income is negative
- 59% of farmers list their primary occupation as 'Other' rather than farming

The above data highlights the fact that farming in Deschutes County is generally not commercially profitable. For a majority of farmers, farming is not a sustaining economic activity, but rather a lifestyle choice. Living on a farm and farming as a secondary economic activity acknowledge a shift from commercial farming towards the benefits of a rural lifestyle.

Farm Trends 2010

Whatever the challenges, agriculture is part of Deschutes County's culture and rural lifestyle. During the public input process, various ideas were discussed on how to preserve agricultural lands, open spaces and rural character of the County, while enabling landowners to make a living. The following ideas identify current trends that could be promoted by the County in conjunction with the local extension service and other agencies and organizations. It is important to emphasize that new uses must conform to State regulations.

Alternative energy: Development of small alternative energy projects would promote local energy self-sufficiency, using Central Oregon's sun, wind, thermal, hydropower and biomass resources. Larger agricultural parcels could be used as commercial wind or solar farms to provide renewable energy as well as income to landowners.

Alternative uses: There is interest in allowing non-farm uses on farm lands to take advantage of agrarian lifestyles and Central Oregon's setting. Ideas being discussed include agri-tourism or hosting weddings. Nonetheless, new non-farm uses must be evaluated to ensure they are compatible with ORS and OARs as well as existing land uses and zoning.

Local markets: Products from small farms are often sold to local markets. Additionally local consumption saves on transportation and energy, allowing better tracking of food sources thereby increasing food safety and improving freshness and quality. Buying local is a current trend that could benefit the County's many small farmers. Community Supported Agriculture is one popular method, where farmers obtain paid subscriptions from customers, who then receive fresh produce every week for the season. Farmers markets and farm stands are another aspect of the local food movement.

Conservation easements: Many states are using programs to put permanent conservation easements on farm lands. As an example of a program that is not yet available in Oregon is the Purchase of Agricultural Conservation Easements (PACE). Funded by the federal government and a combination of other sources, PACE purchases development rights from farmers.

Niche markets: Small quantities or specialized products can be raised to meet particular markets, like organic products or peppermint oil.

Value-added products: Processing crops can increase profitability. An example would be making jam or jelly out of locally grown berries.

Farm Councils: Farm councils are being initiated around the country to promote local sustainable food. The Central Oregon Food Policy Council (COFPC) formed in 2010 to lead the effort to a sustainable and just food system. The COFPC is made up of 12-15 volunteers including representatives from agricultural production, public health, government and others interested in the local food system. Identified strategies include supporting access to local healthy food, advocating for public policies that increase sustainable food production and connecting stakeholders in the food systems field.

Big Look

In 2005 a task force was appointed by the Oregon Governor, Speaker of the House and Senate President to review the current land use system. The Oregon Task Force on Land Use Planning was a 10-member group representing various perspectives, charged with conducting a comprehensive review of the Oregon Statewide Planning Program. Called the Big Look Task

Force, this group was asked to make recommendations for any needed changes to land-use policy to the 2009 Legislature.

After three years of extensive input from experts and citizens throughout the State, the task force developed its findings and recommendations. One of the primary conclusions reached was that Oregon needs a more flexible land use system that responds to regional variations.

Two of the primary recommendations from the Task Force addressed agricultural and forest lands, recommending:

- Counties be allowed to develop regional criteria for designating farm and forest lands, if they also protect important natural areas and assure that development is sustainable.
- Counties be allowed to propose specialized rules to decide what lands are designated as farm or forest land.

2009 Legislature / House Bill 2229

House Bill (HB) 2229 began as the vehicle for legislative recommendations for the Big Look Task Force. However, by the time the Legislature adjourned, very little of the Task Force's recommendations remained. HB 2229 does authorize counties to reevaluate resource lands and amend their comprehensive plan designations for such lands consistent with definitions of "agricultural land" and "forest land." For example, the County could add irrigated lands to the regional definition of farm lands to acknowledge the results of the 1992 farm study. Anything that does not qualify as farmland or forestland may be rezoned for non-resource use, subject to conditions that development in the non-resource zones be rural in character, not significantly conflict with surrounding farm and forest practices, and not have adverse affects on such things as water quality, wildlife habitat, and fire safety. County rezoning activities must be pursuant to a work plan approved by the Oregon Department of Land Conservation and Development. This effectively means the work will be done similar to periodic review with the Land Conservation and Development Commission expressly given exclusive jurisdiction to review a county decision.

Future of Deschutes County Farm Designations and Uses

Statewide Planning Goal 3 requires counties to preserve and maintain agricultural lands. However, in discussions on the future of agriculture in Deschutes County, there are still differences of opinion over which lands should be designated farm lands and what uses should be allowed. Farm lands contribute to the County in a number of ways. Agriculture is part of the ongoing local economy. Wide-open farm lands offer a secondary benefit by providing scenic open spaces that help attract tourist dollars. Farm lands also contribute to the rural character that is often mentioned as important to residents. Finally, it should be noted that agricultural lands are preserved through State policy and land use law because it is difficult to predict what agricultural opportunities might arise, and once fragmented the opportunity to farm may be lost.

On the other hand, there seems to be widespread agreement that much of the local farm land is marginal, particularly without irrigation. The climate, especially the short growing season, makes commercial farming challenging. Statewide Planning Goal 3 does not really account for the conditions in Deschutes County, resulting in agricultural zoning being applied to land with no history of farming and limited potential for profitable farming. The small size of agricultural parcels adds to the challenges. It has been argued that preserving farm lands benefits the wider

public at the expense of agricultural landowners. There is considerable pressure to convert agricultural land to residential or other uses.

The debate is complicated because there are impacts to the farming community from converting agricultural lands to other uses. It can be challenging for a farmer who has residential neighbors because farming activities can have noise, odor or dust impacts. The right-to-farm law discussed earlier offers some protection to farmers, but as residential uses grow there is pressure to convert, leading to a greater loss of agricultural lands.

The goals and policies in this Section are intended to provide the basis for evaluating the future of agriculture in the County over the next twenty years. They are intended to provide, within State guidelines, flexibility to the farming community. County farm lands will be preserved by ensuring a variety of alternative paths to profitability.

Section 2.2 Agricultural Lands Policies

Goals and Policies

Goal 1 **Preserve and maintain agricultural lands and the agricultural industry.**

Policy 2.2.1 Retain agricultural lands through Exclusive Farm Use zoning.

Policy 2.2.2 Exclusive Farm Use sub-zones shall remain as described in the 1992 Farm Study and shown in the table below, unless adequate legal findings for amending the sub-zones are adopted or an individual parcel is rezoned as allowed by Policy 2.2.3.

Exclusive Farm Use Subzones

Subzone Name	*Minimum Acres*	*Profile*
Lower Bridge	130	Irrigated field crops, hay and pasture
Sisters/Cloverdale	63	Irrigated alfalfa, hay and pasture, wooded grazing and some field crops
Terrebonne	35	Irrigated hay and pasture
Tumalo/Redmond/Bend	23	Irrigated pasture and some hay
Alfalfa	36	Irrigated hay and pasture
La Pine	37	Riparian meadows, grazing and meadow hay
Horse Ridge East	320	Rangeland grazing

Policy 2.2.3 Allow comprehensive plan and zoning map amendments for individual EFU parcels as allowed by State Statute, Oregon Administrative Rules and this Comprehensive Plan.

Policy 2.2.4 Develop comprehensive policy criteria and code to provide clarity on when and how EFU parcels can be converted to other designations.

Policy 2.2.5 Uses allowed in Exclusive Farm Use zones shall comply with State Statute and Oregon Administrative Rule.

Policy 2.2.6 Regularly review farm regulations to ensure compliance with changes to State Statute, Oregon Administrative Rules and case law.

Policy 2.2.7 Encourage water projects that benefit agriculture.

Policy 2.2.8 Support a variety of methods to preserve agricultural lands, such as:

a. Support the use of grant funds and other resources to assist local farmers;
b. Work cooperatively with irrigation districts, public agencies and representatives and land owners;
c. Encourage conservation easements, or purchase or transfer of development rights programs;
d. Control noxious weeds;
e. Encourage a food council or 'buy local' program.

Goal 2 **Promote a diverse, sustainable, revenue-generating agricultural sector.**

Policy 2.2.9 Encourage farming by promoting the raising and selling of crops, livestock and/or poultry.

Policy 2.2.10 Support stakeholders in studying and promoting economically viable agricultural opportunities and practices.

Policy 2.2.11 Encourage small farming enterprises, including, but not limited to, niche markets, organic farming, farm stands or value added products.

Policy 2.2.12 Review County Code and revise as needed to permit alternative and supplemental farm activities that are compatible with farming, such as agri-tourism or commercial renewable energy projects. When a preferred alternative or supplemental use identified through a public process is not permitted by State regulations work with the State to review and revise their regulations.

Goal 3 **Ensure Exclusive Farm Use policies, classifications and codes are consistent with local and emerging agricultural conditions and markets.**

Policy 2.2.13 Identify and retain accurately designated agricultural lands.

Policy 2.2.14 Explore new methods of identifying and classifying agricultural lands.

a. Apply for grants to review and, if needed, update farmland designations.
b. Study County agricultural designations considering elements such as water availability, farm viability and economics, climatic conditions, land use patterns, accepted farm practices, and impacts on public services.
c. Lobby for changes to State Statute regarding agricultural definitions specific to Deschutes County that would allow some reclassification of agricultural lands.

Policy 2.2.15 Address land use challenges in the Horse Ridge subzone, specifically:

a. The large number of platted lots not meeting the minimum acreage;
b. The need for non-farm dwellings and location requirements for farm dwellings;
c. Concerns over the impact on private property from off-road vehicles, facilities, and trails located on adjacent public lands.

Policy 2.2.16 Work with the State to review and revise accessory farm dwelling requirements to address the needs of local farmers.

Policy 2.2.17 Encourage coordination between fish/wildlife management organizations and agricultural interests.

Section 2.3 Forest Lands

Background

Protecting forests and their economic benefits are primary goals of the Oregon land use system. Statewide Planning Goal 4 establishes forest identification and protection standards which must be met by local governments. The Goal requires forests to be protected primarily for the growing and harvesting of trees, with environmental and recreational uses also being considered. Additional criteria for Statewide Goal 4 can be found in Oregon Revised Statue (ORS) 215 and Oregon Administrative Rule (OAR) 660-006. The key concept is local governments must inventory forest lands and protect them through local regulations.

County Forestry Designations

In 1979 in order to meet the Statewide Goal 4 inventory requirement for forest lands, the County worked with the Oregon Department of Forestry to review timber productivity based on soils information. A resulting timber productivity map was created and three categories of forest lands were identified based on forest uses identified in Statewide Goal 4.

In the 1990s, the Land Conservation and Development Commission initiated the Forest Rule, OAR 660-006, defining allowed uses, siting conditions and minimum lot sizes in forest zones. In 1992, as part of State mandated Periodic Review, Deschutes County revised its forest designations, reducing forest designations and associated regulations to two (F-1 and F-2).

County Forests 2007 - 2009

The following statistics provide a snapshot of forests in Deschutes County.

Source: County GIS data

- Approximately 52% of the County or over 1 million acres are designated as forest on the Comprehensive Plan map. Of that acreage, 92% is public, primarily federal, leaving approximately 78,000 acres privately held.
- There are 475 forest special assessment accounts.
- The largest privately owned forest land is the 33,000 acre Skyline Forest, formerly Bull Springs Tree Farm.

Source: OSU Extension Service Silviculture and Fire Education Specialist

- Total public and private timber harvest in the County in 2007 was 22.5 million board feet, in 2008, 36.1 million board feet and in 2009, 14.7 million board feet.

Source: Deschutes County Forester

- Since 2002 approximately 130,000 acres of public and private forest lands have burned in Deschutes County at a firefighting expense of approximately $60 million.

Forest Trends 2010

As timber harvesting decreases, other uses for forest lands are emerging. State regulations permit five general types of uses, including forest operations; environmental, agricultural or recreational uses; two types of dwellings and locally dependent uses. Permitted uses are defined

and clarified in OAR 660-006. The following uses are becoming more prominent and likely to gain importance over the next 20 years.

Secondary forest products (forest operations): There is an increasing use of secondary forest products, such as hog fuel (chipped wood) or wood slash, which can be used for everything from animal bedding to presto logs to biomass fuel. There is some concern that those uses will lead to increased logging and degradation of forests. However, there is considerable agreement that the high build up of debris in local forests increases the risk of forest fires. The use of secondary forest products can contribute to the health of the forest as well as the local economy.

Recreation (environmental, agricultural and recreation uses): The proximity of federal forests for hiking, mountain biking, skiing, hunting, fishing, wildlife viewing and other outdoor recreation draws tourists and residents alike. (see Section 2.6 for data on the economic impacts of wildlife tourism.)

Alternative energy (locationally dependent): Commercial alternative energy projects are often locationally dependent. Forestry-related biomass plants and associated infrastructure are being considered in Central Oregon.

Future of Forest Uses

Most of the forest land in Deschutes County is owned and managed by the Federal government under Federal regulations. Forest practices on State or private forest lands are regulated by the Oregon Department of Forestry. The primary role of the County is to limit the impacts of development on private property in forest zones.

Although most forest lands are not owned or managed by Deschutes County, forests contribute immeasurably to livability. Timber management and recreational tourism provide economic benefits and employment. Forests provide an impressive diversity of recreational opportunities. Forests also play a large role in maintaining clean air and water and they provide scenic beauty and habitat for a wide variety of plants and animals. It is important for the County to work cooperatively with forest landowners, including public agencies, non-profit organizations and private land owners.

Residential Development

The primary concern over changing forest uses is that as timber becomes less profitable, the pressure to develop forest lands for residential uses increases. State regulations limit the development of housing in forest zones, recognizing that fragmenting forests decreases productivity. The biggest challenge posed by residential fragmentation of forests is the danger posed by wildfire in heavily wooded areas. Fire danger has increased as dry conditions and disease have impacted the health of forest lands. Years of fire suppression and limited logging have contributed to a build up of wildland fuel that can spread fires quickly. In these conditions, residential uses in forests create conditions dangerous to homeowners and firefighters. Section 3.4, Natural Hazards, has more information on wildfire prevention. The second challenge posed by forest fragmentation is the threat to fish and wildlife. This is addressed in the Water and Wildlife sections of this Chapter.

Skyline Forest

There is a unique opportunity to preserve a large privately held working forest. Skyline Forest consists of approximately 33,000 acres of privately held forest lands at the base of the Three Sisters Mountains. Historically, this property has been logged, but still holds important recreational, scenic and wildlife habitat value. The non-profit Deschutes Land Trust has been working to purchase Skyline Forest from the owners, who represent a large financial company. In 2005 the Board of County Commissioners approved creating a Community Forest Authority, a quasi-municipal corporation that has the authority to issue tax-exempt bonds to pay for purchasing the forest. The bonds will be repaid with revenue from logging. The logging revenue is not anticipated to cover all the bond costs, but combined with other grants and contributions can ensure the bonds are repaid.

HB 2228

As noted above, the goal of the Deschutes Land Trust is to purchase and manage as much of the Skyline Forest as possible for sustainable logging, wildlife, recreation and scenery. HB 2228, adopted by the 2009 Legislature, allows the owners of this land the right to build a clustered community of up to 282 dwelling units and associated services on 1,200 acres. An additional 1,800 acres must be in a conservation easement as a buffer to maintain wildlife habitat and minimize wildfire danger. In exchange for waiving State and local land use regulations to allow this development, the remaining 30,000 acres of the Skyline Forest and additional property in Deschutes and Klamath counties must be sold to a land trust and protected with a conservation easement. There are additional requirements attached to the Statue that provide more detail on items such as road access, master planning and permitted uses.

Section 2.3 Forest Lands Policies

Goals and Policies

Goal 1 **Protect and maintain forest lands for multiple uses, including forest products, watershed protection, conservation, recreation and wildlife habitat protection.**

Policy 2.3.1 Retain forest lands through Forest 1 and Forest 2 zoning.

Policy 2.3.2 To conserve and maintain unimpacted forest lands, retain Forest 1 zoning for those lands with the following characteristics:

a. Consist predominantly of ownerships not developed by residences or non-forest uses;
b. Consist predominantly of contiguous ownerships of 160 acres or larger;
c. Consist predominantly of ownerships contiguous to other lands utilized for commercial forest or commercial farm uses;
d. Are accessed by roads intended primarily for forest management; and
e. Are primarily under forest management.

Policy 2.3.3 To conserve and maintain impacted forest lands, retain Forest 2 zoning for those lands with the following characteristics:

a. Consist predominantly of ownerships developed for residential or non-forest uses;
b. Consist predominantly of ownerships less than 160 acres;
c. Consist of ownerships generally contiguous to tracts containing less than 160 acres and residences, or adjacent to acknowledged exception areas; and
d. Provide a level of public facilities and services, including roads, intended primarily for direct services to rural residences.

Policy 2.3.4 Notwithstanding any other quasi-judicial plan or zone change criteria, lands designated as Forest under this Plan and zoned Forest 2 may upon application be redesignated and rezoned from Forest 2 to Exclusive Farm Use if such lands:

a. Do not qualify under State Statute for forestland tax deferral,
b. Are not necessary to permit forest operations or practices on adjoining lands and do not constitute forested lands that maintain soil, air, water and fish and wildlife resources,
c. Have soils on the property that fall within the definition of agricultural lands as set forth in Goal 3,
d. Are a tract of land 40 acres or less in size,
e. Do not qualify under State Statute and the terms of the Forest 2 zone for a dwelling, and;
f. Were purchased by the property owner after January 1, 1985 but before November 4, 1993.

Such changes may be made regardless of the size of the resulting EFU zoning district. Such changes shall be processed in the same manner as other quasi-judicial plan or zoning map changes.

Policy 2.3.5 Uses allowed in Forest zones shall comply with State Statute and Oregon Administrative Rule.

Policy 2.3.6 Coordinate and cooperate with the U.S. Forest Service, the Bureau of Land Management and other public agencies to promote sustainable forest uses, including recreation, on public forest land, including:

a. Using the Deschutes National Forest Land and Resource Management Plan, or its successor, as the basis for mutual coordination and cooperation with the U.S. Forest Service;
b. Using the Prineville Bureau of Land Management Upper Deschutes Resource Management Plan, or its successor, as the basis for mutual coordination and cooperation with the Bureau of Land Management.

Policy 2.3.7 Notify affected agencies when approving development that could impact Federal or State forest lands.

Policy 2.3.8 Support the maintenance of the Skyline Forest as a Community Forest.

Policy 2.3.9 Support economic development opportunities that promote forest health.

Policy 2.3.10 Provide input on public forest plans that impact Deschutes County.

Policy 2.3.11 Apply for grants to review forest lands based on ORS 215.788-215.794 (2009 HB 2229).

Policy 2.3.12 Coordinate with stakeholders to support forest management projects that:

a. Contribute to public safety by treating wildland hazardous fuels particularly in the designated Wildlland Urban Interface as identified in the Community Wildfire Protection Plans described in Section 3.5 of this Plan;
b. Retain fish and wildlife habitat.

Goal 2 Adequately address impacts to public safety and wildlife when allowing development on forest lands.

Policy 2.3.13 Review County Code and revise as needed to ensure development in forest zones mitigates impacts, particularly impacts on fish and wildlife habitat and public fire safety.

Section 2.4 Goal 5 Overview

Background

Many County resources are protected through Statewide Planning Goal 5, Natural Resources, Scenic and Historical Areas and Open Spaces. Further direction on protecting these resources is provided in Oregon Administrative Rule (OAR) 660-023. It is important to note that OAR 660-016 provided direction when the County did an extensive review of Goal 5 resources primarily in the early 1990s. In 1996 OAR 660-023 replaced OAR 660-016 for all listed resources except cultural resources. The Goal and OAR require local governments to inventory various resources and determine which items on the inventory are significant. For sites identified as significant, an Economic, Social, Environmental and Energy (ESEE) analysis is required. The analysis leads to one of three choices: preserve the resource, allow proposed uses that conflict with the resource or strike a balance between the resource and the conflicting uses. A program must be provided to protect the resources as determined by the ESEE analysis.

Deschutes County completed Goal 5 inventories and the ESEE analysis during Periodic Review, a State process for updating comprehensive plans which lasted from 1988-2003. The County Goal 5 inventories and programs were acknowledged by the Department of Land Conservation and Development as being in compliance with Goal 5. Therefore, the acknowledged Goal 5 inventories, ESEEs and programs are retained in this Plan (although one historic resource is being modified).

OAR 660-023 requires specific Goal 5 resources to be reviewed and amended at each periodic review. However, counties are no longer required to do periodic review. This Plan update is not being done under those regulations.

The following resources are required to be inventoried at each periodic review:

- Federal Wild and Scenic Rivers
- Oregon Scenic Waterways
- Groundwater resources (limited application)
- Natural areas (on the Oregon State Register of Natural Heritage Resources list)

In addition, the following list includes resources the County inventoried during its last periodic review.

- Riparian corridors
- Wetlands
- Wildlife habitat
- Approved Oregon Recreation Trails
- Wilderness areas
- Mineral and aggregate resources
- Energy sources (updated as new sites are proposed)
- Historic resources
- Open spaces
- Scenic views and sites
- Cultural areas

Purpose of Goal 5

The purpose of identifying Goal 5 related lands is to effectively manage Deschutes County's natural and cultural resources to meet the needs of today while retaining their value for future generations. These resources are addressed in the following sections:

Natural Resources

- Water Resources (Section 2.5)
- Wildlife (Section 2.6)
- Open Spaces and Scenic Views and Sites (Section 2.7)
- Energy (Section 2.8)

Other Statewide Planning Goal 5 Resources

- Mining Resources (Section 2.10)
- Historic and Cultural Resources (Section 2.11)

Future Goal 5 Inventories

Although the 2008-2011 Plan update was not completed under periodic review and no updates to the Goal 5 resources were made, the County recognizes the importance of revisiting its Goal 5 resource list. To ensure the appropriate protection of Goal 5 resources, upon adoption of this Plan the County will initiate a Goal 5 technical committee to review its existing inventories and programs. The review will include consideration of existing inventories and programs as well as the cumulative effects of growth on our Goal 5 programs. The complete acknowledged Goal 5 inventory lists as of 2010 can be found in Chapter 5. An incomplete list of County Goal 5 Ordinances can also be found in Chapter 5. Research will continue to identify and list all adopted Goal 5 Ordinances.

Some issues for the Goal 5 review are listed below.

- There are some discrepancies between mapped and listed acknowledged Goal 5 inventories that need to be reconciled.
- Many Goal 5 resources, like wilderness areas, are located on Federal lands and are protected by Federal programs.
- Unlike other Goal 5 resources, amendments to the mining and historic inventories are generally initiated by property owners for specific sites.
- An inventory of Goal 5 wildlife resources was provided by an interagency team made up of Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife, U.S. Forest Service and the Bureau of Land Management. This report was prepared at the request of staff and as part of the Goal 5 review the updated inventories will be reviewed by a technical committee and eventually be recommended for adoption.
- Consider the Deschutes County Greenprint data and community values when reviewing the Goal 5 inventories.

Section 2.4 Goal 5 Overview Policies

Goals and Policies

Goal 1 Protect Goal 5 resources.

Policy 2.4.1 Initiate a review of all Goal 5 inventories and protection programs.

Policy 2.2.2 Until the County initiates amendments to the Goal 5 inventories and programs, all existing Goal 5 inventories, ESEEs and programs are retained and not repealed, except as noted in the findings for Ordinance 2011-003.

Policy 2.4.3 Review Goal 5 resources when a new Goal 5 resource is verified through the applicable state and county process, but at least every 10 years.

Policy 2.4.4 Incorporate new information into the Goal 5 inventory as requested by an applicant or as County staff resources allow.

Policy 2.4.5 As federal lands are sold to private owners, review the impacts to Goal 5 resources.

Section 2.5 Water Resources

Background

Water resource management is impacted by land use planning and includes numerous components from groundwater to river systems and water availability to water quality. Unpolluted water is essential for biodiversity and for human, animal and plant survival. Besides consumption and irrigation, water is also needed for maintaining the river and stream ecosystems that are a large part of Deschutes County's quality of life and economy. Management of this shared resource is a regional priority.

The primary state regulator of water availability is the Oregon Water Resources Department (OWRD). The Oregon Department of Environmental Quality (DEQ) has the primary role in monitoring and enforcing water quality standards. The Oregon DEQ is required to comply with the Federal Environmental Protection Agency.

In addition to those agencies, there are two Statewide Planning Goals relating to the protection of water resources. Statewide Planning Goal 5, Natural Resources Scenic and Historic Areas and Open Spaces, requires an inventory of the following defined water resources. Once inventoried, the Goal requires protection measures. These inventories have been completed and acknowledged by the Land Conservation and Development Commission (See Sections 2.4 and 5.3).

- Riparian Corridors, including water, riparian areas and fish habitat
- Wetlands
- Federal Wild and Scenic Rivers
- State Scenic Waterways
- Groundwater Resources

Statewide Planning Goal 6, Air, Land and Water Resources Quality, requires comprehensive plans to be consistent with state and federal pollution regulations.

The policies in this section provide the framework for evaluating land use actions and define the responsibility of the County to work in partnership with cities, agencies, non-profits and others to achieve efficient use of water resources and effective management of water quality in the Upper Deschutes Basin.

It is important to underscore that the primary water resource management process occurs outside of the state land use planning system. Oregon land use and water management are not integrated. There are no overarching administrative rules that consider statewide water management in conjunction with land use planning.

Regional Water Coordination

Cities, irrigation districts, farmers, non-profits, fisherman and rural residents all have a stake in ensuring adequate quantities of water. Water availability and quality are tied together and are a regional priority. The following are the primary agencies and organizations involved in water management.

Oregon Water Resources Commission and Water Resources Department

The Water Resources Commission oversees the Oregon Water Resources Department that manages the amount of water flowing through, and being diverted from Oregon's water bodies. Surface and groundwater rights are administered through this department.

The Water Resources Department, together with the Department of Environmental Quality, Department of Fish and Wildlife, Department of Agriculture, and stakeholders and partners from around Oregon, is developing the state's first Integrated Water Resources Strategy.

Oregon Department of Environmental Quality

The Department of Environment Quality (DEQ) regulates water quality permits, administers onsite sewage system programs, implements (jointly with Department of Health Services) the statewide drinking water source assessment and protection program, certifies drinking water protection plans for public water supply systems, and administers an underground injection control and an underground storage tank program.

The DEQ is also responsible for carrying out the State's obligation under the federal Clean Water Act. Section 303(d) of the Federal Clean Water Act requires states to identify and list water bodies that do not meet water quality standards. The State will set a total maximum daily load (TMDL) for water bodies that do not meet the quality standards, and the TMDL will calculate the maximum amount of pollutants that can be discharged into the water body while still meeting water quality standards.

Deschutes Water Alliance

The Deschutes Water Alliance (DWA) was formed in 2004 to plan for long-term water resource management in the Deschutes Basin. It is comprised of the following stakeholders:

- The Deschutes Basin Board of Control: an association of 7 irrigation districts that includes North Unit, Central Oregon, Swalley, Tumalo, Three Sisters, Arnold and Ochoco
- The Confederated Tribes of Warm Springs: located in Jefferson County, they are focused on managing water resources as sustainable assets
- Deschutes River Conservancy (DRC): a non-profit organization with a mission to restore streamflow and improve water quality in the Deschutes Basin
- Central Oregon Cities Organization (COCO): includes representatives from the cities of Bend, Culver, La Pine, Madras, Metolius, Prineville, Redmond, and Sisters
- Deschutes County, Jefferson County, Crook County
- Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Water Resources Department and the Bureau of Reclamation are unofficial members.

The vision of the Deschutes Water Alliance is to balance water resources to serve and sustain agriculture, urban and ecosystem needs. To achieve this vision, the mission is to:

- Improve stream flows and water quality in the Deschutes Basin for the benefit of fish, wildlife and people.
- Secure and maintain a reliable and affordable supply of water to sustain agriculture.
- Secure a safe, affordable, and high quality water supply for urban communities.

Deschutes Basin Hydrogeology

The Deschutes River Basin, from its headwaters to the Columbia River, encompasses 10,400 square miles of the north central part of the State. Nearly 91% of Deschutes County lies within the Deschutes Basin. The upper Deschutes River Basin is characterized by recent volcanic activity and strong and rapid groundwater flows. The geologic conditions lead to a strong connection between surface and ground water (see also Section 3.10).

Groundwater flows eastward from the Cascade Range through permeable volcanic rocks out into the basin and then generally northward. Groundwater recharge comes from precipitation in the Cascade Range, inter-basin flow and leaking irrigation canals. No long-term water-level declines attributable to groundwater pumping were found in the upper Deschutes Basin.

Approximately one-half of the ground water flowing from the Cascade Range discharges to spring-fed streams along the margins of the range. The remaining groundwater flows through the subsurface, and eventually discharges to streams near the confluence of the Deschutes, Crooked, and Metolius Rivers.

The large amount of groundwater discharge in the confluence area is primarily caused by geologic factors. The Deschutes River flows north through permeable rock until it hits a region of low-permeable rock near the confluence area. There the permeable rock strata terminates, forcing water to the surface. Virtually all of the regional groundwater in the upper Deschutes Basin discharges to streams south of the area where the Deschutes River enters this low-permeability terrain, at roughly the location of Pelton Dam.

Assessment of water resources of the upper Deschutes Basin confirms that human activities have significantly altered the flow regime in the basin, but on balance have led to the consumption of only a relatively small amount of available water. These impacts do appear to have had a seasonal impact in the lower Deschutes River (in the early months of the calendar year), the reach where all the changes in storage, diversion and surface-groundwater interactions come together in one place. Yet the most dramatic modifications to the water resources regime are clearly seen in terms of low flows below irrigation district diversions in Bend during the summer and below Wickiup Reservoir in the winter.

Reservoir storage and releases for irrigation have highly altered flows in five of the seven water quality impaired reaches in the basin. The upper Deschutes River reach does not often meet target flows in the winter due to upstream reservoir storage at Crescent Lake, Wickiup and Crane Prairie reservoirs. Irrigation diversions have reduced summer flows in six of the seven water quality impaired reaches. Most reaches experience low summer flows due to irrigation diversions. Prior to current restoration efforts, sections of Whychus Creek and Tumalo Creek typically went dry during the irrigation season due to extensive diversion.

Water Rights

The appropriation and use of water in the State of Oregon are regulated under ORS by the Oregon Water Resources Department. Permits issued by OWRD provide for the necessary and allowed points of diversion for water to be diverted from or released to a water body. All water is publicly owned, and with some exceptions, cities, farms, factory owners, and other water uses must obtain a permit or water right from the OWRD to beneficially use water from any source - whether it is underground, or from lakes or streams. Generally speaking,

landowners with water flowing past, through, or under their property do not automatically have the right to use that water without a permit from the OWRD.

Oregon's water laws are based on the principle of prior appropriation. This means the first person to obtain a water right on a stream is the last to be shut off in times of shortage. During water shortages, the water right holder with the oldest date of priority can demand the water specified in their water right regardless of the needs of junior users. If there is a surplus beyond the needs of the senior right holder, the water right holder with the next oldest priority date can take as much as necessary under their right, and so on down the line until there is no surplus or until all rights are satisfied. The date of application for a permit to use water usually becomes the priority date of the right.

Water Availability

Water Availability Constraints

The availability of surface water for irrigating agriculture in Central Oregon began in the 1860s and accelerated at the turn of the century. Surface water rights in the Deschutes Basin have been limited since the early 1900s. Except for very high flow periods during winter and spring run-off, there is no surface water available for any out-of-stream use in the Deschutes River basin. The lack of surface water availability led new development in the 1990s to turn to groundwater for new water needs. The growing demand for groundwater raised concern that the groundwater permitting process ignored the connection between groundwater and surface water.

In 1995 a moratorium on further groundwater permit approvals was instituted by the Water Resources Commission pending the outcome of a collaborative examination of groundwater in the Upper Deschutes Basin. The study, carried out by the U.S. Geological Survey and the OWRD confirmed that snowmelt infiltrates into the ground and recharges the underlying aquifers. The study also confirmed that aquifer discharge provides much of the surface water to streams in the Deschutes Basin. The results verified the potential for groundwater withdraws to impact surface water flows and cause injury to surface water holders.

Exempt Groundwater Users

Groundwater wells for domestic needs in rural areas are generally classified as an exempt use by the OWRD. Exempt use means water right permits are not required if domestic use is less than 15,000 gallons per day and irrigation is less than one-half acre, or commercial use is less than 5,000 gallons per day. A 2006 study for the Deschutes Water Alliance (*Future Ground Water Demand in the Deschutes Basin*) estimated a 2006 total of 20,000 exempt wells in Crook, Deschutes and Jefferson counties, growing to 32,000 by 2025.

Exempt wells do not currently have to mitigate for their groundwater withdraws. Presentations by the Water Resources Department staff indicate that the subsurface water supply in Deschutes County recharges at the rate of approximately 3,500 cubic feet per second (cfs) and existing exempt wells use in the aggregate only 3-4 cfs. This suggests that additional regulation is not needed at this time. However, future policy discussions may need to consider how exempt wells fit into the overall water picture.

Water Banks

Besides exempt wells, new water is needed for other uses, from satisfying increased demand in cities to destination resorts. To address the limited availability of new water rights, two systems have been set up, both managed by the Deschutes River Conservancy. First the Deschutes Water Alliance set up a voluntary Water Bank as a cooperative, coordinated, transparent and voluntary system to identify and meet the water needs of qualified buyers. It operates in conformance to ORS and through a water marketplace. The Bank facilitates transfers of water rights between different users, including the Deschutes River and its tributaries.

The second system is the Groundwater Mitigation Bank. The Water Resources Commission approved rules for the Deschutes Groundwater Mitigation Program in 2002 under OAR 690-505. Under the Mitigation Program, applicants for new groundwater permits are informed of their mitigation obligation by the OWRD during the first phase of the groundwater permit application process, and that they must provide mitigation before their permit can be issued. Applicants can provide either permanent or temporary mitigation credits. Mitigation credits can be established through instream transfers, aquifer recharge, storage release or conserved water projects.

Water Conservation

Water conservation plays a major role in ensuring adequate water availability. Promoting water conservation leads to an efficient and cost-effective use of resources. Generally, conservation is seen as a win for the community, the economy and the environment.

Oregon State Policy on Conservation and Efficient Water Use

The Oregon Water Resources Commission adopted state policy addressing conservation and efficient water use. Rules to carry out the policy are presented in the OAR 690-086.

The conservation policy stems from a number of factors including:

- Increasingly frequent summer water shortages in many Oregon regions
- Expanding water needs for municipalities due to population growth
- In-stream flow demand in response to state or federal listings of sensitive, threatened or endangered species that depend on streamflow and water quality
- The link between healthy ecosystem functions, water quality, recreation and the Oregon economy

The policy rules were developed to provide a process to facilitate efficient water use and water supply planning consistent with capabilities of the water supplier and the OWRD. Major water suppliers and water users are encouraged by the policy to prepare water management and conservation plans. Implementation of conservation projects can help restore streamflows, stabilize water supplies that provide for economic development and growth.

Irrigation Districts Conservation

Agriculture is estimated to use approximately 90% of the surface water in the Upper Deschutes Basin. Therefore irrigation district conservation efforts can have a significant impact on water availability. Water savings from water conservation projects undertaken by irrigation districts or their patrons can be transferred to instream use for the Allocation of Conserved Water (ORS 537.455 to 537.500, OAR 690-018).

A major conservation initiative by irrigation districts is the piping and lining of irrigation canals. Water seeps out of canals into the permeable rock layer below and is lost to irrigation uses. Piping and lining projects provide benefits such as improving water delivery efficiency, reliability and freeing water for other uses. Concerns have been expressed that the water that leaks from the canals recharges the aquifer, and piping and lining have the potential to lower the water table. Additionally, some residents with open irrigation canals on their properties appreciate the aesthetic and wildlife benefits of the canals.

A number of irrigation district efficiency improvements have been completed since 1997. These improvements, through reducing seepage losses in conveyance systems and improving on-farm efficiency, have reduced water losses by 45,360 acre-feet on an annual basis in the Upper Deschutes Basin. It is estimated that 110,268 acre-feet could be saved annually, based on a Deschutes Water Alliance report *(Irrigation District Water Efficiency Cost Analysis and Prioritization)*. Certain districts have been able to reduce piping project costs by incorporating hydroelectric facilities in suitable reaches.

In 2009 Swalley Irrigation District, Three Sisters Irrigation District and Central Oregon Irrigation District were awarded $3.1 million, $1.3 million and $4.2 million respectively to improve water conservation. Tumalo Irrigation District was awarded $1.8 million in 2010. For Swalley, the funds are the final piece to complete a $14.5 million project involving the piping of 5.1 miles of a 12-mile canal and the construction of a 0.75-megawatt hydroelectric plant. Swalley Irrigation District returned 28 cubic feet per second to the Deschutes River as a result of its piping project, the single largest permanent contribution of water back to the Deschutes River.

Three Sisters Irrigation District will be using its funds to launch the first of a three-phase, $12 million pipeline project that will boost stream flows in Whychus Creek by reducing water loss. The first phase will include converting more than three miles of exposed canal to buried pipe, and replacing aging head gates and monitoring equipment with automated, remotely operating units. The completed project should boost summer stream flows in Whychus Creek by 25 to 30 percent. The final phase of the project will be the construction of 1.5-mega-watt hydroelectric plant similar to the one being built by the Swalley Irrigation District.

Central Oregon Irrigation District utilized the funds to assist in piping a 2.5 mile section of its Pilot Butte Canal permanently conserving 19.6 cubic feet per second to the Deschutes River and for the construction of a 5.0 megawatt hydroelectric facility.

On-Farm Efficiency

Irrigation districts in cooperation with consultants, Soil and Water Conservation Districts and the National Resources Conservation Service have compiled and implemented water conservation plans furthering the goal of improving and identifying on-farm efficiency opportunities. Analysis of on-farm conservation opportunities based on a 1997 Reclamation study show that an additional 112,410 to 146,698 acre-feet of water could be saved if on-farm efficiency were improved to 70-80% across all districts.

Other Conservation Efforts

Since water resources in Deschutes County are shared, there is a responsibility for all residents and visitors to use water wisely. Irrigation districts and cities are the primary water users in

Deschutes County and have their own plans for water conservation. Although not actively involved in those efforts, the County can be open to partnerships as requested. Partnerships can also be an option for small water districts outside city limits that are interested in water conservation efforts. Individual water users are often rural residents who get their water from exempt wells. A coordinated regional effort to promote conservation could go far in increasing public awareness.

One action the County can take to promote individual water conservation is to ensure County facilities employ water efficient tools and techniques. Tracking and advertising the savings can show the public the benefits of water conservation. Examples of water conservation tools that the County could initiate include xeroscaping (using plant selection and watering techniques to promote water efficient landscapes), wastewater reuse (reusing wastewater for landscaping) or efficient irrigation (such as using drip irrigation or smart controllers).

Deschutes Basin Ecosystem

Deschutes County constitutes 26% of the Deschutes River Basin, a major watershed in Central Oregon. The Deschutes River is the major waterway draining the Basin and flows north to the Columbia River that culminates in the Pacific Ocean. Five sub-basins feed the main stem. Most of Deschutes County is contained by parts of three: the Upper Deschutes River Sub-basin, the Middle Deschutes River Sub-basin, and the Lower Crooked River Sub-basin. The remainder of the County is located in the Upper Crooked River Sub-basin and in the Goose and Summer Lakes Basin.

The Deschutes River is a vital, multi-purpose waterway that touches the lives of thousands of people along its banks and throughout Central Oregon. An important historical, economic, and cultural resource, the Deschutes provides natural beauty, abundant wildlife, and varied recreational opportunities. Most of the upper flow of the Deschutes River is through public land, although portions flow past private holdings.

Wild and Scenic Waterways

The federal Wild and Scenic Rivers Act created a program designed to protect the character of free-flowing rivers. Enacted in 1968, the Wild and Scenic Rivers Act created several categories of rivers with different levels of protection for each category. Section 7 of the Wild and Scenic Rivers Act provides minimal protection for instream flows and prohibits Federal assistance or licensing of water resource development projects within listed sections of river. Additionally, Section 7 prohibits Federal agencies from recommending any activities that will negatively affect the unique characteristics of a listed reach without adequately notifying Congress, the Secretary of Agriculture, and the Secretary of the Interior.

Individual states administer management programs for each listed reach within their boundaries, and the federal government has authorization to acquire land along each reach to maintain the character of the river (16 U.S.C. 1271-1287). However, the Wild and Scenic Rivers Act does not authorize Federal regulation of water diversions, nor does it authorize Federal acquisition of instream water rights.

Three stretches of rivers in the Upper Deschutes Basin are in the Wild and Scenic River System.

Table 2.5.1 - Wild and Scenic Rivers in Deschutes County

Waterway	Description
Upper Deschutes River	Deschutes River From Wickiup Dam to the Bend Urban Growth Boundary
Middle Deschutes River	From Odin Falls to the upper end of Lake Billy Chinook
Whychus Creek	Source to USGS Gage 14075000

Source: National Park Service

Oregon Scenic Waterways

In 1970, Oregon voters passed an initiative that created the Scenic Waterways Act, which initiated the Scenic Waterways program. The State lists waterways in order to protect their unique scenic beauty, recreation, fish, wildlife, or scientific features (OAR 736-040). The program lists waterways under six categories, each of which defines different management goals and activities to occur along and adjacent to the river.

The Oregon Parks and Recreation Department administers the Scenic Waterways program. Landowners wishing to pursue a new activity within a quarter mile of a Scenic Waterway may need to notify the Parks and Recreation Commission, and the Commission may deny this activity if it impairs the unique qualities of the waterway. Many of the listed waterways' unique qualities depend on adequate instream flows (ORS 390.835). The Scenic Waterways program prohibits new activities in a Scenic Waterway area if those activities would impair flow and if that impaired flow would harm the unique qualities of the waterway. Oregon Senate Bill 1033, passed in 1995, added groundwater pumping to these regulated activities.

Table 2.5.2 - Oregon Scenic Waterways in Deschutes County

Waterway	Description
Upper Deschutes River	From Little Lava Lake to Crane Prairie Reservoir
	From the gauging station below Wickiup Dam to General Patch Bridge
	From Harper Bridge to the COID diversion structure near river mile 171
	Robert Sawyer Park to Tumalo State Park
	From Deschutes Market Road Bridge to Lake Billy Chinook (excluding the Cline Falls hydroelectric facility near RM 145

Source: Oregon Revised Statutes 390.826

Rivers and Streams

Inventoried rivers and streams in Deschutes County are summarized below:

Table 2.5.3 - River Miles in Deschutes County

Major Rivers and Streams	Miles
Deschutes River	97
Little Deschutes River	42
Whychus Creek (lower 6-miles are in Jefferson County	39
Tumalo Creek	16
Paulina Creek	10
Fall River	8
Crooked River	7

Source: Deschutes County / City of Bend River Study (1986)

Besides rivers and creeks listed in Table 2.5.3, there are numerous perennial streams as shown in Table 2.5.4. All of these streams, except portions of Indian Ford Creek, Cache Creek and Dry Creek, are located on federal land and are subject to either the Deschutes National Forest or the Bureau of Land Management Resource Management Plans.

Table 2.5.4 - Perennial Streams in Deschutes County

• Bottle Creek	• Full Creek	• Spring Creek
• Bridge Creek	• Goose Creek	• Three Creek
• Brush Draw	• Indian Ford Creek	• SF Tumalo Creek
• Bull Creek	• Jack Creek	• NF Whychus Creek
• Cache Creek	• Kaleetan Creek	• Soda Crater Creek
• Charlton Creek	• Metolius Creek	• NF Trout Creek
• Cultus Creek	• Park Creek EF	• NF Tumalo Creek
• Cultus River	• Park Creek WF	• MF Tumalo Creek
• Deer Creek	• Pole Creek	• First Creek
• Dry Creek	• Rock Creek	• Soap Creek
• Fall Creek	• Snow Creek	• Todd Lake Creek

Source: Deschutes County/City of Bend River Study 1986

Riparian Areas

Riparian areas are areas adjacent to rivers, streams, lakes or ponds where there is vegetation that requires free or unbound water or conditions that are more moist than normal. Riparian areas form an interconnected system within a watershed. At the water's edge they define the transition zone between aquatic and terrestrial systems. Riparian areas often contain a diversity of vegetation not found in upland areas. Riparian areas are limited in Deschutes County and are important habitats for both fish and wildlife.

The Deschutes County Comprehensive Plan, adopted in 1979 and revised, mapped riparian areas along the following rivers and streams.

Table 2.5.5 - Riparian Acreage in Deschutes County

Streams	Riparian Acres
Deschutes River	1,440
Little Deschutes River	2,920
Paulina Creek	846
Indian Ford Creek	573
Tumalo Creek	50
Whychus Creek	47
Fall River	43
Crooked River	38
TOTAL	***5,966***

Source: Deschutes County/City of Bend River Study 1986

Significant riparian habitat is located in one or more of the following three areas:

- The area within 100 feet of the ordinary high water mark of an inventoried river or stream. The 100 foot wide area may contain both riparian vegetation and upland vegetation.

- Wetlands and flood plain are also frequently within 100 feet of a stream or river. In some cases the riparian vegetation may extend beyond 100 feet from the ordinary high water mark if it is a designated wetland or flood plain.
- The area adjacent to an inventoried river or stream and located within a flood plain mapped by the Federal Emergency Management Agency and zoned Flood Plain by the County. The flood plain may extend beyond 100 feet from the ordinary high water mark of the stream and may contain wetland.

The County has not conducted an inventory of riparian areas adjacent to lakes and ponds on private land. However, many of these areas are included in National Wetland Inventory Maps and are subject to County, State and/or Federal wetland fill and removal regulations. Riparian areas adjacent to the many lakes on federal lands are managed and protected under federal land and resource management plans and are not included in the County inventory.

Wetlands

Wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation typically adapted for life in saturated soil conditions. Deschutes County Ordinance 92-045 adopted all wetlands identified on the U. S. Fish and Wildlife Service National Wetland Inventory (NWI) Maps as the Deschutes County wetland inventory. Additionally, Deschutes County Ordinance 2011-008 adopted a Local Wetland Inventory (LWI) covering 18,937 acres in South Deschutes County. These mapped wetlands are subject to County, state and federal fill and removal regulations.

The NWI Map shows an inventory of wetlands based on high-altitude aerial photos and limited field work. While the NWI can be useful for many resource management and planning purposes, its small scale, accuracy limitations, errors of omission that range up to 55 percent (existing wetlands not shown on NWI), age (1980s), and absence of property boundaries make it unsuitable for parcel-based decision making. An LWI for areas in addition to South Deschutes County would greatly improve Deschutes County's ability to conserve wetland resources, which are vital to maintaining water quality and healthy fish and wildlife populations in the Upper Deschutes basin. Fish species dependent on riparian and wetland areas in the County include: Bull Trout, Redband Trout, and Summer Steelhead.

With the exception of narrowly defined riparian buffers (100 ft from top of bank for all Class 1 and Class 2 streams), Deschutes County does not protect wetlands; instead development activities proposed in a NWI are required to initiate a land-use procedure and notify the Oregon Department of State Lands (DSL). According to the County's zoning requirements, no person shall fill or remove any material or remove any vegetation, within the bed and banks of any stream or river or in any wetland, unless approved as a conditional use or exception. All necessary state and federal permits must be obtained as condition of approval.

If jurisdictional wetlands are located in the near-stream environment, Oregon's Removal-Fill Law directs DSL to regulate removal or placement of fill in "Waters of the State." The DSL, in concert with the US Army Corps of Engineers, requires that any impacts to wetlands be mitigated so there's no 'net loss' of the resource. The Oregon Department of Fish and Wildlife (ODFW) and Department of Environmental Quality (DEQ) do not have direct permitting authority on wetland fills, but instead review and provide technical advice on wetland

applications. The DSL gives notice of the permit applications to ODFW and DEQ, among other agencies, for suggestions on reducing impacts to fish, wildlife, and water quality. However, various agencies responsible for processing permits for individual projects have limited ability to consider larger scale community needs or values. Only through an adopted Goal 5 or Goal 6 wetlands plan can a community impose its local control and direct agencies not to issue a fill permit that is contrary to its plan.

The foundation of wetland planning is the LWI, which includes a comprehensive survey and map of all wetlands in the study area, and a document compiling key information about each site. The inventory must provide sufficient information to support local wetland planning decisions, and present the information in a manner accessible to citizens. For these reasons, a set of specifications for LWI products was established as an OAR (141-086-0110 through 141-086-0240). In addition to the wetland locations and descriptions, local planners need information on what functions and values each wetland provides. This assessment of wetland qualities is conducted concurrently with, and is part of, the inventory. Replacing the NWI with an LWI (reviewed and approved by the DSL) will determine jurisdictional wetland characteristics in portions of the upper Deschutes basin. It will examine spatial information, including FEMA floodplains, aquatic soils, areas with depths to groundwater less than two feet, and riparian areas for wetland type and function.

Floodplains

Federal Emergency Management Agency Maps
The Federal Emergency Management Agency (FEMA) maps flood-plains adjacent to the following rivers and streams in Deschutes County. The floodplain along these rivers and streams is recognized in a Flood Plain zone by the County.

Table 2.5.6 - Floodplains Adjacent to Rivers and Streams

• Deschutes River	• Long Prairie
• Little Deschutes River	• Dry River
• Whychus Creek	• Spring River
• Crooked River	• Indian Ford Creek
• Paulina Creek	

Source: Deschutes County GIS

Floodplains are defined as the lowland and relatively flat areas adjoining inland waters including at a minimum, that area subject to a one percent (100-year recurrence) or greater chance of flooding in any one year. Generally, river flooding along the Deschutes River has not historically been a serious problem in Deschutes County. This is due to the porous nature of the local geology, irrigation diversion canals and reservoir retention. Studies completed by the U.S. Army Corp of Engineers have resulted in designating a 100 year flood-plain for the Little Deschutes River and Whychus Creek. Regular flooding events have occurred near the headwaters of Tumalo Creek and in the Tumalo community. Along Whychus Creek, the city of Sisters frequently experiences flooding, with the most significant event occurring in 1964 (see also Section 3.5).

Instream Water Rights

Oregon was one of the first states to acknowledge that instream uses were beneficial and create a framework for instream flow protection. Instream flows are those required to maintain ecosytem or other public needs. In 1987 the Oregon Legislature passed the Instream Water Rights Act and created the statutory framework necessary to establish instream water rights. OWRD holds these rights in trust for the public, but they can be purchased, leased, or gifted to the state by anyone (OAR 690-077). The rights are intended to provide public benefits such as fisheries enhancement, pollution abatement or recreation. OWRD regulates instream rights in the same manner that they regulate traditional water rights. Instream flow rights may not injure other water rights holders, cause the enlargement of a water right, and exceed the flows necessary to increase public benefits (OAR 690-077).

Establishing New Instream Water Rights

The majority of instream water rights held by the state of Oregon are junior water rights. These junior rights are not often met during the summer irrigation season. Three state agencies can apply for new instream water rights. The Department of Environmental Quality (DEQ), Department of Fish and Wildlife (ODFW) or Parks and Recreation Department (OPRD) can determine that instream flow rights are not adequate to provide specified public benefits and can apply to OWRD for additional instream flow rights (ORS 537.336). In general, instream water rights cannot exceed the estimated average natural flow of a stream.

Establishing Senior Instream Water Rights

Three techniques in OAR 690 allow individuals or agencies to create senior instream water rights. First, individuals or organizations can lease an existing water right for instream use. Individuals may lease all or part of their water right for instream use during all or part of the year (OAR 690-077). In the Deschutes Basin, the majority of leased water comes from irrigation districts and their customers. Water rights created through instream leases have the same priority date as the original water right. Leasing water instream provides a flexible, low-cost technique for improving instream flows, but it does not permanently protect water instream.

Second, water right holders may permanently transfer existing water rights instream (OAR 690-077). Permanent water transfers allow individuals to transfer water off of their land while improving instream flows in the basin. They are often associated with a change in the character of the land from agriculture to other uses. As with temporary transfers, instream water rights created through permanent transfers have the same priority date as the originating water right that was transferred instream.

Oregon's Conserved Water program provides a third technique for creating senior instream water rights (OAR 690-018). This program is relatively unique within western water law. Oregon adopted its Conserved Water rules in 1987 to encourage water conservation and to promote local cooperation in instream flow improvement. To be eligible for the Conserved Water program, a water rights holder needs to satisfy the use listed on their permit with less water than they have the right and ability to divert. Water rights holders who implement water conservation projects can lease, sell, or transfer a portion of their conserved water. At least 25% of the conserved water goes to the state, which transfers the water instream.

The water rights holder receives a proportion of the remaining conserved water that depends on project funding. The proportion depends upon on what percentage of the Conserved Water project is funded through public sources and on any special agreements that financing partners have made with the water rights holder. Unless otherwise agreed upon, the water rights holder usually receives between 25% and 75% of the total conserved water. Instream water rights created through the conserved water program usually have the same priority date as the originating water right. The three techniques, leasing, transfers and conserved water can be used to place existing junior or senior water rights instream.

Instream Flows

Increasing the water flow on rivers and streams is important because low flows raise water temperatures which provides inhospitable habitat for fish and aquatic life.

Irrigation

Stream flows in most of the upper Deschutes River Basin are controlled by the influence of reservoir regulation and irrigation diversions near Bend. Storage reservoirs were constructed by the irrigators for the purpose of storing water from the river during the non-irrigation season to serve as a supplement to the natural flow of the river during the irrigation season. Three reservoirs, Crane Prairie, Crescent Lake, and Wickiup were constructed by the Bureau of Reclamation in the 1920s and 1940s, financed by loans secured and repaid by the irrigation districts. The three reservoirs have a combined storage capacity of 347,550 acre-feet. Seven irrigation districts distribute water to productive parts of the County, however not all of these districts irrigate land completely within it. Summer release from the reservoirs provide instream benefits for wildlife, navigation, and water quality. Recreational use at many of the projects is also significant.

Nearly 90% of the streamflow from the Deschutes River in Bend is diverted through irrigation canals during the irrigation season which typically runs from April through October. During the summer months, the diversions cause a dramatic reduction of streamflow in the middle Deschutes sub-basin. The porous, volcanic soil characteristic of this region causes as much as 50% of the water that is diverted from the river in irrigation canals to seep into the ground before it reaches the farm. As a result, irrigation districts need to divert twice the amount of water they need to serve their patrons. These seasonal flow disruptions have contributed to a decline in the overall health of rivers and streams including degraded fish habitat and poor water quality.

Fisheries and water quality drive instream flow restoration in the Upper Basin. The reaches historically supported salmon and trout populations. Anadromous (fish that migrate between fresh and salt water) salmon re-introduction efforts have drawn attention to water quantity issues in the basin. Prior to current restoration efforts, sections of Whychus Creek and Tumalo Creek typically dried up during the irrigation season due to extensive diversion.

Voluntary, market-based approaches, enabled by statutory law, provide the greatest opportunity for restoring instream flows in the Deschutes Basin. Tools available include instream transfers, leases, storage leases and allocation of conserved water. The Deschutes River Conservancy, local irrigation districts and state and federal partners are working together to restore water to reaches by using these tools.

Federal and state regulatory approaches also have the potential to affect instream flow allocation. Federal approaches include the Wild and Scenic Rivers Act, the Clean Water Act, and the Endangered Species Act. State approaches include the State Scenic Waterways Act and instream flow rights to support aquatic life.

Fish and Aquatic Habitat

A discussion in the Wildlife section highlights the economic benefits that fishing generates for Deschutes County. Protecting and enhancing local fish habitat can ensure those benefits continue.

Naturally spawning populations of native rainbow trout and whitefish along with introduced populations of rainbow, brown and brook trout and kokanee salmon are present in streams and reservoirs. Most natural lakes were historically barren of fish populations but today nearly all suitable lakes are stocked annually with fingerling or legal sized rainbow, brook, brown and cutthroat trout and kokanee, coho and Atlantic salmon. Lake trout have been introduced into Big Cultus Lake and have established a natural producing population. Most lakes do not provide suitable spawning habitat and populations can only be maintained by continued stocking. It is important to sustain the naturally reproducing populations and to balance stocking programs with the proper habitats.

Federal Endangered Species Act

As discussed in the Wildlife section of this Plan, species identified as threatened or endangered by the National Oceanic Atmospheric Administration (NOAA) Fisheries or the U.S. Fish and Wildlife Service (USFWS) are offered some protections under the Endangered Species Act (ESA). The act prohibits federal actions that jeopardize listed species and private actions that result in a "taking" of listed species. The ESA protects threatened or endangered populations or habitat of listed salmon and trout in the Deschutes Basin.

The Deschutes River and its tributaries provide spawning habitat for several populations of ESA listed fish. Both wild summer steelhead and bull trout are currently listed as threatened under the ESA. Historically, these two species thrived throughout the Basin. However, flow modification and habitat degradation have reduced available spawning habitat and limited population sizes. Steelhead trout were historically present in waterways within Deschutes County, including portions of the Deschutes River, Crooked River, and Whychus Creek. Historically, bull trout were found throughout the Deschutes River, the Little Deschutes River, and the Lower Crooked. In Deschutes County, documented bull trout have been found in the Middle Deschutes, but no documented spawning has occurred.

Bull Trout

Bull trout are currently listed as threatened under the Federal ESA in the Deschutes River Basin. Bull trout are a cold-water fish of relatively pristine stream and lake habitat in the Pacific Northwest. They have specific habitat requirements, including the "Four C's": Cold, Clean, Complex, and Connected habitat. Bull trout require the coldest water temperatures of any northwest salmonid; they require the cleanest stream substrates for spawning and rearing; they require complex habitats, including streams with riffles and deep pools, undercut banks and lots of large logs; and they need migratory routes from main river, lake, and even ocean habitats to

headwater streams for annual spawning and feeding migrations. Critical habitat for Bull Trout is located north of Lower Bridge Road below Big Falls on Bureau of Land Management land.

Steelhead Trout

The construction of the Pelton Round Butte dam complex west of Madras in 1964 blocked the migration of salmon and steelhead to the ocean. In 2005 a re-licensing agreement for the Pelton Round Butte hydroelectric project included the establishment of the Pelton Round Butte Fund. The fund is intended to support resource protection measures to mitigate project-related impacts, including those that enhance and improve wetlands, riparian and riverine habitats, and riparian, aquatic and terrestrial species connectivity.

The multi-organization agreement for relicensing Pelton Round Butte lays out a comprehensive fish passage program that includes a solution to assist in juvenile fish collection and passage efforts over the project's three dams. The plan facilitates the return of spring Chinook and sockeye salmon to the Metolius River and steelhead to the Crooked River (to Bowman Dam) and the Deschutes River (Big Falls north of Lower Bridge Road). As part of the plan, 200,000 steelhead fry were released into Whychus Creek in 2007. It is difficult to estimate when the fish will return to Whychus Creek as adults ready to spawn and restore the natural cycle to the stream, but it is estimated to be three to five years.

ESA and Deschutes County

The ESA requires the appropriate federal agency, NOAA or USFWS, to issue regulations as deemed necessary and advisable to provide for the conservation of the species. Deschutes County is evaluating whether its local government policies and practices are sufficiently protective of steelhead trout and their habitat. Specifically, Deschutes County desires to avoid a "take" of reintroduced steelhead trout, and reduce the potential of ESA-related enforcement actions and third-party lawsuits. The County does not authorize or participate in high-risk activities, such as water diversions, so there is minimal risk that the County's activities could directly cause steelhead trout mortality. The County's practices, however, can indirectly affect steelhead trout through changes in riparian habitat, floodplain function, erosion control, or other practices that could negatively impact steelhead populations or habitat.

It is important to note that reintroduced steelhead trout are blocked from upstream movement to the Upper Deschutes River at Big Falls, approximately 30 miles downstream from Bend. As a consequence, there is minimal risk that the County's activities in areas along the Deschutes River or its tributaries above Big Falls could have a direct impact on steelhead trout populations or aquatic habitat. The County's practices, however, can indirectly affect steelhead trout in the Deschutes River downstream of Big Falls through changes in water quality. Loss of riparian shade through the application of County policies, for example, could increase water temperatures in downstream portions of the Deschutes River.

The irrigation districts in the region, along with other local governments at a greater risk of steelhead take, are preparing a Habitat Conservation Plan (HCP) to address the risks posed to steelhead. An HCP is a five to six year process undertaken by entities whose otherwise lawful activities are at risk of resulting in an accidental take. The plan outlines potential impacts these activities pose to the ESA-listed species and identifies specific steps taken to minimize and mitigate accidental take. If the plan is approved by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, the entity is permitted to proceed with their activities,

provided the terms and conditions identified in the HCP are followed. The local HCP process relating to steelhead was initiated in 2008 and expected to be completed by 2014.

Through a risk assessment conducted in 2008-2009, it was determined that the potential risk posed by Deschutes County governmental activities was minimal and did not require County participation in the HCP. The risk assessment also provided recommendations for the County to minimize exposure to a "take". Many of these recommendations to land use and stormwater have been incorporated throughout this Comprehensive Plan.

Deschutes River Mitigation and Enhancement Program

The Deschutes River Mitigation and Enhancement Program was created in 1991 as a result of a Central Oregon Irrigation District (COID) Hydroelectric Project (FERC License Application No. 3571) and Conditional Use Permit 87-2. The program helps achieve ODFW habitat and management goals and objectives within the Upper Deschutes River sub-basin, consistent with the COID/ODFW agreement. A condition of both the FERC license and conditional use permit is that COID will provide ODFW with funds to develop and implement a fish and wildlife habitat mitigation and enhancement program for the Upper Deschutes River Basin. On October 7, 2008 the Deschutes River Mitigation and Enhancement Committee adopted an Upper Deschutes River Restoration Strategy developed jointly by ODFW, Upper Deschutes Watershed Council and the Deschutes River Conservancy.

Upper Deschutes River Restoration Strategy

The Upper Deschutes River Restoration Strategy (the Strategy) outlines necessary steps to restore the structure and function of the Deschutes River between Wickiup Reservoir and North Canal Dam. Activities have been identified to help achieve a restoration vision for the upper Deschutes River and a clear set of actions and recognizable outcomes that will be necessary for success.

Flows in the upper Deschutes River were remarkably stable under natural conditions. Irrigation storage in Wickiup and Crane Prairie Reservoirs now largely dewater this reach between October and April and artificially increase flow in the reach during the late spring, summer, and early fall. The shift from a naturally stable flow pattern to a highly variable one has limited fish populations in the Deschutes River. The 2004 Deschutes Sub-basin Plan identified that "stream flow extremes, especially low or intermittent flows, are probably the most significant factors limiting fish production in much of the Deschutes River sub-basin (sic) today." The ODFW identifies improving redband trout and whitefish populations and determining the feasibility of re-introducing bull trout as goals for the upper Deschutes River.

Restoration Strategy Elements and Recommended Actions

As stated earlier, streamflow is the greatest limiting factor in the upper Deschutes River. Streamflow restoration and related actions have the greatest potential for improving ecological conditions in the long-term. However, improving intra- and inter-annual flow patterns alone will not be sufficient to achieve the restoration vision. There is a need for strategically determined, short-term, local scale habitat enhancement and long-term, reach scale channel reconstruction to complement streamflow restoration in the upper Deschutes River. Comprehensive restoration monitoring will help to document current status and trends while improving actions in the future. There is also a need for a research program to document emerging issues in the

upper Deschutes River, including water quality issues related to plant growth and nutrient inputs. The high priority recommendations are summarized below.

High Priority Actions

- Identify the desired dimension, pattern, and profile of the upper Deschutes River.
- Identify target hydrograph and benchmarks.
- Restore individual components of the hydrograph through temporary and permanent water transactions.
- Identify high-value, at-risk riparian areas.
- Establish a comprehensive monitoring plan.
- Support community organizing and information sharing.
- Establish a research program to study emerging water quality issues.

Groundwater Quality

Generally, groundwater quality in Deschutes County is generally classified as being 'good,' providing high quality drinking water to most of its residents. However, several productive aquifers lie in shallow alluvial sediments that are vulnerable to contamination from human activities and development.

The Department of Environmental Quality (DEQ) Laboratory and Water Quality Divisions' *Groundwater Quality Report for the Deschutes Basin* (March 2006) identifies areas of concern for groundwater contamination based on various sources of data and groundwater quality studies. Based on collected data, development patterns and the geology of the underlying aquifer, the report makes recommendations for a couple of areas in the County. The report notes the groundwater aquifer in the Redmond area is vulnerable to contamination from human activities and recommends further study by the DEQ. The La Pine aquifer in the southern portion of the county from the Sunriver area to the Klamath County line between Newberry Caldera and the Cascades is an area of particular concern because of data collected through several studies and the high level of development in the area. The report also identifies underground injection systems that could contaminate the aquifer with pollutants from stormwater drywells or sewage drillholes.

In South Deschutes County, the concern for groundwater quality arises from nitrate contamination associated with on-site wastewater treatment (septic) systems discharging to the shallow unconfined aquifer. The issue is small lots with highly permeable rapidly draining soils and a high groundwater table with relatively cold water temperatures. Combined with the fact that the majority of lots are served by on-site wastewater treatment systems and individual wells, concern arose that nitrates from the septic systems could contaminate local wells and the river system.

Considerable work has gone into studying the groundwater in South County. In 1999 Deschutes County and the Department of Environmental Quality (DEQ) identified the need for a better understanding of the processes that affect the movement and chemistry of nitrogen in the aquifer underlying the La Pine area. In response, the U.S. Geological Service (USGS), in cooperation with Deschutes County and DEQ, began a study to examine the hydrologic and chemical processes that affect the movement and chemical transformation of nitrogen within the aquifer. A primary objective was to provide tools for evaluating the effects of existing and

future residential development on water quality and to develop strategies for managing groundwater quality.

Field research from the USGS study shows that in a 250-square-mile study area near La Pine the groundwater underlying the La Pine sub-basin is highly vulnerable and being polluted by continued reliance on traditional onsite systems. Environmental impacts from residential development include higher nitrate concentrations in groundwater that is tapped for domestic water supply and discharges to rivers. Nitrates are regulated by the federal Environmental Protection Agency and DEQ as a human health concern. Vulnerability of the shallow aquifer to contamination led to concern that wastewater from septic systems poses a threat to the primary drinking water supply and local river systems. The Upper Deschutes and Little Deschutes Sub-basins have abundant, natural sources of phosphorus from volcanic soils and rocks so the rivers are naturally nitrogen limited. Nitrogen-limited rivers are sensitive to low concentrations of available nitrogen until some other component becomes limiting, and that may lead to ecological impacts.

In 2008 the County used the research on nitrates to adopt a 'local rule' that required South County residents to convert their septic systems over a period of 14 years to alternative sewage system technology designed to reduce nitrates. New septic systems were also required to use alternative technologies. The County created a process to assist residents in funding the conversions.

Many South County residents expressed concern over the costs involved with converting their septic systems and disputed the science behind the rule. Placed on the ballet by petition, the local rule was rescinded by voters in March 2009.

As of 2010 the DEQ is leading the effort to address nitrates in South County, with the full cooperation of the County. One solution being considered is creating a sewer system or extending Sunriver's to serve some of the nearby areas. Sewer systems are tightly restricted on rural lands by Statewide Planning Goal 11 and OAR 660-11, so the Department of Land Conservation and Development is also involved in these efforts.

Surface Water Quality

The federal Clean Water Act requires identifying rivers that do not meet water quality standards for several parameters. The DEQ periodically evaluates water bodies in Oregon based on federally-approved water quality standards. A list of water quality impaired water bodies is produced from this analysis and referred to by the section of the CWA, as 303(d) listings. The list is the basis for developing state standards for each pollutant entering a water body. These Total Maximum Daily Loads (TMDL) are used with Water Quality Management Plans to outline how agencies and individuals will meet water quality standards for those listed water bodies.

The TMDL Water Quality Management Plans identify Designated Management Agencies (DMA) that are required to develop and implement them. A DMA can be a federal, state or local governmental agency that has legal authority to address the contributing pollutants. A TMDL implementation plan must indicate how the DMA will reduce pollution in order to address load allocations.

Compliance with Land Use Requirements

It is helpful to coordinate TMDL implementation with local land use plans, such as this Comprehensive Plan. That will ensure maximum coordination in addressing water quality issues. To provide evidence that a TMDL implementation plan is in compliance with local land use requirements, in most cases the plan should:

- Identify applicable acknowledged local comprehensive plan provisions and land use regulations, and
- Explain how the implementation plan is consistent with local planning requirements or what steps will be taken to make the local planning requirements consistent with it.

The following are identified on the federal Clean Water Act 303(d) List for 2006 for not meeting water quality standards. This list is regularly amended by DEQ so specific segments are not listed.

Rivers
- Upper Deschutes River
- Middle Deschutes River
- Little Deschutes River

Tributaries
- Indian Ford Creek
- Tumalo Creek
- Whychus Creek

Lakes
- Lava Lake

Water and Land Use

There are some water issues that can be managed through County Codes, such as wellhead protection or stormwater ordinances.

Water Management Plans

Water Management Plans can be useful tools for understanding water use for large projects. Setting goals for water use, determining how much water will be needed, assessing options such as the reuse of graywater for landscaping and ensuring implementation of the plan can go a long way towards efficient use of water in new development. Water Management Plans would not be needed for single family homes or other small projects.

Well Head Protection

Wellhead protection (WHP) is a plan designed to protect groundwater resources of Public Water Systems (PWS) from contamination. A community's source of drinking water is an extremely important resource, contributing to both the human and economic health of the area. WHP involves determining the area around the well most susceptible to contamination, inventorying potential contaminant sources and implementing management strategies to reduce the risk associated with those sources. WHP is an investment in the future.

In Oregon it is recommended that an area large enough to encompass 10 years of groundwater travel time be delineated so that if the aquifer becomes contaminated upgradient, there will be sufficient time to devise a plan to deal with the contamination. Delineations as described may

extend in excess of several thousand feet away from a wellhead. Currently Deschutes County does not have a wellhead protection plan.

Stormwater

In 2005 the cities and counties of Central Oregon joined forces to protect local water resources from polluted urban runoff, manage urban flooding, and meet new state and federal regulatory requirements by developing comprehensive stormwater management guidance for the region. This new partnership provides opportunities to work more efficiently and effectively and provide consistency and clout for the region.

The first major project the partnership undertook was the development of a regional stormwater management manual. The Central Oregon Stormwater Manual provides stormwater guidance for each participating jurisdiction. It was funded primarily through jurisdictional contributions, and was coordinated by a committee of participating cities, counties and the Central Oregon Intergovernmental Council.

Central Oregon Stormwater Management Project

The Central Oregon Stormwater Manual adopts best available stormwater management guidance from Oregon and Eastern Washington to create a reference for engineers, builders, and local government staff on the design and construction of runoff treatment and flow control facilities. The Best Management Practices (BMPs) that make up the core of the Manual are intended to comply with all federal and state regulations. They are suitable to the unique climatic and hydro-geologic conditions of the region, and will protect both water quality and natural runoff patterns. In contrast to historic practices, non-underground injection methods of managing stormwater are encouraged and pre-treatment required for water injected underground.

Section 2.5 Water Resource Policies

Goals and Policies

Water Coordination, Availability and Conservation

Goal 1 **Develop regional, comprehensive water management policies that balance the diverse needs of water users and recognize Oregon water law.**

Policy 2.5.1 Participate in Statewide and regional water planning including:
a. Work cooperatively with stakeholders, such as the Oregon Water Resources Department, the Deschutes Water Alliance and other non-profit water organizations;
b. Support the creation and continual updating of a regional water management plan.

Policy 2.5.2 Support grants for water system infrastructure improvements, upgrades or expansions.

Policy 2.5.3 Goal 5 inventories, ESEEs and programs are retained and not repealed.

Goal 2 **Increase water conservation efforts.**

Policy 2.5.4 Promote efficient water use through targeted conservation, educational and, as needed, regulatory or incentive programs.
a. Review County Code and revise as needed to ensure new development incorporates recognized efficient water use practices for all water uses.
b. Encourage the reuse of grey water for landscaping.

Policy 2.5.5 Promote a coordinated regional water conservation effort that includes increasing public awareness of water conservation tools and practices.

Policy 2.5.6 Support conservation efforts by irrigation districts, including programs to provide incentives for water conservation.

River and Riparian Ecosystems and Wetlands

Goal 3 **Maintain and enhance a healthy ecosystem in the Deschutes River Basin.**

Policy 2.5.7 The County shall notify the Oregon Division of State Lands and the Oregon Department of Fish and Wildlife of any development applications for land within a wetland identified on the National Wetland Inventory or South Deschutes County Local Wetland Inventory maps.

Policy 2.5.8 Work with stakeholders to restore, maintain and/or enhance healthy river and riparian ecosystems and wetlands, including the following:
a. Encourage efforts to address fluctuating water levels in the Deschutes River system;
b. Cooperate to improve surface waters, especially those designated water quality impaired under the federal Clean Water Act;

c. Support research on methods to restore, maintain and enhance river and riparian ecosystems and wetlands;
d. Support restoration efforts for river and riparian ecosystems and wetlands;
e. Inventory and consider protections for cold water springs;
f. Evaluate waterways for possible designation under the Scenic Waterways program;
g. In collaboration with stakeholders, map channel migration zones and identify effective protections;
h. Develop comprehensive riparian management or mitigation practices that enhance ecosystems, such as vegetation removal criteria.

Policy 2.5.9 Support studies on the Deschutes River ecosystem and incorporate watershed studies that provide new scientific information on the Deschutes River ecosystem, such as the 2010 Local Wetland Inventory adopted in Ordinance 2011-008.

Policy 2.5.10 Support educational efforts and identify areas where the County could provide information on the Deschutes River ecosystem, including rivers, riparian areas, floodplains and wetlands.
a. Explore methods of ensuring property owners know and understand regulations for rivers, riparian areas, floodplains and wetlands.

Policy 2.5.11 Support the high priority actions from the Deschutes River Mitigation and Enhancement Committee's 2008 Upper Deschutes River Restoration Strategy.

Goal 4 Maintain and enhance fish populations and riparian habitat.

Policy 2.5.12 Coordinate with stakeholders to protect and enhance fish and wildlife habitat in river and riparian habitats and wetlands.

Policy 2.5.13 Promote healthy fish populations through incentives and education.

Policy 2.5.14 Support healthy native fish populations through coordination with stakeholders who provide fish habitat management and restoration.
a. Review, and apply where appropriate, strategies for protecting fish and fish habitat.
b. Promote salmon recovery through voluntary incentives and encouraging appropriate species management and habitat restoration.

Policy 2.5.15 Review Habitat Conservation Plans for species listed under the Endangered Species Act, to identify appropriate new policies or codes.
a. Spawning areas for trout should be considered significant habitat and should be protected in rivers and streams.
b. Cooperate with irrigation districts in preserving spawning areas for trout, where feasible.

Policy 2.5.16 Use a combination of incentives and/or regulations to mitigate development impacts on river and riparian ecosystems and wetlands.

Groundwater and Surface Water Quality

Goal 5 Protect and improve water quality in the Deschutes River Basin.

Policy 2.5.17 Support plans, cooperative agreements, education, water quality monitoring and other tools that protect watersheds, reduce erosion and runoff, protect the natural water systems/processes that filter and/or clean water and preserve water quality.

Policy 2.5.18 Coordinate with the Oregon Department of Environmental Quality and other stakeholders on regional water quality maintenance and improvement efforts such as identifying and abating point and non-point pollution or developing and implementing Total Maximum Daily Load and Water Quality Management Plans.

Policy 2.5.19 Coordinate with stakeholders to address water-related public health issues.

a. Support amendments to State regulations to permit centralized sewer systems in areas with high levels of existing or potential development or identified water quality concerns.
b. If a public health hazard is declared in rural Deschutes County, expedite actions such as legislative amendments allowing sewers or similar infrastructure.

Policy 2.5.20 Work with the community to expand the range of tools available to protect groundwater quality by reviewing new technologies, including tools to improve the quality and reduce the quantity of rural and agricultural stormwater runoff.

Policy 2.5.21 Explore adopting new ordinances, such as a wellhead protection ordinance for public water systems, in accordance with applicable Federal and/or State requirements.

Land Use and Water Policy

Goal 6 Coordinate land use and water policies.

Policy 2.5.22 Coordinate with other affected agencies when a land use or development application may impact river or riparian ecosystems or wetlands.

Policy 2.5.23 Encourage land use patterns and practices that preserve the integrity of the natural hydrologic system and recognize the relationship between ground and surface water.

Policy 2.5.24 Ensure water impacts are reviewed and, if necessary, addressed for significant land uses or developments.

Policy 2.5.25 Evaluate methods of modeling the cumulative impacts of new land uses or developments on water quality and quantity.

Policy 2.5.26 Explore an intergovernmental agreement with the irrigation districts for ensuring irrigated land partitions and lot line adjustments are not approved without notice to and comment by the affected district.

Policy 2.5.27 Explore incorporating appropriate stormwater management practices into Deschutes County Code.

Policy 2.5.28 Support wastewater facilities and improvements where warranted.

Policy 2.5.29 Support regulations, education programs and cleaning procedures at public and private boat landings.

Policy 2.5.30 Consider adopting regulations for dock construction based on recommendations of the Oregon Department of Fish and Wildlife and the Deschutes River Mitigation and Enhancement Program.

Section 2.6 Wildlife

Background

Wildlife diversity is a major attraction of Deschutes County. It was mentioned in many Comprehensive Plan meetings in 2008 and 2009 as important to the community. Healthy wildlife populations are often a sign of a healthy environment for humans as well as other species. The key to protecting wildlife is protecting the habitats each species needs for food, water, shelter and reproduction. Also important is retaining or enhancing connectivity between habitats, in order to protect migration routes and avoid isolated populations.

Wildlife is tied to land use planning because human development impacts habitats in complex ways. Wildlife protections are provided by federal, state and local governments. Oregon land use planning protects wildlife with Statewide Planning Goal 5, Open Spaces, Scenic and Historical Areas and Natural Resources and the associated Oregon Administrative Rule (OAR) 660-023 (this Rule replaced 660-016 in 1996). Statewide Goal 5 includes a list of resources which each local government must inventory, including wildlife habitat.

The process requires local governments to inventory wildlife habitat and determine which items on the inventory are significant. For sites identified as significant, an Economic, Social, Environmental and Energy (ESEE) analysis is required. The analysis leads to one of three choices: preserve the resource, allow proposed uses that conflict with the resource or strike a balance between the resource and the conflicting uses. A program must be provided to protect the resources as determined by the ESEE analysis.

In considering wildlife habitat, counties rely on the expertise of the Oregon Department of Fish and Wildlife (ODFW) and U.S. Fish and Wildlife Service (USFWS). Those agencies provide information for the required wildlife inventory and recommendations on how to protect wildlife habitat on private lands. Note that this section focuses on wildlife, while fish are covered in the Water Resources section of this Plan.

Wildlife Designations

Comprehensive Planning for Wildlife

Plan 2000, the Comprehensive Plan adopted in 1979, included a Fish and Wildlife Chapter with policies aimed at protecting wildlife. That Plan also noted the controversial nature of wildlife protections. To implement the Plan policies, the Wildlife Area Combining Zone was adopted. This overlay zone was intended to protect identified big game habitat through zoning tools such as appropriate lot sizes and setbacks. In 1986 a River Study was completed and adopted into the Resource Element. Goals and policies from that study, including wildlife goals, were added to Plan 2000.

As part of State mandated Periodic Review, the County took another look at wildlife protections to further comply with the requirements of Goal 5 and the then prevailing OAR 660-16. The County worked with the ODFW to obtain the most recent inventory information on fish and wildlife resources in the county and to identify uses conflicting with those resources. This information was used to update the inventories and amend the ESEE analyses.

In addition, ODFW provided information to support zoning ordinance provisions to resolve conflicts between fish and wildlife resource protection and development. The County adopted a Sensitive Bird and Mammal Combining Zone which identified and protected specific bird nests or leks and bat hibernating or nursery sites.

Ordinances for Compliance with Goal 5

During periodic review in 1992, Deschutes County met the requirements of Goal 5 by:

- The adoption of Goals and Policies in Ordinance 92-040 reflecting Goal 5 requirements, including a Sensitive Bird and Mammal Combining Zone to identify and protect specific bird nests or leks and bat hibernating or nursery sites;
- The adoption of Ordinance 92-041 amended the comprehensive plan to inventory each Goal 5 resource, analyze conflicting uses, and analyze the ESEE consequences of protecting or not protecting inventoried fish and wildlife resources;
- The adoption of zoning ordinance provisions in Ordinance 92-042, as applied to inventoried sites by the map adopted by Ordinance 92-046.

In 2015, the Land Conservation and Development Commission (LCDC) adopted rules to Oregon Administrative Rule (OAR) chapter 660, division 23, to establish procedures for considering development proposals on lands identified as Greater Sage-Grouse Area Habitat. Deschutes County met the requirements by:

- Adopting the 2015 Goal 5 Greater Sage Grouse habitat Area Inventory Map into its Comprehensive Plan and amending the Sensitive Bird and Mammal Habitat Inventory to remove 1990 sage grouse lek and range data by Ordinance 2015-010 (Those maps are incorporated by reference herein); and,
- Adopting sage grouse regulations as a Greater Sage Grouse Area Combining Zone by Ordinance 2015-011.

Wildlife Snapshot 2008-2009

Source: County GIS data

- There are 816,649 acres in Deschutes County's Wildlife Area Combining Zone.
- There are 40 sites protected by the Sensitive Bird and Mammal Habitat Combining Zone.
- 76% of County land is owned and managed by the Federal government through the U.S. Forest Service and Bureau of Land Management.

Source: Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon, 2008 May 2009 Prepared for Oregon Department of Fish and Wildlife by Dean Runyan Associates

- Nearly $70 million was spent in Deschutes County on travel generated expenditures on wildlife viewing, fishing and hunting by people from over 50 miles away.
- Over 60% of the $70 million noted above was spent for wildlife viewing, with fishing second with nearly 30% and nearly 10% on hunting.
- Over $8 million in revenue from fishing, hunting and wildlife viewing came from people who live in the County or within 50 miles of the County.
- Over 60% of the $8 million noted above was spent on fishing, over 20% was spent on hunting and under 20% was spent on wildlife viewing.
- All total, over $78 million was spent in Deschutes County on fishing, hunting and wildlife viewing.

Deer Migration Corridor

The Bend/La Pine migration corridor is approximately 56 miles long and 3 to 4 miles wide and parallels the Deschutes and Little Deschutes Rivers. The corridor is used by deer migrating from summer range in the forest along the east slope of the Cascades to the North Paulina deer winter range. Deschutes County adopted a "Deer Migration Priority Area" based on a 1999 ODFW map submitted to the South County Regional Problem Solving Group. This specific sub-area is precluded from destination resorts.

Deer Winter Range

The ODFW identified the Metolius, Tumalo and North Paulina deer winter ranges during Deschutes County's initial comprehensive plan. The boundaries of these winter ranges are shown on the Big Game Sensitive Area map in the 1978 Comprehensive Plan and have been zoned with the Wildlife Combining Zone since 1979. The winter ranges support a population of approximately 15,000 deer.

In 1992, ODFW recommended deer winter range in the northeast corner of the county, in the Smith Rock State Park area, be included in the Deschutes County inventory and protected with the same measures applied to other deer winter range. This area was officially included and mapped on the Wildlife Combining Map when Ordinance 92-040 was adopted by the Board of County Commissioners.

Elk Habitat

The Land and Resource Management Plan for the Deschutes National Forest identifies 6 key elk habitat areas in Deschutes County. The ODFW also recognizes these areas as critical elk habitat for calving, winter or summer range. The following areas are mapped on the Big Game Habitat Area map and in the Deschutes National Forest Land and Resource Management Plan:

- Tumalo Mountain
- Kiwa
- Ryan
- Crane Prairie
- Fall River
- Clover Meadow

Antelope Habitat

The Bend and Ochoco District offices of the ODFW provided maps of the antelope range and winter range. The available information is adequate to indicate that the resource is significant. The antelope habitat is mapped on Deschutes County's Big Game Habitat-Wildlife Area Combining Zone Map.

Sensitive Birds

Nest sites for the northern bald eagle, osprey, golden eagle, prairie falcon, great grey owl, and great blue heron rookeries are inventoried in Ordinance No. 92-041. The area required for each nest site varies between species. The minimum area required for protection of nest sites

has been identified by the ODFW in their management guidelines for protecting colony nesting birds, osprey, eagles and raptor nests.

Federal and State Wildlife Protections

Federal Protections

The primary federal protection for wildlife is the Endangered Species Act (ESA), which sets the preservation of biodiversity as its highest priority. Under ESA, National Oceanic Atmospheric Administration (NOAA) Fisheries or the U.S. Fish and Wildlife Service (USFWS) list species as threatened or endangered. ESA prohibits both federal actions that jeopardize listed species and private actions that result in the "taking" of listed species. Court rulings have explicitly determined that habitat modification can lead to a "taking," even if the modification does not affect a specific individual member of the species. ESA authorizes civil and criminal suits be brought against entities that violate its substantive or procedural provisions.

There are two fish species and one bird species listed as federally threatened or endangered in Deschutes County. Fish are discussed under the Water Resources section of this chapter and the bird, the Northern Spotted Owl, has not been found on private lands.

State Protections

It is Oregon's policy "to prevent the serious depletion of any indigenous species" (ORS 496.012). The Oregon Department of Fish and Wildlife maintains a list of fish and wildlife species determined to be either threatened or endangered according to OAR 635. When a species population is seriously depleted, recovery can be difficult and expensive as well as socially and economically divisive. To provide a positive approach to species conservation, a "sensitive" species classification was created under Oregon's Sensitive Specie Rule (OAR 635-100-040). Table 2.7.1 lists species in Deschutes County that are listed by either federal or state wildlife agencies under the above mentioned laws.

Besides the listings of endangered or threatened, species can be federally listed as candidate species or species of concern. State listings include threatened, critical and vulnerable. Each status has a definition specifying different actions.

Table2.6.1- Special Status of Select Mammals, Birds, Amphibians, and Reptiles in Deschutes County 2009

Species	*State Status*	*Federal Status*
Mammals		
California Wolverine	Threatened	Species of Concern
Fisher	Critical	--
Fringed Myotis	Vulnerable	--
Long-eared Myotis	--	Species of Concern
Long-legged Myotis	Vulnerable	Species of Concern
Pallid Bat	Vulnerable	--
Preble's Shrew	--	Species of Concern
Pygmy Rabbit	Vulnerable	Species of Concern
Silver-haried bat	Vulnerable	Species of Concern
Small-footed Myotis	--	Species of Concern
Spotted bat	Vulnerable	--
Townsends western big-eared bat	Critical	Species of Concern
Yuma Myotis	--	Species of Concern
Birds		
American Peregrine Falcon	Vulnerable	Delisted
Bald Eagle	Threatened	Delisted
Black Tern	--	Species of Concern
Black-backed Woodpecker	Vulnerable	--
Ferruginous Hawk	Vulnerable	Species of Concern
Flammulated Owl	Vulnerable	--
Great Gray Owl	Vulnerable	--
Greater Sage Grouse	Vulnerable	Species of Concern
Lewis' Woodpecker	Critical	Species of Concern
Loggerhead Shrike	Vulnerable	--
Long-billed Curlew	Vulnerable	--
Mountain Quail	Vulnerable	Species of Concern
Northern Goshawk	Vulnerable	Species of Concern
Northern Spotted Owl	Threatened	Threatened
Olive-sided Flycatcher	Vulnerable	Species of Concern
Pileated Woodpecker	Vulnerable	--
Swainson's Hawk	Vulnerable	--
Western Burrowing Owl	Vulnerable*	Species of Concern
White-head Woodpecker	Critical	Species of Concern
Willow Flycatcher	Vulnerable	Species of Concern
Yellow-breasted chat	--	Species of Concern
Yellow-billed cuckoo	Vulnerable	Candidate
Amphibians and Reptiles		
Cascades Frog	Vulnerable	Species of Concern
Coastal tailed frog	Vulnerable	Species of Concern
Northern Sagebrush Lizard	--	Species of Concern
Oregon slender salamander	Vulnerable	Species of Concern
Oregon Spotted Frog	Critical	Candidate
Western Pond Turtle	Critical	--
Western Toad	Vulnerable	--
* listed only for the Basin and Range Ecoregion		

Source: 2009 Interagency Report and ODFW

Oregon Department of Fish and Wildlife

Oregon Conservation Strategy

In 2006 the Oregon Conservation Strategy (OCS) was adopted by Oregon's Fish and Wildlife Commission for the state of Oregon. Wildlife and habitat issues are often crisis-driven and focused on individual species. The OSC is intended to provide a long-term, big-picture look, using the best available science, on how best to maintain and improve Oregon's species, habitats and ecosystems.

This document is not intended to be a set of regulations, but rather it presents issues, opportunities and recommended actions that can serve as the basis for regional collaborative actions. The recommendations within the OCS can be used to address species and habitat conservation needs, to expand existing partnerships and develop new ones, and to provide a context for balancing Oregon's conservation and development priorities. The future of many species will depend on landowners' and land managers' willingness to voluntarily take action on their own to improve fish and wildlife habitat.

The OCS works by defining ecoregions and offering an overview of each region that covers a variety of ecological, land use and economic issues. Parts of Deschutes County fall into three of the ecoregions; East Cascade, Blue Mountains and Northern Basin and Range. For Deschutes County this document offers a wealth of knowledge that can be used to inform fish and wildlife habitat policies and protect and enhance ecosystems.

Fish and Wildlife Habitat Mitigation Policy

The ODFW's Fish and Wildlife Habitat Mitigation Policy provides direction for their staff to review and comment on projects that may impact fish and wildlife habitat. This policy recognizes six distinct categories of wildlife habitat ranging from Category 1 – essential, limited, and irreplaceable habitat, to Category 6 – low value habitat. The policy goal for Category 1 habitat is no loss of habitat quantity or quality through avoidance of impacts by using development action if impacts cannot be avoided. The ODFW recommends avoidance of Category 1 habitats as they are irreplaceable, and thus mitigation is not a viable option. Categories 2-4 are for essential or important, but not irreplaceable habitats. Category 5 habitat is not essential or important, but has high restoration potential.

Interagency Report

In 2009 the USFW, ODFW, U.S. Forest Service and the Bureau of Land Management collaborated to provide a report on Wildlife in Deschutes County, *Updated Wildlife Information and Recommendations for the Deschutes County Comprehensive Plan Update* (Interagency Report). This report provided updated information to be used in revising the County Goal 5 inventory. This update will be done as part of the Goal 5 review as described in Section 2.4 of this Plan. The report also outlined numerous issues that the agencies believe are important for the County to address. The Interagency Report generated debate over how best to protect wildlife while also protecting the rights of property owners. Key issues from the report are touched on below.

Economic benefits of fish and wildlife: The report notes the ODFW report by Dean Runyan regarding the economic benefits of fishing, hunting and wildlife viewing, including that Deschutes County generated more freshwater fishing revenue than any other county in Oregon.

Oregon Conservation Strategy: The report discusses the Oregon Conservation Strategy described above and recommends that the County use it as a guide and reference for the maintenance and enhancement of wildlife resources.

Threatened and Endangered Species and Species of Concern: The report recommends developing and adopting measures to protect federal and state listed threatened and endangered species to limit conflicting use.

Riparian and wetland areas for wildlife and fish: The report recommends completing and adopting a Local Wetland Inventory. The current National Wetland Inventory was done at a scale so that wetlands under 5 acres are not identified. Yet, those wetlands provide significant habitat. Deschutes County adopted a Local Wetland Inventory for South County in 2011.

Oregon Spotted Frog: The report recommends adding an Oregon Spotted Frog habitat area to the wildlife area combining zone and provides some specific ideas for protecting those areas. The Oregon Spotted Frog can be found in the floodplains and wetlands along the Deschutes River and Little Deschutes River, south of Bend. Riverine oxbows are particularly key habitat. This frog is listed as a Federal Candidate and State Critical Species.

Shrub-Steppe Habitat: The report recommends the County consider impacts to wildlife and habitat when development will degrade shrub-steppe habitat. Shrub-steppe habitat provides needed resources for numerous birds and mammals, including 12 Oregon listed sensitive species, and one threatened species. Large blocks of un-fragmented habitat with low human disturbance are needed to support shrub-steppe wildlife. If avoidance of these areas is not possible, providing for "no net loss' and a "net benefit" (restoration) of shrub-steppe habitat should be a vital component of any conservation plan.

Greater Sage Grouse: The report provides recommendations for limiting conflicting uses near sage grouse leks and habitat. The population management objective for sage-grouse in this region (Prineville District), which includes portions of Deschutes and Crook counties, is to restore sage grouse numbers and distribution near the 1980 spring breeding population level, approximately 3,000 birds. Many aspects of human development have impacted sage grouse populations and can be considered conflicting uses. Conservation efforts focused on maintaining large expanses of sagebrush habitat, enhancing the quality of existing habitat, and increasing connections between suitable habitat patches would be most beneficial to maintaining healthy sage-grouse populations. Breeding and nesting habitat is particularly important because it is essential, limited and irreplaceable.

Critical Bird and Mammal Sites: The report does not recommend additional or modification of existing protections for site specific sensitive bird and mammal sites, except for additional protections for sage grouse. The report does provide a new inventory and site specific recommendations that will be used to update the list of Goal 5 wildlife resources.

Game Species: The report does not recommend changes to the existing big game winter range or migration corridor maps. It does recommend that the County revise the uses allowed in those areas to prohibit the following uses that generate activity, noise and habitat alteration:

- Guest ranch
- Outdoor commercial events (i.e. Wedding Venues, Farmers Market)
- OHV course
- Paintball course

- Shooting range
- Model airplane park
- BMX course

Sensitive Species: Table 2.7.2 shows species considered sensitive to human disturbance. Mule deer are the only species in decline.

Table 2.7.2 - Big Game Population Estimates, Deschutes County (2009)

Species	*Population*
Mule Deer	9,337*
Elk	1,500
Pronghorn	1,000
Cougar	~150
Black Bear	~150
Silver Grey Squirrel	~800

* The management objective for the Paulina and Upper Deschutes Wildlife Management Units, primarily in Deschutes County, is an April adult population of 18,7000 mule deer.

Source: Interagency Report

Fish and Wildlife Habitat Mitigation Policy: The Interagency Report includes one recommendation that is only from the ODFW. They recommend that the County require impact avoidance for development that will impact Category 1 habitat and require a wildlife mitigation plan for development that will impact habitat Categories 2-5, to limit conflicting uses.

The Interagency Report recommendations will be considered more closely when the Goal 5 review is undertaken.

Future of Wildlife and Habitat in Deschutes County

Coordination

Much of the wildlife habitat in Deschutes County is located on public lands. Federal lands make up 76% of County lands with another 3% State or County owned. Federal lands are not subject to County regulation but as noted in the Forest section of this Plan, they are important economic generators that also contribute to the community's quality of life, providing ample opportunities for wildlife viewing, fishing and hunting. It should be noted that not all federal lands are managed for wildlife habitat.

Regarding public lands the County's role is to coordinate with the land management agencies to ensure development approved by the County does not impact wildlife.

Another area for coordination is with the Trust for Public Lands (TPL). In 2009 this non-profit group initiated a Greenprint effort that will identify specific areas needing protection, including wildlife habitat. A survey done by this organization identified protecting wildlife habitat as important to County residents.

Rural Development

The loss of wildlife species and habitat may lead to declining recreational opportunities, tourist dollars and quality of life. Yet, many species are sensitive to human development, with some species benefiting and some harmed by land disturbance. New structures or infrastructure can fragment habitats. Barriers such as roads, dams or housing can interfere with migration routes and connectivity leading to isolated and unhealthy populations. Development can also increase

non-native and invasive species. Most Deschutes County residents consider the local wildlife as one of the benefits of living in this region. With careful planning, many of the impacts to wildlife habitat can be mitigated.

Section 2.6 Wildlife Policies

Goals and Policies

Goal 1 **Maintain and enhance a diversity of wildlife and habitats.**

Policy 2.6.1 Goal 5 wildlife inventories, ESEEs and programs are retained and not repealed.

Policy 2.6.2 Promote stewardship of wildlife habitats and corridors, particularly those with significant biological, ecological, aesthetic and recreational value.

Policy 2.6.3 Ensure Goal 5 wildlife inventories and habitat protection programs are up-to-date through public processes and expert sources, such as the 2009 Interagency Report.

Policy 2.6.4 Support incentives for restoring and/or preserving significant wildlife habitat by traditional means such as zoning or innovative means, including land swaps, conservation easements, transfer of development rights, tax incentives or purchase by public or non-profit agencies.

Policy 2.6.5 Assist in providing information and education on wildlife and habitat protection.

Policy 2.6.6 Review the Oregon Conservation Strategy when amending the Wildlife section of this Plan.

Policy 2.6.7 Use a combination of incentives, regulations and education to promote stewardship of wildlife habitat and address the impacts of development.

Policy 2.6.8 Balance protection of wildlife with wildland fire mitigation on private lands in the designated Wildland Urban Interface.

Goal 2 **Promote the economic and recreational benefits of wildlife and habitat.**

Policy 2.6.9 Encourage wildlife related tourism.

Policy 2.6.10 Coordinate with stakeholders to ensure access to significant wildlife and riparian habitat through public or non-profit ownership.

Goal 3 **Support retaining populations of Federal and State protected endangered species.**

Policy 2.6.11 Develop local approaches, in coordination with Federal and State agencies, for protecting Federal or State Threatened or Endangered Species or Species of Concern.

Policy 2.6.12 Address potential conflicts between large-scale development and sage grouse habitat using Ordinances Nos. 2010-010 and 2010-011, which are consistent with OAR 660-023-0115.

Section 2.7 Open Spaces, Scenic Views and Sites

Background

Open spaces are generally undeveloped areas that are being maintained for some other purpose, such as farms, parks, forests or wildlife habitat. Besides the value that stems from the primary use of the land, open spaces provide aesthetically pleasing undeveloped landscapes. Because these areas are undeveloped they also provide additional benefits such as water recharge and safety zones from natural hazards like flooding.

Deschutes County has a rich abundance of open space. With public land ownership at close to 80% and extensive farms and forests, open spaces are an important draw for visitors and were often mentioned as important to the area's quality of life. Along with the open spaces, scenic views were identified as important to residents. The backdrop of the Cascade Mountains, with its vast forest and sagebrush landscapes and riparian and wetland habitats, all provide an inspirational setting for visitors and residents alike. Statewide Planning Goal 5 recommends, but does not require, creating an inventory and protections for open spaces, scenic views and sites. Oregon Administrative Rule (OAR) 660-023 defines open space designations as parks, forests, wildlife preserves, nature sanctuaries and golf courses.

Open Space and Scenic View Designations and Protections

The 1979 Resource Element contained a list of open spaces and areas of special concern, the majority of which were in Federal and/or State control. As part of State Periodic Review in 1992, the list was updated. The Goal 5 review directed by Section 2.4 of this Plan will initiate an update of that inventory.

As of 2010, open spaces are protected through an Open Space and Conservation map designation and zoning district. Scenic view protection is implemented through the Landscape Management Combining Zone regulations, with the list of landscape management roads and rivers in the Goal 5 resource list in Chapter 5 of this Plan.

Deschutes County Open Space and Views 2009

Source: County GIS data

- There are 70,634 acres in the Open Space and Conservation Zone
- Nearly 65% of the Open Space and Conservation Zone land is Federally owned and another nearly 12% is State owned
- There are 32 roads/road segments in the Landscape Management Overlay Zone
- The Landscape Management Overlay Zone also applies to major rivers and streams

Future of Open Spaces, Scenic Views and Sites

Open Space

In Deschutes County, approximately 76% of the land is owned and managed by the Federal government and is not subject to County regulations. These lands remain mostly undeveloped and contribute greatly to the open space in the County, including areas such as the Newberry National Monument or the Three Sisters Wilderness Area and numerous high mountain lakes. In addition, there are three state parks and three state scenic viewpoints that contribute open

space. Finally, private forest and agriculture lands act as open space, as do the numerous golf courses throughout the County.

It can be expected that over the 20-year life of this Plan, most of the Federal lands will remain undeveloped and will continue to function as open space. The State parks are also anticipated to remain (see Section 3.8). The County can work closely with federal and state agencies to protect these special areas. On private lands the County can lend support to voluntary conservation easements and land trusts. As of 2010 private lands suitable for open space designation were eligible for special property tax consideration (ORS 308A.300-330), because they maintain high quality scenic environments for the benefit of the public.

Scenic Views and Sites

Scenic views can be found in nearly every part of the County. View issues generally involve a fine balancing act between the conflicting rights of property owners, neighbors and the wider community. The following list presents some of the issues that have arisen recently.

- A landowner cuts the swath of trees that block his/her mountain views, thus impacting their neighbors' views of forest lands.
- A cell tower is proposed that will provide the cell phone service many people depend on, but the height of the tower impacts a neighbor's views.
- A landowner wants to be energy self-sufficient and proposes a wind turbine, but the turbine height impacts a neighbor's views.

Views from roads and rivers have long been protected by a landscape management overlay zone. There have been questions as to the effectiveness and usefulness of this protection. There have also been questions as to the right way to balance other scenic view areas.

Design Development

The scenic resources in the County include high mountain peaks, open meadows, riparian corridors, wetlands and forests. These areas contribute to the high quality of life for county residents. Development will inevitably occur within some of these areas and the type and placement of it can have a profound effect on the visual landscape. Appropriately placed and designed buildings can complement the natural environment and can serve as an extension to the natural landscape. For example, keeping building heights below the forest canopy and using materials that blend with the forest can help maintain its visual dominance.

It is the goal of this Plan to encourage development design that fits with the natural landscape. It is not the intent of this element to dictate the type of design that should be used. In fact, there are many types of architectural and site design styles that can complement the surroundings.

Deschutes County Greenprint

One avenue the County can take is to identify specific sites or views that still need to be protected. This work was undertaken in 2009 through the Deschutes County Greenprint. The Trust for Public Land (TPL) initiated the public process to create a Greenprint which identified a number of values, including; open spaces, scenic views, wildlife habitat, forest land, farm and ranch land, trails and water quality. TPL will also work with partners to identify sources of funding that can be used to help purchase specific lands. Working with the TPL will provide the County with important information that can be incorporated into this Plan.

Section 2.7 Open Spaces, Scenic Views and Sites Policies

Goal and Policies

Goal 1 **Coordinate with property owners to ensure protection of significant open spaces and scenic views and sites.**

Policy 2.7.1 Goal 5 open spaces, scenic views and sites inventories, ESEEs and programs are retained and not repealed.

Policy 2.7.2 Cooperate with stakeholders to establish a comprehensive system of connected open spaces.

Policy 2.7.3 Support efforts to identify and protect significant open spaces and visually important areas including those that provide a visual separation between communities such as the open spaces between Bend and Redmond or lands that are visually prominent.

Policy 2.7.4 Encourage a variety of approaches that protect significant open spaces and scenic views and sites.

Policy 2.7.5 Encourage new development to be sensitive to scenic views and sites.

Policy 2.7.6 Review County Code and revise as needed to protect open space and scenic views and sites, including:

a. Provide incentives to locate structures in forests or view corridors so as to maintain the visual character of the area;
b. Work with private property owners to provide incentives and mitigations for protecting visually important areas from development impacts;
c. Maintain and revise if needed, the Landscape Management Combining Zone code to effectively protect scenic views while minimizing impacts on property owners;
d. Review County Code, including sign and cell tower code and proposed wind turbine code, to effectively protect scenic views while minimizing impacts on property and business owners;
e. Review County Code for ways to mitigate for developments that significantly impact scenic views.

Section 2.8 Energy Resources

Background

Land use decisions often have a direct effect on energy use and conservation. How communities and buildings are designed and what transportation and utility options are available all impact energy usage. Energy is addressed in the Oregon land use system through Statewide Planning Goal 13, Energy, which requires land uses to be managed for energy conservation, based on sound economic principles.

A prime method of managing land for energy conservation is to design communities to be compact and walkable, so as to limit the need for automobiles and conserve fossil fuel. For a rural county, these types of transportation related energy savings are limited. Instead the County can focus on other conservation measures.

The second energy issue to be addressed is how to promote alternative energy generation, while managing the inevitable impacts. The impacts and problems stemming from traditional fossil fuel energy sources such as oil and coal are clear, but little agreement exists over a solution. As of 2010 there is an emphasis on promoting sustainable, alternative power generation from wind, solar, biomass, hydroelectric or geothermal.

Energy Conservation

Energy conservation frees existing energy resources for other uses and saves money. It is generally seen as a win-win, where the environment benefits from lowered demand for power, and households benefit from lower electric bills. Conservation is also being incorporated into other sections of this Plan, including Water Resources and Environmental Quality.

There are a few ways the County can work proactively to conserve energy. One is to apply energy conservation techniques at County facilities, then track and publicize the energy saved. The County can also support local utility companies that provide energy audits. These educational tools can alert the community to individual actions that can save money as well as energy. Education could also be directed to address thermal ratings for new buildings and to promote more efficient lay-outs. Another option is to strengthen regulations, such as amending subdivision standards.

The County has long promoted energy conservation through a passive solar code that requires new structures to be sited so that they do not block the sun from falling on adjacent properties. This code effectively ensures that all structures are able to obtain passive solar energy. Various studies have shown that solar orientation can create significant energy savings. During implementation of the passive solar code some simple revisions have been identified that could create exemptions for small lots and provide a variance procedure. These changes would provide some flexibility to the existing code while retaining the benefits of passive solar.

Siting Energy Facilities

In general, cities and counties have siting authority over energy projects below a certain size or generating capacity. This includes individual projects powering or supplementing homes and businesses or small commercial projects which produce energy for sale. Larger facilities are

regulated by the Oregon Energy Facility Siting Council. The thresholds for Siting Council jurisdiction are determined by the Legislature and are defined in Oregon Revised Statutes (ORS) 469.300. The Siting Council does not regulate hydroelectric development. Instead, the Oregon Water Resources Commission has the authority to issue licenses for hydroelectric development.

Counties may face planning decisions for the following types of energy projects:

- Thermal power or combustion turbine electric generation projects having a nominal electric generating capacity of less than 25 megawatts.
- Wind or solar electric generating projects having a peak generating capacity of less than 105 megawatts.
- Geothermal electric generating projects with a peak generating capacity of less than 38.8 megawatts.
- Electric transmission and distribution lines carrying less than 230 kilovolts and less than 10 miles in length.
- Biofuel production facilities, if the fuel produced is capable of being burned to produce the equivalent of less than six billion Btu of heat a day or if the facility is otherwise exempt from Siting Council jurisdiction under ORS 469.320(2).

Although the County is considered rich in alternative energy sources, a study of potential sites would provide more specific information on where these sources exist. The map would also allow a comparison between the energy sites and other protected resources.

Home and Business Alternative Energy Generation

The following are known viable sources of alternative energy production for individual homes and businesses in Deschutes County. Impacts to be managed from these uses are increasingly understood and are limited by the size of the projects. In 2010 the County is in the process of creating code to permit small wind turbines for home or business use.

Wind

Small electric wind turbines for residential or small commercial use convert the energy of the wind to electricity. A small wind turbine can produce from 500 watts to 100 kilowatts of electricity, typically producing up to 10 kilowatts. Small turbines range in height from 60-100 feet in height. Unobstructed access to a consistent wind resource is necessary for safe, efficient operation of wind turbines. Oregon law allows landowners to secure a "wind energy easement" to ensure the undisturbed flow of wind across a site (ORS 105.900 - 915).

The electricity generated can be stored in batteries for times of limited wind. If there is a connection to a traditional power grid and excess electricity is produced, it is sometimes possible to sell the excess to the local utility. The primary impacts from small wind generation that need to be considered include: height of the structure, lot size, setbacks, noise, aesthetics, abandonment and wildlife impacts.

Solar

Generally, small solar electric generating systems use photovoltaic cells on the roof of a building to produce electricity from the radiant energy of the sun. The impacts from individual solar projects are regulated through building regulations, rather than land use regulations. The

main issue with home or business use of solar energy is that as of 2010 it is not competitively priced and requires subsides. This is anticipated to change as the technology improves.

Biomass

Biomass is solar energy stored in organic material from living plants. The most common and most widely used source of biomass is firewood used to heat homes and to a lesser extent small businesses. Additionally, biomass materials are being produced from waste products, such as crop residue or forest thinning. The primary impact from home or business use of biomass is air pollution. Although considered carbon neutral since the carbon release through burning was carbon that was absorbed during the growth of the material and would be released as the material decays, the particles caused by the burning may impact air quality. Regulations limiting the burning of firewood are often enacted in urban areas, but are not as useful in rural communities.

Commercial Energy Generation

The State oversees construction and approval of large commercial energy facilities, as noted above. However there is a role for local governments to oversee smaller commercial projects.

Commercial energy generation is considerably more complex than permitting small projects for homes and businesses. From a land use perspective, the scale, extended time frame, investment required and required off-site components all complicate the approval process. For example, to move the electricity generated at an alternative energy facility to market there is often a need for approval of roads, transmission lines or substations. The accessory facilities may or may not be in place at the same site as the main facility, but are an integral part of the project and are currently reviewed separately, based on State regulations.

Although the commercial alternative energy systems listed below have some similarities, there are often different requirements, advantages and impacts to be considered. The primary impact they all share is that they are large industrial structures that will impact the land through the construction process, causing noise, dust, erosion, the spread of noxious weeds and similar damages. These impacts can generally be controlled through proper management of the site. Other types of impacts to be noted are listed below.

Wind Energy Generation

There is a growing interest in commercial wind farms. As of 2010, a wind farm is undergoing approval in Crook County, with some accessory uses to the wind farm being approved in Deschutes County.

Wildlife impacts: Construction of wind energy projects may have both temporary and permanent impacts on wildlife habitat. Bird or bat fatalities from collision with turbine towers or blades have been reported. Requiring an applicant to conduct appropriate pre-construction wildlife surveys as well as post-construction monitoring can address wildlife concerns.

Visual impacts: The need for high towers and exposure to open terrain is inherent in the function of wind turbines, and therefore some visual impact is unavoidable. Careful placement with a thought to nearby roads and homes can aid in limiting the visual impacts.

Solar Energy Generation

Various technologies assist in capturing, converting and distributing solar energy. State officials have declared solar energy a priority sector in developing the Oregon's economy. One of the key regions for developing the solar power industry is Central Oregon, due in part to its plentiful cool and sunny days, and the number of solar power companies already doing business here.

Wildlife impacts: The concentrated sunlight reflected by solar panels or mirrors could kill or injure wildlife, and in a sensitive habitat – such as a desert ecosystem – the environmental effects might be significant. Similar to wind turbines, requiring the applicant to conduct appropriate pre-construction wildlife surveys and post-construction monitoring would also be important.

Visual impacts: Solar facilities can stretch for miles and create visual impacts. Thoughtful design and placement are important for solar facilities.

Commercial Biomass

Commercial biomass uses organic material such as wood, agricultural waste or crop residues to power boilers to generate heat. According to the Oregon Forest Resources Institute an estimated 4.25 million acres (about 15% of Oregon's forestland) have the potential to provide useful woody biomass through thinning to reduce the risk of uncharacteristic forest fires. A potential long-term use is converting woody biomass to biofuels and bioproducts to replace fossil fuels.

Identified biomass opportunities include:

- Warm Springs
- Gilchrist
- La Pine

Transportation impacts: Biomass materials need to be transported to a central location, generating traffic and air pollution. Building a biomass facility as close as possible to an available source will mitigate this somewhat.

Visual impacts: A biomass plant is an industrial use with tall smokestacks, so visual impacts are unavoidable. Similar to wind facilities, appropriate siting can go a long way towards mitigating this concern.

Air quality impacts: There is potential for air quality impacts. These impacts will be managed by the Oregon Department of Environmental Quality rather than the County.

Geothermal Energy Generation

Geothermal energy is a form of renewable energy derived from heat in the earth. This heat is transferred to water through various means and the steam produced is used to produce electricity.

Geothermal energy is completely dependent on the location of geothermal resources. Central Oregon may contain some of the best prospects for geothermal exploration in the continental United States. As of 2010 the area around Newberry Crater is being explored for potential geothermal energy. This exploration is in the Deschutes National Forest and therefore does

not need County approval. However, accessory uses such as substations or transmission lines might potentially require County review.

A 1984 a Geothermal Study was adopted into the Resource Element of the Comprehensive Plan and led to more specific regulations for geothermal energy generation being adopted into the Zoning Code in 1991.

Hydroelectric Energy Generation

Irrigation canals in Central Oregon are now being looked at as more than just a way to distribute water from the Deschutes River to farmers and ranchers. With energy costs rising and the desirability or renewable energy sources, the power of water rushing through the canals is seen as a source of power and revenue. Hydropower projects that are currently constructed include:

- Central Oregon Irrigation District (COID) has installed two hydropower projects totaling 10.5 megawatts (MW). The Siphon Power Project (5.5 MW) in the south part of Bend and the Juniper Ridge Power Project (5.0 MW) approximately 5 miles north of Bend.
- Swalley Irrigation District has installed a hydropower project totaling 750 kilowatts (kW) in their main canal 5.1 miles below an existing diversion.

Additionally, Tumalo Irrigation District received a grant with which they conducted a hydroelectric feasibility study.

In 1986 a River Study was adopted into the Resource Element of the Comprehensive Plan and led to more specific regulations for hydroelectric energy generation being adopted into the Conditional Use section of the Zoning Code in 1991.

Future of Energy

Energy conservation is likely to be an ongoing issue over the next few decades and the County can continue to promote more efficient energy use. As for alternative energy facilities, the State of Oregon promotes these through a requirement that utility suppliers include renewable energy in their portfolios. Additionally, the State offers numerous tax credits and other incentives for both commercial and individual alternative energy projects.

The Rural Renewable Energy Development Zone is another State initiative. These zones encourage investment in alternative energy through granting tax exemptions, similar to an enterprise zone. This idea should be investigated further as an option for the County.

Looking at County regulations in place in 2010, the acreage needed to allow a utility facility is likely on farm or forest lands. Farm and forest land is highly regulated through ORS and OAR. State requirements for utility facilities and accessory uses have been incorporated into the County Zoning Code. Additionally, utility facilities and accessory uses are permitted in most non-farm or non-forest zones, subject to the general conditional use and site plan requirements. The County has additional conditional use regulations for geothermal and hydroelectric facilities, but not for wind or solar energy. The geothermal and hydroelectric regulations are over a decade old and may no longer be effective given the growth of the industry and technology.

In considering existing or potential new regulations, thought should be given to not just the energy generation facility, but also the necessary accessory uses, such as transmission lines,

roads or substations that are necessary to market the energy produced. Regulations should also acknowledge that some forms of alternative energy are dependent on the location of the power source, such as geothermal and hydroelectric. Another area to consider for the regulations is how to provide incentives to energy providers to encourage them to first offer the energy they generate to local utility companies. The review of regulations should also consider how other protected resources would be impacted by the development of alternative energy facilities.

In reviewing regulations, the County should coordinate with agencies, organizations and businesses with expertise in the alternative energy field. For example, an Interagency Working Group (Working Group) comprised of Oregon Department of Fish and Wildlife, United States Fish and Wildlife, United States Forest Service and the Bureau of Land Management created a report (Interagency Report, see Section 2.7 of this Plan) that includes a number of recommendations for protecting wildlife when approving alternative energy facilities. A review of these recommendations will provide valuable information on managing wildlife impacts from new energy facilities.

New regulations should ensure that the County's are in compliance with State requirements, are flexible and minimally intrusive so as to encourage interest, provide incentives where feasible and still manage impacts to the rural community and natural environment.

Section 2.8 Energy Policies

Goals and Policies

Goal 1 **Promote energy conservation.**

Policy 2.8.1 Incorporate energy conservation into the building and management of all County operations and capital projects using regular energy audits to refine the results.

Policy 2.8.2 Reduce energy demand by supporting energy efficiency in all sectors of the economy.

Policy 2.8.3 Encourage energy suppliers to explore innovative alternative energy conservation technologies and provide energy audits and incentives.

Policy 2.8.4 Support stakeholders that promote energy conservation.

Policy 2.8.5 Review County Code and revise as needed to ensure effective energy conservation regulations, such as revising County Code on solar energy to create flexibility and permit exceptions for small properties and sites with specific anomalies.

Goal 2 **Promote affordable, efficient, reliable and environmentally sound energy systems for individual home and business consumers.**

Policy 2.8.6 Review County Code and revise as needed to permit alternative energy systems for homes and businesses and mitigate impacts on neighboring properties and the natural environment.

Policy 2.8.7 Support incentives for homes and businesses to install alternative energy systems.

Goal 3 **Promote affordable, efficient, reliable and environmentally sound commercial energy facilities.**

Policy 2.8.8 Review County Code and revise as needed to develop an efficient permitting process and effective siting standards for commercial renewable energy projects that address all project components as well as environmental and social impacts.

Policy 2.8.9 Support commercial renewable energy projects, including the following:

a. Review the concept of Rural Renewable Energy Development Zones;
b. Support studies that identify and inventory potential significant commercial energy resource sites;
c. Examine alternatives to protect identified significant commercial energy resource sites;
d. Support the use and marketing of methane gas from County Landfills.

Policy 2.8.10 Encourage commercial renewable energy providers to supply local power.

Policy 2.8.11 Goal 5 energy inventories, ESEEs and programs are retained and not repealed.

Section 2.9 Environmental Quality

Background

Environmental quality is addressed in Statewide Planning Goal 6, Air, Water and Land Resources Quality, which requires local governments to comply with applicable state or federal environmental regulations regarding waste and process discharges from the combined effect of new and existing development. The Oregon Department of Environmental Quality (DEQ) is the regulatory state agency primarily responsible for monitoring and enforcing both federal and state environmental regulations. They issue and enforce permits for pollution control and monitor air, water and land quality.

Still, a DEQ fact sheet (DEQ 06-OD-001 1/09) shows that more than 80% of land, air and water pollution comes from the daily activities of Oregonians, such as driving cars and fertilizing lawns. Because the majority of pollution comes from everyday actions, there is much that can be done locally. There is a growing awareness that seemingly small individual actions, such as employing reusable grocery bags or dumping used motor oil down the drain, can cumulatively impact the environment, either positively or negatively.

The concept of sustainable development that meets the needs of today without compromising the needs of future generations, provides a context for thinking about future growth. It is a common sense way to be sure that the consequences of collective actions are understood.

Two primary methods for the County to promote careful stewardship of the environment are by setting a good example through County actions and by providing information to the community on a variety of environmental issues. Additionally the County can thoughtfully manage the impacts of growth on the environment in cooperation with other agencies, organizations and jurisdictions.

Clean Air

Deschutes County air is monitored by the DEQ and is generally good quality. One of the primary air quality issues nationally and locally, is the pollution from automobiles. Deschutes County is somewhat limited in addressing this issue since rural homes are spread out over long distances, making alternatives to the automobile such as bicycles or transit challenging. One way to address this is to cooperate with cities in promoting smart growth in urban areas. Smart growth uses thoughtful design to build compact neighborhoods with a variety of transportation alternatives such as transit or trails.

Forest fires are the other primary sources of air pollution in this area. The County is actively working to prevent and control forest fires, but this issue is multi-jurisdictional and involves cooperation and education (see Section 3.5).

Another air quality issue that has been raised is the potential problems that come from allowing new residential uses to locate near existing mining or industrial uses. One way to deal with this issue is to consult DEQ on these approvals so they can make recommendations for siting the residential use based on prevailing winds.

Clean Water

Water quality issues cannot be separated from the issues of water availability and the health of rivers and streams. Concerns over water quantity and quality were noted frequently in public meetings as a key issue for the County going forward. Water issues are addressed in this Plan in Section 2.5 Water Resources and Section 3.10 under South Deschutes County's Regional Problem Solving.

Clean Land

Land provides essential food, shelter, raw materials and plant and animal habitat. Maintaining healthy and productive land is key to every section of this Plan. Yet, land quality is generally discussed in relationship to specific developed sites with possible pollution, such as gas stations, land fills or dry cleaners. DEQ maintains a list of potentially polluted sites in Deschutes County and works with property owners to enforce state and federal regulations.

Any development has an impact on the land and many of those impacts can be controlled though understanding, education and if needed, regulation. The following issues have been raised:

Noxious Weeds

Noxious weeds are a serious issue in Deschutes County. These non-native and sometimes poisonous species overrun native vegetation, shelter undesirable insects, consume scarce water and infest crops. They can and do grow anywhere, but thrive on disturbed surfaces. Roadsides, former farmlands, inactive surface mines and non-landscaped areas around construction sites are all prime sites. Weeds on any one property have a major affect on the maintenance of others.

The County has a Weed District as defined by Oregon Revised Statute (ORS) 570.500-600, with a Board that oversees education and active weed eradication. Enforcement procedures have been initiated that include citations and fines. A review of opportunities to regulate weeds through the Zoning Code should be explored. These regulations should require not just eradication but also restoration, to prevent further infestations.

Sustainable Green Building

Both during construction and over time, buildings impact the environment. Green building focuses on design, construction and operation of buildings that efficiently use energy, water and materials, while promoting a clean environment. Environmentally friendly development can be extended to include utility facilities/lines and roads. There are industry accepted standards that have been developed for creating low impact and efficient buildings, such as those of Leadership in Energy and Environmental Design (LEED).

Additionally innovative, environmentally-friendly building techniques, like straw bale construction are regularly being proposed. The County can review the State building code to promote flexibility and safety in reviewing design innovations. Another step is to continue to advocate green building by providing information to the public.

Noise and Light Pollution

Noise is often defined as unwanted sound. It can vary in frequency, duration and intensity. In Deschutes County noise is regulated in the Health and Safety section of County Code.

However, often noise issues arise out of specific land uses. As a rural county, some noise from farming and forestry practices is normal and permitted. Still, in 2010 attempts to increase the types of uses allowed on rural residential and farm lands have raised the question of how much noise is appropriate. Noise travels long distances in rural areas and can impact the quality of life for rural residents. The County will continue to address noise concerns as specific land uses are proposed and regularly evaluate the current noise restrictions.

In Deschutes County night skies are expansive and in the rural darkness the stars and Milky Way are brightly visible. The University of Oregon maintains the Pine Mountain Observatory to take advantage of these conditions. In 1994 Deschutes County adopted an outdoor lighting ordinance to allow residents to light their properties as needed, but to ensure the lighting does not illuminate outside the owners property. This ordinance needs to be retained and reviewed regularly to ensure adequate protection of the nighttime darkness.

Solid Waste / Recycling / Hazardous Waste

Oregon law establishes a hierarchy for managing solid waste with a goal of minimizing waste disposal. The first step is to prevent waste generation, followed by reuse, recycling, composting and energy recovery. Only if those options are not available does disposal come into play. Although recycling programs frequently have an economic cost, they provide environmental benefits though conserving energy and landfill space. The key to successful recycling is the availability of markets for recycled goods.

Deschutes County's Solid Waste Department, in response to State Statute and community demand, continues to refine existing recycling programs and explore new programs and opportunities. As of 2010 programs include education, curbside recycling and free and convenient drop off sites. Also available, although more limited, is free disposal of hazardous waste and electronic waste. One aspect of recycling that could be strengthened is recycling of construction waste. Deschutes County's task is to continue to manage waste in a manner that is fiscally responsible, environmentally thoughtful and in compliance with state and federal regulations.

Area of Critical State Concern

The Oregon legislature first authorized the designation of an Area of Critical State Concern (ACSC) as part of the legislation creating the statewide land use program (Senate Bill 100) in 1973. At that time, several areas were identified as possibly warranting state protection in the face of uncontrolled development, including the Columbia River Gorge, areas of the Oregon Coast, and portions of the Metolius basin. Several of these areas were later protected through federal action, or through special state land use goals.

On July 15, 2009 the Legislative Assembly enacted HB 3298. House Bill 3298, designates the Metolius basin and an adjoining area as the Metolius Area of Critical State Concern (Metolius ACSC) and approves an accompanying management plan submitted by the Land Conservation and Development Commission (LCDC). The legislature approved the management plan and directed the LCDC to adopt the plan, by rule, with specified changes.

HB 3298 approves the designation of the Metolius Area of Critical State Concern as recommended by LCDC. This area includes the Metolius drainage basin and an adjoining area (Areas 1 and 2 in the management plan), which are located in portions of Jefferson and Deschutes Counties (near Black Butte). The prohibition of new destination resorts applies to

eligible lands mapped previously by Jefferson and Deschutes Counties in the Metolius Area of Critical State Concern.

The following uses are prohibited in the Metolius Area of Critical State Concern management plan approved under HB 3298:

- Any new destination resort, as defined by Statewide Planning Goal 8 or ORS 197.435 to 197.467.
- Any new golf course.
- Certain new residential, commercial, industrial or new uses exceeding a stated number of dwelling units, or exceeding an average annual consumptive use of water, depending whether the land is in Area 1 or Area 2.

Section 2.9 Environmental Quality Policies

Goals and Policies

Goal 1 **Maintain and improve the quality of the air, water and land.**

Policy 2.9.1 Support environmental stewardship in County operations and capital projects, including where feasible, using resource-efficient building techniques, materials and technologies in County building projects.

Policy 2.9.2 Maintain County noise and outdoor lighting codes and revise as needed.

Policy 2.9.3 Where research identifies environmentally sensitive areas, work with agencies and stakeholders to protect those areas or minimize adverse land use or development impacts.

Policy 2.9.4 Be a leader in the control of noxious weeds and invasive species through education and regulations.

a. Support education for the community and for County departments on how to recognize and report on noxious weeds.

Goal 2 **Promote sustainable building practices that minimize the impacts on the natural environment.**

Policy 2.9.5 Review County Code and revise as needed to promote the use of resource-efficient building and landscaping techniques, materials and technologies for new construction and renovation projects.

Goal 3 **Encourage and increase recycling.**

Policy 2.9.6 Encourage and support reuse through education and recycling through the Recycling Program.

a. Provide convenient recycling at all County events and in all County facilities.
b. Provide convenient opportunities to recycle materials and compost green waste in locations at transfer stations and through home pick up.
c. Provide convenient opportunities for disposal of hazardous waste and e-waste.
d. Aim for 80% recycling of construction waste in all County building projects.
e. Promote 20% recycling of construction waste in all projects requiring a building permit.
f. Support businesses and industries that utilize recyclable materials.

Section 2.10 Surface Mining

Background

Surface mining provides non-renewable resources, such as pumice, cinders, building stone, sand, gravel and crushed rock. The extraction of these materials provides employment as well as products important to local economic development. Yet mining of mineral and aggregate resources creates noise, dust and traffic and potential pollution that can conflict with neighboring land uses, particularly residential uses. This conflict can be aggravated by delayed or incomplete reclamation of the land. Surface mining is protected through Statewide Planning Goal 5, Natural Resources, Scenic and Historic Areas and Open Spaces and the associated Oregon Administrative Rule (OAR) 660-023 (this rule replaced 660-016 in 1996). Mineral and aggregate resources are included on the list of Statewide Goal 5 resources that the County must inventory and protect.

Surface Mining Designations

In the 1979 Plan, the County had a chapter discussing demand for aggregate, based on anticipated population growth. In 1990 after a lengthy legal challenge and additional research, an updated inventory, mining analysis and revised regulations were adopted. County sites were designated under OAR 660-016 and continue to be regulated under those rules. Since that time, additional sites have been added to the inventory under the OAR Safe Harbor regulations, at the request of property owners and after a Goal 5 Economic, Social, Environmental and Energy (ESEE) analysis was completed as required by OAR 660-023. The inventory of surface mining sites can be found in Chapter 5. It is unclear if sites on this list are still being actively mined, exhausted or being held for future mining. This list will be reviewed as part of the proposed Goal 5 analysis addressed in the Goal 5 section of this chapter (Section 2.4).

Surface Mining in 2009

Source: County GIS and Comprehensive Plan information

- There are 9,452 acres in the Surface Mining Zone.
- There are 57,908 acres in the Surface Mining Impact Area Combining Zone.
- 62 surface mine sites on the County GIS mapping system.
- 112 surface mine sites in the Comprehensive Plan inventory.

Several sites in the County appear to be no longer mined, and are either abandoned or have been officially reclaimed, but have not rezoned.

Future of Mining in Deschutes County

Surface mining provides an important product but also can create conflicts between mines and residences. Additionally, surface mining plays a role in spreading noxious weeds and impacting water quality, and should be examined for potential control measures. A review of County regulations can insure that the Code is adequately protecting the resource and the community, in conjunction with the Oregon Department of Geology and Mineral Industries.

Section 2.10 Surface Mining Policies

Goals and Policies

Goal 1 **Protect and utilize mineral and aggregate resources while minimizing adverse impacts of extraction, processing and transporting the resource.**

Policy 2.10.1 Goal 5 mining inventories, ESEEs and programs are retained and not repealed.

Policy 2.10.2 Cooperate and coordinate mining regulations with the Oregon Department of Geology and Mineral Industries.

Policy 2.10.3 Balance protection of mineral and aggregate resources with conflicting resources and uses.

Policy 2.10.4 Review surface mining codes and revise as needed to consider especially mitigation factors, imported material and reclamation.

Policy 2.10.5 Review surface mining site inventories as described in Section 2.4, including the associated Economic, Social, Environmental and Energy (ESEE) analyses.

Policy 2.10.6 Support efforts by private property owners and appropriate regulatory agencies to address reclamation of Goal 5 mine sites approved under 660-016 following mineral extraction.

Section 2.11 Cultural and Historic Resources

Background

Historic buildings and sites connect us to the past and teach us how people in different eras managed resources and worked within their surroundings. Interesting information can be gleaned through an examination of significant buildings, rock shelters, cemeteries and individual graves, ranches, trails, wagon train routes, townsites, mill sites, fish hatcheries, river crossings, bridges, canals, dams, historic roads and other unique resources. These resources enrich the community by providing tangible evidence of our heritage.

Historic resources are recognized by Statewide Planning Goal 5, Natural Resources, Scenic Views and Historic Areas and Open Spaces, and Oregon Administrative Rule (OAR) 660-023. The Statewide Goal and OAR recommend, but do not require, the County to inventory and protect historic and cultural sites.

Historic Designations

In 1979 the County inventoried potential historic and cultural sites in the Resource Element. The 1979 Plan included goals and policies for protection of historic resources as well as provisions that the County establish a Historical Landmarks Commission and adopt an ordinance to protect designated historic sites.

On September 17, 1980 the Board of County Commissioners adopted Ordinance PL-21, which established a Historical Landmarks Commission and created a process to evaluate, designate and regulate historic structures.

The Historic Landmarks Commission subsequently, and over time, evaluated proposed historic sites. The resulting inventory of historically designated sites can be found in Chapter 5. This inventory will be reviewed as part of the Goal 5 review as described in the Goal 5 section of this Plan. Starting in 1997, all historic and cultural designations have been initiated at the request of property owners through the Comprehensive Plan text amendment process.

Cultural and Historic Resources 2010

Source: County GIS and Comprehensive Plan Information

- 36 Historic or Cultural sites in the Comprehensive Plan Inventory
- 6 Sites in Deschutes County on the National Historic Register

Future of Cultural and Historic Resources

Deschutes County supports the voluntary preservation of significant cultural and historical sites. Going forward there are a few issues regarding cultural and historical resources that need to be addressed. The first is to clarify that the County's role is to cooperate with the Historic Landmarks Commission. That body contains persons with expertise in historic and cultural preservation.

Another concern is that the current County inventory is old and contains incomplete information on some of the sites. Additionally it does not include sites on the National Register of Historic Places. Adding these sites to the list would not require any action from the property

owner or County, but would ensure the list is useful to the public. These issues can be managed during the Goal 5 review.

Another concern is that when cultural resources are discovered at a project site it can create significant delays. This can be addressed by creating a proactive process in conjunction with local tribes, for protecting cultural resources while not impacting on-going work.

Section 2.11 Cultural and Historic Resources Policies

Goal and Policies

Goal 1 **Promote the preservation of designated historic and cultural resources through education, incentives and voluntary programs.**

Policy 2.11.1 The Historic Landmarks Commission shall take the lead in promoting historic and cultural resource preservation as defined in DCC 2.28.

a. Support incentives for private landowners to protect and restore historic resources.
b. Support the Historic Landmarks Commission to promote educational programs to inform the public of the values of historic preservation.
c. Support improved training for the Historic Landmarks Commission.

Policy 2.11.2 Coordinate cultural and historic preservation with the Oregon State Historic Preservation Office.

a. Maintain Deschutes County as a Certified Local Government.
b. Encourage private property owners to coordinate with the State Historic Preservation Office.

Policy 2.11.3 Encourage the preservation of lands with significant historic or cultural resources.

a. Develop and maintain a comprehensive list of sites on the National Register of Historic Places.
b. Review County Code and revise as needed to provide incentives and adequate regulations to preserve sites listed on the Statewide Goal 5 historic and cultural inventory.

Policy 2.11.4 Goal 5 historic inventories, ESEEs and programs are retained and not repealed, except for the amendment noted in Ordinance 2011-003.

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