



Benton County Rural Living Handbook



Benton Soil and Water
CONSERVATION DISTRICT

Benton County Rural Living Handbook

Created By

BENTON
SOIL AND WATER



CONSERVATION
DISTRICT

Cover Photos

Camas ⁴

Oaks in Field ²⁶

Soap Creek Schoolhouse ²⁶

Rural Road Sunset ¹⁶

2014

Table of Contents

1. Introduction

Purpose.....	5
How to Use.....	5
Acronyms.....	5
Acknowledgements.....	6
About Benton SWCD.....	6
Benton County.....	7
Rural Living.....	10

2. Buying and Developing Rural Property

Land Use in Benton County.....	13
Common Zoning types.....	13
Legal Issues.....	14
Key Considerations.....	15

3. The Rural Experience

Being Neighborly.....	19
Right to Farm Law.....	20
Things You Should Know When Living Next to.....	21

4. Land Management

Management Plan.....	27
Conservation Practices.....	27
Weed Management.....	29
Rural Roads.....	33
Fire Prevention.....	33

5. Wildlife and Habitat

Habitats.....	37
Living with Nature.....	39

6. Water

Watersheds.....	43
Water Rights.....	43
Water Storage.....	43
Irrigation.....	46
Ground Water.....	48
Water Quality Management.....	51

7. Soil

Importance of Soil.....	55
Management Practices.....	55
Soil Quality.....	56

8. Agriculture

Small Farms.....	59
Agricultural Certification Programs.....	60

9. Livestock Management

Species Requirements.....	63
Fencing.....	63
Pasture & Grazing Management.....	64
Manure Management.....	66
Mud Management.....	67

10. Forestry

Oregon's Forest Protection Act.....	71
Small Woodland Management.....	71
Permits.....	72

11. Resource Directory

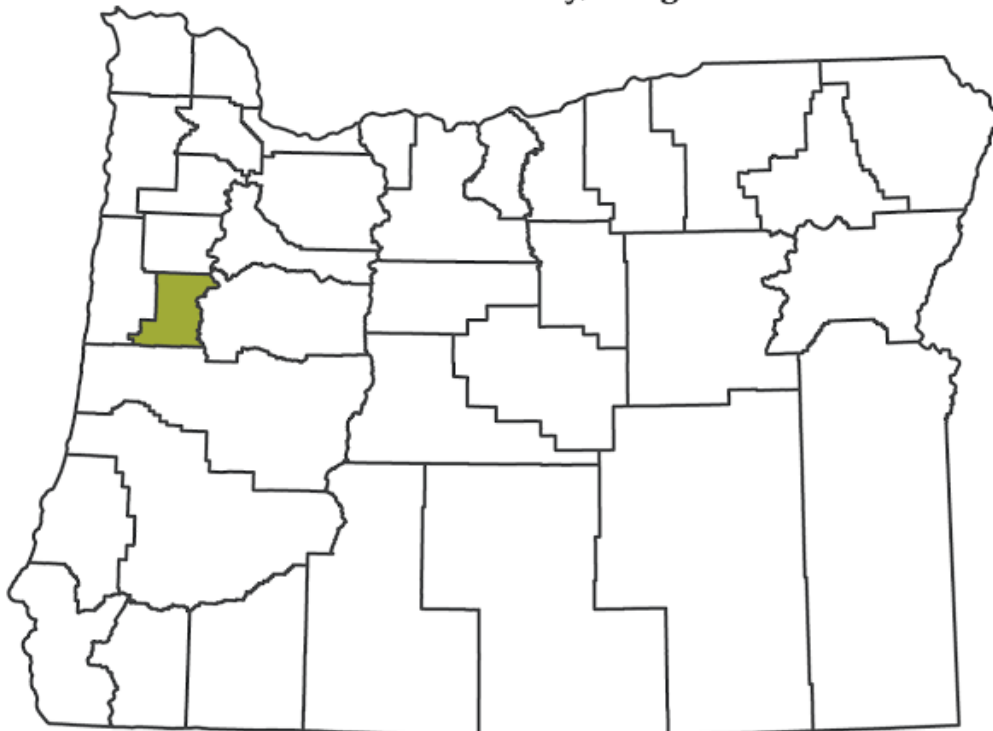
Conservation Programs.....	75
Waste Management.....	76
Local Groups.....	77
Local Events.....	81
Contact List.....	83

Credits.....	85
--------------	----



Common Horsetail ²⁶

Benton County, Oregon ²⁰



Chapter 1: Introduction

1

Introduction

Purpose.....	5
How to Use.....	5
Acronymns.....	5
Acknowledgements.....	6
About Benton SWCD.....	6
Benton County.....	7
Rural Living.....	10

Benton County ²⁰

- City
- Road
- Highway



Purpose

As more people move to Benton County, the rural/urban buffers are shrinking. Some urban residents are now living next door to rural agricultural producers. To protect the agricultural and ecological values that the county's natural resources provide to the region, new and current residents require easy access to practical information. Many government agencies and other organizations have published bits and pieces of this information, but its scattered nature makes it difficult for property owners to find the answers they need. The Rural Living Handbook brings the essential information together in one document and identifies resources for additional information.

The Benton Soil and Water Conservation District (BSWCD) created this document to assist rural property owners in understanding and implementing conservation practices on their property. This document is primarily for small or new landowners, but does have value for the more experienced or large-scale agricultural producers. It points the reader to more complete sources of information when they exist. By educating property owners on conservation practices, the Benton SWCD hopes to encourage greater participation in proactive land stewardship, and to make life in Benton County for new and long term residents a more rewarding experience.

How to Use

The Rural Living Handbook has eleven chapters that address a broad range of topics related to rural living. Each chapter is broken into sections with detailed information on a specific topic related to the section heading. Throughout the chapters and at the end of

the chapters there are lists of resources that provide additional information on the topics discussed in that chapter. Phone numbers of local and state agencies are located in the last chapter of the document for quick access. Many of these agencies' websites are listed within the document in the Additional Resources box of the section related to that entity's mandates.

The District has made considerable efforts to validate the information in this document, especially regarding laws, codes and regulations. If any discrepancy exists between this document and the official wording, the official wording takes precedence. This document is not intended to provide legal advice. Always check with regulatory agencies before engaging in any significant projects.

Acronyms

AFO	Animal Feeding Operation
BLM	Bureau of Land Management
CAFO	Confined Animal Feeding Operation
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
FSA	Farm Service Agency
GMO	Genetically Modified Organism
NOP	National Organic Program
NRCS	Natural Resources Conservation Service
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish & Wildlife
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
OSU	Oregon State University
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
ROW	Right of Way
SWCD	Soil & Water Conservation District
USDA	U.S. Department of Agriculture

Acknowledgements

For the creation of this guide, Benton Soil & Water Conservation District relied heavily on the rural living guides produced by other Oregon SWCDs. Special thanks are due especially to Marion, Polk, Linn, Jackson, Deschutes and Hood River SWCDs. We would also like to thank all of the individuals at organizations and agencies who provided the resources and information used to create this document. Without their research, publications, and support this document would not have been possible.



Soap Creek Valley ²⁶

Special Thanks

Kristin Anderson, Associate Planner,
Benton County Planning Division

Chris Bentley, Senior Planner, Benton
County Planning Division

Marvin Gilmour, Farmer & BSWCD
Director, Zone 2

Betty Malone, Sunrise Tree Farm

Pat Malone, Sunrise Tree Farm & BSWCD
Director, Zone 1

Anne Marie Moss, Oregon Farm Bureau

Emily Phillips, Recycling Coordinator,
Republic Services

Michael Powers, Water Quality Lead
Policy Specialist, Oregon Department
of Agriculture

Doug Sackinger, GIS Coordinator, Benton
County GIS & Maps

Tom Snyder, District Conservationist,
Natural Resources Conservation Service

Laurie Starha, Engineering/Survey
Program Manager, Benton County
Public Works

Mike Totey, District Forester, Oregon
Department of Forestry

About Benton SWCD

The Benton SWCD, which covers all of Benton County, was established in 1956. The District is classified by the state as a special district and is partially funded by a county-wide permanent tax base of 5 cents per \$1,000 assessed property value. Benton SWCD is led by seven elected volunteer directors. Five directors represent geographical zones in the county and two are at-large. Benton SWCD is not affiliated with Benton County government and has no regulatory authority. Benton SWCD's mission is to provide leadership to Benton County residents through education and technical assistance for conservation and responsible use and management of soil, water and related resources.

The overarching goal of Benton SWCD is to focus attention on soil and water conservation issues, activities and concerns through these comprehensive approaches:

- Provide technical knowledge and assistance to county residents using technology appropriate to each situation.

- Conduct soil and water conservation education and outreach activities for all ages.

Increase visibility of Benton SWCD as the conservation organization for Benton County.

Assist commercial producers to achieve their resource management objectives.


Help residents understand the financial assistance available to them.

Build and maintain working relationships with district partners and cooperators.

Accomplishing these goals requires collaborative efforts among citizens, natural resources users and managers, local, state and federal agencies, non-profits and the District. The Benton SWCD is located in downtown Corvallis, on the southeast corner of 5th and Monroe, across from the Benton County Courthouse. Benton SWCD has a user-friendly website (www.BentonSWCD.org) with information about our programs and resources.

History of Conservation Districts

In 1935, President F. D. Roosevelt addressed the problem of the Dust Bowl and soil erosion by establishing the Soil Conservation Service within the USDA. In 1937, this legislation was implemented at the state level to allow the formation of local soil conservation districts. In 1963, the state of Oregon added "water" to the names of the districts. The districts in Oregon are political subdivisions of state government, but are also municipal corporations.



Benton County

Benton County was created from Polk County by an act of the Provisional Government of Oregon in 1847. It is one of seven counties in the United States to be named after Senator Thomas Hart Benton of Missouri, a longtime advocate of the development of the Oregon Territory. The county was created out of an area originally inhabited by the Klickitat Indians, who rented it from the Kalapuya Indians for use as hunting grounds. At that time, the boundaries began at the intersection of Polk County and the Willamette River, ran as far south as the California border and as far west as the Pacific Ocean. Later, portions of Benton County were taken to form Coos, Curry, Douglas, Jackson, Josephine, Lane and Lincoln Counties, leaving it in its present form with 679 square miles of land area. In Benton County there are five incorporated cities (Corvallis, Philomath, Monroe, Adair Village and North Albany) and five officially designated unincorporated communities (Alesia, Wren, Alpine, Bellfountain and Greenberry).

Benton Geography and Soil

Benton County, Oregon is about 40 miles southwest of the capital city of Salem and about 45 miles northwest of the city of Eugene. The eastern boundary of Benton County is the Willamette River. The Alesia Basin, partially located in Benton County, is geographically separated from the rest of the county by the Coast Range. Approximately 15,000 years ago the great ice dam of Missoula Lake thawed and refroze repeatedly causing 2,000 years of cataclysmic floods throughout what is now known as the Columbia River Gorge and the Willamette Valley. Those flooding events deposited rich sediments, making the Willamette Valley the most fertile and productive area in Oregon.

Benton County By the Numbers

The following statistical information was derived from the U. S. Census Bureau, the OSU Oregon Communities Explorer and the 2007 USDA Census of Agriculture.

<p>Area 679 sq mi (434,560 acres)</p>		<p>Population 86,591 (2013 US Census Bureau estimate)</p>	
<p>Median Age 31.9 (2007-11)</p>	<p>White 82% (2012)</p>	<p>Asian 5.6% (2012)</p>	<p>Latino 6.7% (2012)</p>
<p>Farms (2009) 906</p>	<p>Century Farms/ Ranches 40 (data from Oregon Century Farm & Ranch Program)</p>	<p>Total Timber Harvest (2011) 118,007 (1000s board feet)</p>	
<p>% of land in farms (2009) 26.46 (114,982 acres)</p>	<p>Benton County Farmers Markets 4 (Corvallis Farmers' Market – Saturday, Corvallis Farmers' Market – Wednesday, Corvallis Indoor Winter Market, Wren Community Market)</p>		
<p>Median Household Income (2007-11) \$42,763</p>	<p>Poverty Rate (2007-11) 21%</p>	<p>Total Housing Units (2010) 36,245</p>	<p>Median Home Value (2007-11) \$240,361</p>

Community Highlights

Town	Population	Most Common Industry	Most Common Occupation	Highlights
Corvallis	54,462 (incl ~50% OSU students)	Educational Services (>25%)	Postsecondary Teachers (7.4%)	"Heart of the Valley" and home of Oregon State University
N. Albany	7,286	Computer & Electronic Products	Management	The rest of Albany is in Linn County
Philomath	4,543	Educational Services	Production	Historically a mill town, has transitioned to manufacturing
Monroe	617	Educational Services	Production	Known for agriculture, especially grass seed
Adair Village	840			Historical site of 2 military bases; bedroom community for Monmouth/Corvallis
Alsea (unincorporated)	164	Educational Services		On west side of Coast Range; deep roots in lumber; now agricultural enterprises & fishing



Restoration work involves youth in Kings Valley. ¹⁴

Rural Living

The U.S. Census Bureau uses a formula involving population size of 2,500 or less and population density of 500 persons per square mile or less to classify a place as rural.

Life in urban and rural environments differs greatly. The two environments have distinct characteristics based on the common activities and surroundings. However, the urban-rural boundary is becoming harder to define due to increased sprawl and development. It is not uncommon to see a subdivision located near an orchard or pasture.

People often move to the country to connect with nature, for more privacy, and a slower pace of life. Rural living also means increased distances to urban amenities such as grocery stores, schools, medical facilities, and cultural events.

Rural environments often lack access to utility services. For example, the rural property owner is responsible for managing and maintaining their own well water and septic systems.

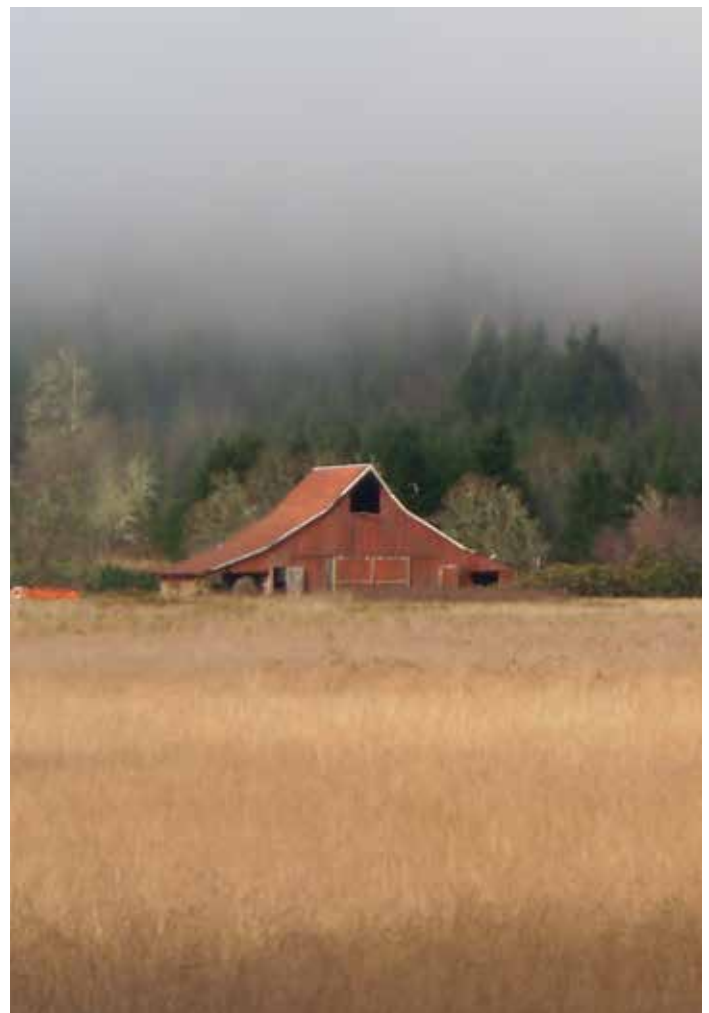
Rural living can be immensely rewarding but it requires a great effort to manage weeds, live with wildlife, and protect water quality. Continue reading to find out more about common rural living concerns.



Wild turkeys may visit rural property. ²⁵



Benton County has two rodeos. ⁴



A misty morning in Alsea. ²⁵

Additional Resources



Benton County Historical Museum and Society
www.bentoncountymuseum.org/index.cfm

Climate of Benton County
www.ocs.oregonstate.edu/county_climate/Benton_files/Benton.html

Historical Society timeline that starts in 1850
www.bentoncountymuseum.org/timeline/index.cfm

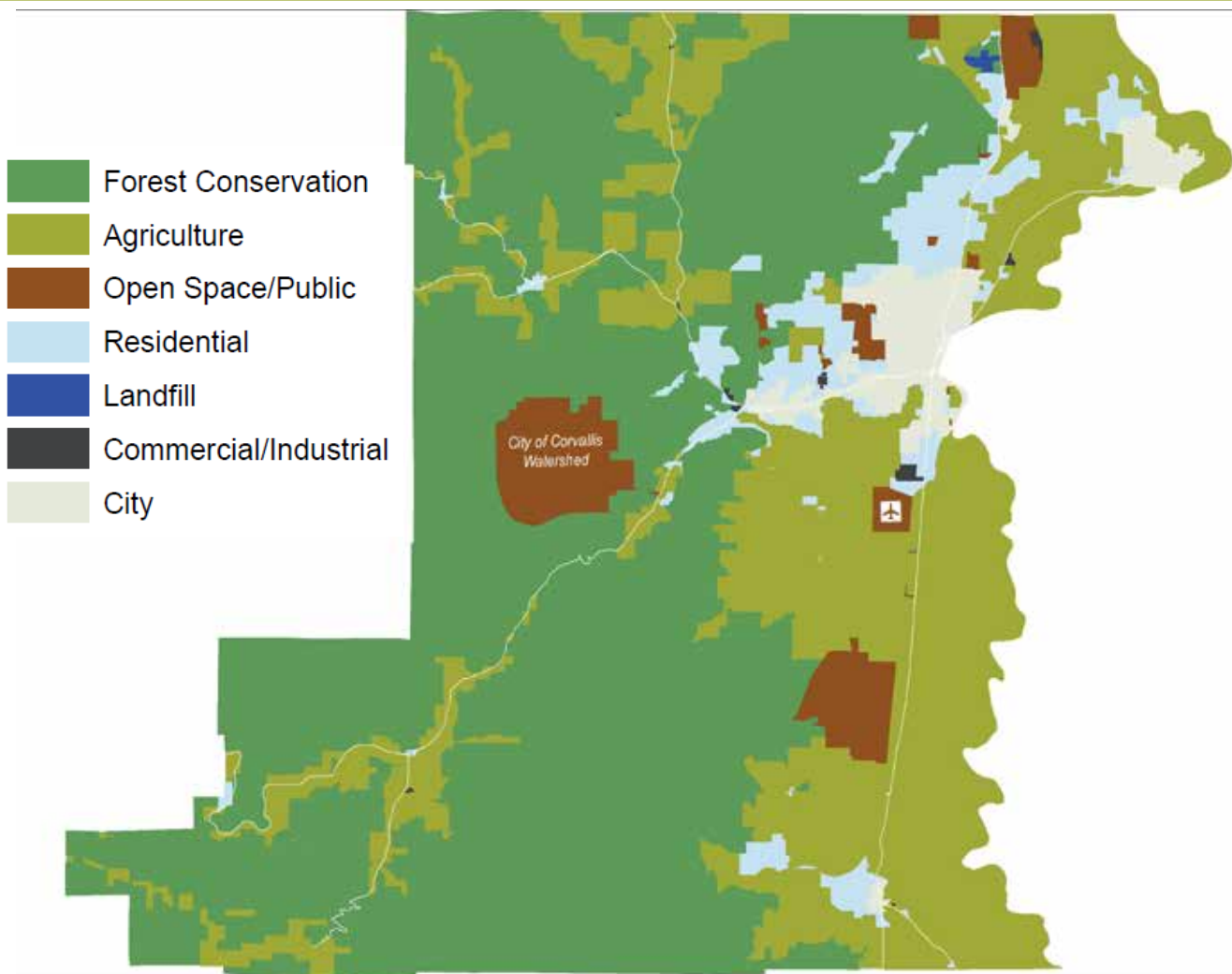
The Historical Record of Oak Creek Benton County, Oregon by Patricia Benner
<http://oregonstate.edu/dept/oakcreek/files/about.html>

Chapter 2: Buying & Developing Rural Property

2

Buying & Developing Rural Property

Land Use.....	13
Common Zoning Types.....	13
Legal Issues.....	14
Key Considerations.....	15



Benton County Simplified Zoning Map ²³

Land Use in Benton County

Land use zoning regulates many aspects of a piece of property. The chapter of code for each zone describes permissible uses on the land, whether you can divide property, and building restrictions such as height limits and setbacks from property lines. The goals of zoning include: limiting the conflicts that can arise between adjacent property owners due to land use activities; maintaining property values and a certain set of uses; using public services and facilities efficiently; and preserving the ability for rural land to be used for farming, forestry, mining and other resource purposes that contribute to the local economy.

Common Zoning Types

Rural Residential

This land is intended for residential uses in a rural setting, often including or adjacent to farm and forest uses, which are “outright permitted.” This means that residents should expect normal farm and forest management practices, which may result in herbicide and pesticide spraying, large amounts of dust, noise that could continue day and night, felling of trees, slash burning, and manure smells. Because of the resource nature of surrounding properties, there may also be wildfires, hunting, use by bears and cougars, and difficulties with water supply and water quality. One single-family dwelling can be allowed on any legally created property that meets requirements for drinking water, sewage disposal, road/emergency access, and other considerations.



Combines are active in the EFU zone. ²⁶

Urban Residential

This land is very similar to “Rural Residential” zoned land, except this land will eventually become part of a city and thus has some different rules. For example, one duplex can be allowed.

Exclusive Farm Use (EFU) and Multi-Purpose Agriculture

This land is intended for resource uses, and most properties do not have a dwelling right. Allowable uses include farm use, forestry use, wildlife habitat, mining, and other resource-related uses. A wide variety of other uses are potentially allowable, such as wineries, sewage lagoons, facilities for processing farm or forest products, commercial power generating facilities, and solid waste disposal sites.

Forest Conservation

This land is intended for resource uses, and most properties do not have a dwelling right. Allowable uses include forestry use, farm use, wildlife habitat, and mining. Other potentially allowable uses include private hunting operations, firearms training facilities, youth camps, and solid waste disposal sites.

Other Zones

There are many other zones, such as Commercial, Industrial, and Open Space, but they apply to much smaller portions of the County. Additionally, a few areas also have overlay zones, such as "Airport," "Floodplain Management," and "Willamette River Greenway," which modify the allowable uses and development standards of the underlying zone.

Legal Issues

Determine what land use rules apply to the property you are considering and to the properties in the vicinity. Some properties can be divided into smaller parcels, orchards can be sprayed with pesticides and forests can be logged. Animals and farm equipment can legally create noise and dust 24 hours a day, seven days a week, and the location of manure storage isn't regulated by the County. If the land is zoned Residential, one dwelling is the normal maximum allowed – garages and workshops can not be converted into separate living units. If the land is not zoned Residential, you will want assurances that the home you are considering was put there legally. Be sure to check for and understand easements that



Owens Farm has a conservation easement. ¹⁴

pertain to the property. Utility, access and septic easements legally allow others some use of your property and may prohibit conflicting uses. Many properties have not been surveyed, which means fences, driveways, buildings, septic systems, and other structures may only appear to be on a parcel of land. You can make the sale closure subject to the completion of a survey of the boundaries.

Building Permits

Buildings 200 square feet or less that will not be used as habitable space might not need permits. However, rules exist for the distance structures should be sited away from property lines, streams, wetlands, floodplain, septic drainfields, roads, and so forth. Contact Benton County Community Development prior to clearing land and construction.

Easements

An easement is a right to use, for a specific purpose, a particular area of land owned by another. Some examples of easements include septic drainfields, drainage, wells, and access. Neighbors and the current owner may be a good source of information about the use of an area. However, easements should show up on a title search. Take time to understand the implications of any easements that are present on the property.

Conservation Easements

A conservation easement is a voluntary, legally binding agreement between a landowner and a land trust. It protects the natural resources on a property, such as wildlife habitat, farmland, or timber, and provides an array of benefits to landowners, future generations and the community. With this agreement, the landowner agrees to permanently eliminate some uses of their land, while retaining ownership and control. The landowner, the

Key Considerations

Trust, and funders work together to develop a plan. Some easements may include tax incentives and continued opportunities for traditional rural uses. The landowner retains the title on the property, and can sell their land, though the easement remains with the property in perpetuity. In accepting an easement, the Trust is obligated to forever ensure that the provisions of the easement are upheld.

Key Considerations for Buying Rural Property

Living in the country can be very satisfying. Whether you want to raise crops and livestock or just enjoy open space and solitude, this section offers some tips to help with your acquisition plan. The first step is to understand your expectations of rural living. If you have never lived in a rural environment, you may want to consider renting a place prior to buying so you can get a feel for the country lifestyle.

Find the Right Realtor

Once you decide that rural living is a good choice, you are likely to work with a realtor. It is best to select a real estate agent who specializes in rural properties. He or she should be familiar with land use restrictions, be aware of water challenges and know where to get answers to your questions. It is in your interest to work with a buyer's agent. Have all components of the property inspected prior to making an offer to make sure you are getting what you expect and not a liability. Furthermore, many rural buyers find it helpful to hire an attorney who is an expert on rural property sales to represent them in the closing process.

Pre-existing Regulatory Obligations

The previous property owner may have committed to certain practices or programs that the new owner may be obligated to complete. Examples include: forestry re-planting, government administered conservation program, or land use violations.

Soil

Soil characteristics are important and often overlooked. Soil type affects what you can grow and your management plan. Use the NRCS Web Soil Survey to create a soil map of your property. Research the history of the land use and crops planted on the property. Consult the soil conservationist at Benton SWCD or NRCS for assistance in interpretation and development of a management plan. More information can be found in Chapter 7: Soil.



Ask BSWCD how to assess your soil. ¹⁴

Natural Hazards

The hazards of greatest risk to Benton County include: earthquake, flood and severe weather and warrant consideration and preparedness.

Timber

Do you plan to purchase a small woodland or property adjacent to a forest? Unlike seasonal farming or gardening, small woodlands tend to operate over longer time frames of years rather than months. However, logging may occur on an adjacent parcel at any time. Woodland management has unique considerations. Find more information in Chapter 10: Forestry.

Future Changes

The possibility of neighboring land use or activity changes should be considered before buying property. These types of changes can drastically alter the experience of a place. They may block views, cause noise or odors, or change how your land functions. Like seasonal changes, rural land activities can also vary greatly over time due to ever-changing agricultural markets and land values.

Water & Septic

Whether or not your property has water and sewage connections, you will need a reliable water source for domestic use and farm irrigation. Where will your domestic water come from: a well, surface water, or municipal water? Depending on the water source, you may need to research the long-term availability of the water supply. Existence, age and condition wells and septic systems are important to consider. You may also want to determine the height of the water table and look into water rights for your intended water usage before acquiring a property. Other important water-related topics can be found in Chapter 6: Water.

Power & Other Hook-Ups

You will want to determine the availability of phone service/coverage, internet, television and power. Power hook-ups can be expensive in the country. The ideal home site may require a costly power run. If you are on a tight budget, investigate the hook-ups prior to making an offer on the property. If you are interested in going off the grid and generating your own power, visit www.homepower.com to find out more.

Animals

Owning livestock requires resources and time. Livestock owners not only care for farm animals but also manage and maintain fences, pastures, water and outbuildings. The space requirements depend on the species and numbers of animals present. Livestock owners also need a plan for managing odors and waste; the amount of waste produced can be surprisingly large. For example, one horse produces eight to ten tons of manure each year. Find out more in Chapter 9: Livestock Management.



Livestock help with nutrient management. ¹⁴



Bottle-feeding a lamb. ⁸



Goats at an area farm. ⁹

Additional Resources



An Introductory Guide to Land Use Planning for Small Cities and Counties in Oregon
www.oregon.gov/LCD/docs/publications/introductory_guide_to_land_use_planning_in_oregon.pdf

Benton County Comprehensive Plan
www.co.benton.or.us/cd/planning/comprehensive_plan.php

Benton County Development Code
www.co.benton.or.us/cd/planning/development_code.php

Benton County Hazard Analysis
www.co.benton.or.us/sheriff/ems/documents/2006_countyhazardanalysis.pdf

Benton County Planning Division
www.co.benton.or.us/cd/planning/contact_us.php or 541-766-6819

Earthquakes and Landslides Risk Assessment
http://water.oregonstate.edu/oakcreek/research/geology/pdf_files/equake%20and%20lanslide%20dogami.pdf

Goal 7 of the Benton County Comprehensive Plan
www.co.benton.or.us/cd/planning/documents/cp-goal_7.pdf

Greenbelt Land Trust
www.greenbeltlandtrust.org

Rural Development Planning: Protect Your Health and the Environment
www.co.benton.or.us/cd/documents/rural_development_planning.pdf

3

The Rural Experience

Being Neighborly.....	19
Right to Farm Law.....	20
Things You Should Know When Living Next to.....	21



A grass field being replanted with hazelnuts. ²⁶

Being Neighborly

Successful country living requires neighborly cooperation. Your practices can impact your neighbor's property and their practices can impact you. Meet some of the locals to better understand the community character and dynamics.

Livestock

Benton County is entirely a livestock district, which means the livestock owner must keep livestock on their own property, there is no open range. Keeping livestock off of private and public property is the responsibility of the livestock owner, not the property owner. Moving livestock on country roads is often necessary. Be cautious and prepare for delays.

Weeds and Pests

Good management will prevent noxious weeds and pests from becoming established on your land or spreading between neighbors. If you are interested in growing the same crop as your neighbor, talk with them about their pest management strategy so that you can manage yours in an appropriate way.

Private Property

Always know whose land you are on and ask permission before entry. People who live in rural areas prize their privacy and their space.

Rural Practices

Any property in Benton County can have farming or timber activities, so even if there is no orchard or logging operation at present, there could be at any time in the future without any public notice. Research what types of activities will be occurring on neighboring properties because you are likely to be

affected in some way. Some practices, such as running machinery after dark, are common farming activities at certain times of the year. Odors, noise, drift and dust are some examples of the realities of agricultural production that you may experience. Talk with local residents to find out about the common agricultural activities that occur in the area.



Pet ownership has its own set of considerations. ⁸

Domestic Animals

Dogs and cats must be under control and on your property at all times. Free roaming dogs are a threat to livestock and wildlife. Farmers and ranchers have the right to protect their livestock and in some cases may destroy animals that threaten their livestock. Dog owners whose dogs injure or kill livestock will be held financially responsible and such dogs may be euthanized. It is your responsibility to license your pets and vaccinate them against rabies. Your pet should have a collar and identification tags. For more information, review the Animal Control Chapter of the Benton County Code.



A fence like this keeps livestock out of a creek. ²⁵

Fences

By working with your neighbors to maintain fences and property lines, there is an opportunity to improve cooperation and build relationships. Properly maintained fences are important for the protection of livestock and wildlife, which may become entangled, injured or killed. Cooperatively build and maintain boundary fences to keep livestock from trespassing. It should be the responsibility of each property owner sharing a fence to maintain part of the existing fence and/or share in the cost for constructing a new fence, if necessary. Keep in mind that fences often do not indicate property lines. Contact Benton County Planning Division before building a new fence, because restrictions may apply.

Right to Farm Law

ORS 30.930, the Right to Farm law, protects farmers from legal action brought by individuals, local governments, and special districts, which may be intended to limit the ability to farm or conduct forest practices. This protection covers all lands zoned Exclusive Farm Use (EFU) or forest use outside of the

urban growth boundary. This law does not protect farmers and foresters from non-farm-generated occurrences such as: increased traffic, vandalism, and litter. The following topics are protected by the right-to-farm law and should be considered prior to purchasing rural property.

Noise

Agricultural production can be fairly noisy at times. Farmers often work from the early hours of the morning to the late hours of the night, especially during the planting season (spring) and harvesting season (late summer). The timing of this work varies depending on the type of crop. The schedule and operation of agricultural practices are based on external factors like weather, so they often take place outside of normal work hours. Noise levels can vary greatly depending on the type of work being conducted.

Spray Drift

There is a chance that rural property owners may be affected by spray drift coming from other properties. Pesticides are normally applied from the spring to the fall, with the heaviest application occurring during the



Benton County is home to several large migratory beekeepers, who play a critical role in food production. ²⁶

Things You Should Know...

spring. Spray has the ability to travel by wind drift or volatilization. In either case, when the chemical becomes airborne it may be able to travel long distances. Spray drift can be minimized by following the label and consulting with a certified applicator.



Dust created by agricultural activities. ⁴

Dust and Pollen

Depending on the types of crop that are being grown and the land management practices of neighbors, there can be times when air quality is low. Tillage can create large clouds of dust that can travel long distances. Wind erosion from bare fields can also cause dust. High wind events are more frequent in rural areas because of the lack of natural windbreaks. Pollen levels can also become extremely high in rural areas because of the concentration of pollen-producing crops grown in Benton County. Crops, like grass seed and trees, that are grown on a large scale will produce pollen at a level that can cause irritation or allergic reactions in sensitive individuals.

Smoke and Odors

Smoke is caused by the burning of yard debris, cardboard and residual crop vegetation and is

a common occurrence in rural Benton County. It is a legal and common practice for rural property owners to burn piles of vegetation that create large clouds of malodorous smoke. Animal operations and field applications of manure can produce undesirable odors.

Things You Should Know When Living Next to...

Vineyards

Like other farming operations, vineyards generate noise from field equipment. Typical equipment includes tractors and sprayers in the spring and bird control devices (cannons and bird distress calls) near harvest. A common pesticide used in vineyards is sulfur for control of powdery mildew. It may be applied numerous times during the spring and summer. Some people are allergic to sulfur, but even if you aren't allergic, it has a distinct odor that you may find offensive.



Grapes on the vine. ¹⁴

Phenoxy-type herbicides (such as Crossbow) used for poison oak, blackberry and thistle control are devastating to vineyards. Even small quantities can volatilize during high temperatures and carry on the wind for miles. Oregon Department of Agriculture can fine for spray drift and require violators to pay for all damage and losses incurred by the vineyard.

Orchards

Workers prune orchards between November and February. In early February orchard sprayers, which emit a high pitched whine, cover dormant trees with oil and sulfur to control insects and diseases. Expect to see signs warning about chemical use and entry restrictions while the orchard is being sprayed.

March to June is bloom season and time to control frost, insects, and diseases. From dusk until dawn orchard sprayers and wind machines make noise and blow air.

Harvest season depends on the type of orchard, but typically occurs sometime between July and early October. During harvest, forklifts in the orchard gather fruit bins and load trucks to haul the fruit. After the harvest, sprayers apply foliar nutrients to the leaves and apply oil and sulfur to control overwintering insects.

Seed Farms

Pollination, which may last from ten days to three weeks, is a bad time for people with allergies. Depending on the grass variety, it will be sprayed one to four times a year. You may want to be informed about the kinds of chemicals used.

Harvesting activities may take place at almost any time of night or day: some farmers start at 4:00 am and others prefer to work until 10:00 or 11:00 at night. Various grass seed farming practices create noticeable quantities of dust. A grass seed field might be dusty for



Christmas tree farm in Benton County. ²⁵

Things You Should Know...

about five days over the growing season, and although most farmers try to be considerate of their neighbors, they may not be able to wait until the wind is favorable before they have to complete their work.

Christmas Tree Farms

Harvest time spans from late October to December 10th during daylight hours. Helicopters are generally used by large commercial growers. Depending on weather conditions, helicopters can be used to fertilize trees or to spray weeds or fungus in the spring. In good weather spraying might occur from February to August but the most likely window is March to June.

Trucks of various sizes are used in the Christmas tree industry. Crew trucks are most likely to be present from mid-June through September for pruning and harvest preparation. Big semi-trucks are used during harvest and at planting to bring in seedlings. Choose and cut operations generally operate from mid-November to Christmas. Weekends are the busiest times, especially the first weekend in December. Some farms may offer school tours.

Erosion on steep hillsides is a common occurrence on tree farms with bare soil. Consider talking to your neighbor about intercropping with grasses if you see muddy water in the ditches by a public road.

Logging Operations

If you buy property near public or private forest land, those trees may be cut at any time. Standing timber is a resource and to realize a return on the owner's investment, the trees will be harvested at some point. When harvest occurs, your surroundings may shift suddenly. The most obvious change will be a loss of



Organic produce at the Farmers' Market. ¹⁴

shade, especially if the harvest is a clear cut.

On the positive side, harvest only occurs about once every forty years. The duration of the logging operation will depend on the volume of timber and size of the harvest unit, or number of acres being cut. Harvest operations begin before daylight and, depending on your proximity to the project area, you may hear trees falling, chainsaws, large equipment and log trucks. If the effort is a thin instead of a clear cut, you can expect the same types of noise and activity, but the post-harvest shift will be less abrupt.

The second phase of a logging operation is the planting of seedlings. You can expect herbicide application to take place pre- and post-planting (late summer and early spring) to control competing vegetation. The site may be broadcast burned in May or June or piles of slash may be burned between October and December. In either case, some smoke is likely to persist for up to a week.

Organic Farms

Organic farms provide beautiful pastoral scenery, but maintaining these panoramas requires odiferous organic inputs such as manure and compost or other amendments, usually in the spring. Many organic farms have a produce stand, which means you will have easy access to fresh produce, but also means you can expect increased traffic to the stand during hours of operation. Organic farmers primarily use cultivation for weed control, so tractor noise and dust may occur.

Dairies

Farms that raise animals produce quantities of manure that must be managed without disrupting the farm operation, the environment, or public health. On dairy farms, animals are confined for most of the winter

and manure accumulates in the barn. In the summer, cows spend time in the pasture but come into the parlor two times a day to be milked and deposit manure on concrete pads while they are waiting in line.

Some farmers clean their barns daily and spread the manure on their fields to fertilize the soil and recycle nutrients. In the winter, manure is stored in manure storage tanks or lagoons that are emptied a few times each year when the weather permits. Odors may be noticeable during these brief clean-out periods.

Humidity, temperature, local topography, and wind direction have a major influence on how far odors travel and how strong they are at a specific location. At this time, there are no standards or rules regulating odors.



Chickens are commonly kept in Benton County. ¹



Agriculture can take many shapes in Benton County. ¹⁴

Additional Resources



Animal Control Chapter of Benton County Code
www.co.benton.or.us/boc/documents/code/chapter9.pdf

Finding the Common Ground: Understanding Your Community's Agriculture
<http://pubs.cas.psu.edu/FreePubs/pdfs/ua317.pdf>

Rural Road Safety Guide
www.oregon.gov/ODOT/TS/docs/roadway/ruralroadsafety.pdf

4

Land Management

Management Plan.....	27
Conservation Practices.....	27
Weed Management.....	29
Rural Roads.....	33
Fire Prevention.....	33



Workers planting native species at a restoration site. ⁴

Management Plan

A management plan is a written record of your natural resources, the recommended conservation practices, and the management decisions that you choose to implement and maintain on your land. Developing a management plan is a proactive effort to protect the natural resources on your property. It is also the first step in finding and qualifying for government conservation programs and funding. Management plans can be developed for a number of different resources: forestry, agriculture, soil, water and wildlife habitat.

Components of a Management Plan

Property owner's objectives and goals.

Aerial photographs or diagrams of the property.

Resource information: soil type, potential crops, possible stocking rate and available water resources.

Description of land treatment decisions.

Plan of operation that includes a timeline and scheduled maintenance of conservation practices and systems.



Your local resource conservationists can help you develop a comprehensive management plan. Contact a conservation planner from the Natural Resources Conservation Service (NRCS) or Benton SWCD for assistance. Include your family from the beginning of the process to create a plan that meets your needs and those of your heirs.

Benefits of a Management Plan

Helps property owners comply with environmental regulations.

Identifies current and potential natural resource problems.



Start the Conservation Planning Process

To start a Conservation Plan, you can access this handy document from Natural Resources Conservation Service: *STEPS for Healthy & Sustainable Rural Living on Small Acreages in Oregon*. Hard copies of this document are available at the Benton SWCD office. Contact the Benton SWCD to speak with a resource conservationist for assistance with specific sections of the plan. We will be happy to help you develop your conservation plan.

Conservation Practices

Conservation practices serve to improve and protect farmland, soil, water quality, forestland and wildlife habitat. Buffers, cover crops, crop rotation, and the other management strategies listed below are common conservation practices adopted by land managers in Western Oregon.

Buffers

Buffers are vegetative strips provide a variety of natural services. They trap soil to reduce erosion and polluted runoff. They provide wildlife habitat, increase soil productivity. They also protect areas from winds and flooding,

and enhance the property's aesthetics. The use of native plants will reduce maintenance and increase the buffer's effectiveness. Native plants can be purchased from Benton SWCD's Annual Native Plant Sale.

Cover Crops

Grasses, legumes, forbs and other herbaceous plants can be used to provide seasonal cover on cropland when the soil would otherwise be bare. Cover crops reduce erosion caused by wind and water, add soil organic matter and contribute to good soil structure and water infiltration. Cover crops suppress weeds, help retain soil moisture, and attract beneficial insects.



Fava bean cover crop in a raised bed. ¹⁴

Crop Rotation

Crop rotation is a system of growing different crops in planned succession on the same field. Crop rotation helps suppress weeds, manage soil nutrients, and break disease cycles.

Grazing Management

Grazing management maximizes production and improves grazing lands. Common practices include management of herd size, fencing, livestock water systems, grazing rotations, and mixed forage plantings.

Nutrient Management

Nutrient management requires application of the correct amount and form of plant nutrients at the right time to optimize crop yield and minimize impacts on water quality. Nutrient management can save you money because it can prevent overapplication of costly fertilizers. Test your manure for nutrient content so that you can apply it at an agronomic rate.

Pest Management

Pest management is a customized system to reduce crop and environmental damage with environmentally sensitive strategies of prevention, avoidance, monitoring, and suppression.

Additional Resources



NRCS: Practices to Enhance Your Conservation Systems
www.nrcs.usda.gov/wps/portal/nrcs/detail/or/technical/?cid=nrcs142p2_044357#practices

NRCS: Your Conservation Plan
www.nrcs.usda.gov/wps/portal/nrcs/detailfull/or/technical/cp/?cid=nrcs142p2_044342

STEPS for Healthy & Sustainable Rural Living on Small Acreages in Oregon
www.nrcs.usda.gov/wps/portal/nrcs/detail/or/home/?cid=NRCS142P2_044019

Weed Management

Weeds are plants growing in places where they are not wanted. Invasive weeds are non-native plants that can cause harm to the natural environment, humans and animals. The Oregon Department of Agriculture estimates that Oregon spends \$81 million annually on the control of invasives species. Weed management is an on-going activity. Weeds that appear to be suppressed may re-emerge. Reducing soil disturbance along with regular monitoring and weed removal are the keys to weed control.

Pathways and Prevention

Weeds are often introduced by human activities. Some weeds (like Himalayan blackberry) are brought in for agricultural purposes, others (like reed canarygrass) may be imported for erosion control, and many (like butterfly bush) have been introduced through the nursery trade. Once present, weeds can be spread by people, birds, wildlife, wind, water, machinery and other means.

Follow these practices to help limit the spread of invasive weeds on your property and throughout the county:

After working with or walking through weeds, remove any plant parts from your apparel and gear before moving to another area. **PLAY, CLEAN, GO.**

Use only native or non-invasive species when planting new vegetation.

Carefully choose pond plants to avoid accidentally introducing weedy aquatic species.

Never dump aquarium contents down any drain. Seal in a bag and put in the trash.

Buy fire wood locally. Weeds and pests can be transported in wood.

Clean boats of all vegetation and aquatic life after each use. **CLEAN, DRAIN, and DRY.**



A Weed Spotters volunteer pulls ox-eye daisy at Finley Refuge. ⁸

Reporting

Look for new invaders every time you are outdoors. Scan the area and pay special attention to:

Pathways (roads, trails, edges)

Habitats (aquatic plants in water bodies, understory plants on forest floor, etc.)

Distribution - (plants that seem out of place)

When you find something:

Double check the ID (consult a guidebook or contact an expert at Benton SWCD or OSU Extension Master Gardeners).

Record the location on a map.

Record the size of the infestation (# of plants, area covered).

Take a digital photo of the plant.

Go to www.oregoninvasiveshotline.org to report with as much info as you have.



Weed Free Hay & Straw

Oregon Department of Agriculture has developed a pilot weed-free forage certification program. This is a voluntary pilot program that certifies weed-free forage and adds value to the product.

For more information visit the ODA website listed in Additional Resources.



Quickly respond to any new weed infestation. Common weed control techniques include:

Physical: Hand-pulling weeds before they set seed can help stop them from spreading.

Mechanical: Mow, rake or use powered tools and machinery to manage weeds.

Grazing: Allow livestock to graze weeds before they go to seed. Since animals can transport seeds, don't move them from a weedy area to a weed free area.

Chemicals: Herbicides are commonly used to kill weeds. Be sure to read the product label prior to application. Use the weather (e.g., wind direction), buffers or other practices to minimize any transport of chemicals away from the target plant by runoff or drift.



BSWCD staff and volunteers pull invasive water primrose from the Willamette River. ¹²

Weed Management Strategies

Property owners will benefit greatly from working with neighbors on weed management because of the transient nature of weeds. Be aware that certain weeds require different management strategies to control. Identifying weed threats on your property is the first step to early detection and rapid response. Prevention is the most cost effective line of defense. Keep your property covered with desirable vegetation and make sure not to transport weeds. Use native or non-invasive vegetation to out-compete noxious weeds.

Additional Resources



Benton SWCD: Weed Profiles
www.bentonswcd.org/programs/invasive-species/weed-profiles

Benton SWCD: What You Can Do
www.bentonswcd.org/programs/invasive-species/what-you-can-do-about-invasive-species

Oregon Department of Agriculture: Weed Free Forage
<http://oregon.gov/oda/programs/MarketAccess/MACertification/Pages/WeedFreeForage.aspx>

Oregon State Noxious Weed List
www.oregon.gov/ODA/plant/weeds/Pages/statelist2.aspx

If you SEE these weeds on your land, REMOVE them.

English Ivy *Hedera helix*

Evergreen vine. Three- to 5-lobed, waxy leaves with lighter colored veins. Long trailing stems can run along the ground or grow vertically up trees or hillsides. Invades forest habitats and threatens all vegetation. Dense thickets suppress germination and growth of native trees and shrubs.



Scotch Broom *Cytisus scoparius*

Evergreen shrub. Stems are distinctly 5-ridged, with leaves that are 3-parted. Stems may be leafless much of the year. Fruit pods are flattened with hairs mostly at seams. Pea-like flowers, not fragrant, vary from yellow to red in color and occur single or paired.



False Brome *Brachypodium sylvaticum*

Perennial bunchgrass. Grows in short clumps. Leaves are flat, broad and have hairs on leaf edges. Spikelets on top of stems do not have stalks. Grass stems and leaves are a candy apple green color through the growing season.



Meadow Knapweed *Centaurea debeauxii*

Perennial forb. One to several stems extending from a woody root. Lower leaves have long stalks, upper leaves have no stalks. Rosette leaves have prominent white mid-veins. All leaves are hairy. Bright pink to purple flowers with papery, fringed bracts.



Tansy Ragwort *Senecio jacobaea*

Biennial forb. Branching flower stalks with bright yellow flowers. Stems are a purplish-red in color. Leaves are dark green and deeply lobed.



If you SEE these weeds in Benton County, REMOVE & REPORT them.

Yellow Flag Iris *Iris pseudacorus*

Herbaceous perennial. Three-angled corky fruits. Fan-shaped base. Dense patches exclude native vegetation and create anoxic conditions that impact fish & wildlife.



Knotweeds *Polygonum cuspidatum*, *Polygonum x bohemicum*, *Polygonum sachalinense*

Herbaceous to woody perennial. Small, white to green flowers in drooping clusters from leaf axils. Reddish brown and hollow stems. Leaves broad and ovate. Found near water sources. Forms dense thickets that displace native vegetation. Creates bank erosion; considered a potential flood hazard. Lowers quality of riparian habitat. Vigorous rhizomes form deep, dense mat. Plants resprout from stem or root fragments downstream.



Old Man's Beard *Clematis vitalba*

Perennial, woody vine. Creamy white flowers in summer, 1" wide. Seed heads persist through winter; hairy looking seed heads. Creeping vine has the ability to blanket shrubs and trees; plants grow on the ground in layers several feet thick. Increases the amount of dead material in forests, destroying food sources for native wildlife.



Spurge Laurel *Daphne laureola*

Evergreen shrub. Dark green, glossy, long oblong, spirally arranged leaves. Yellow-green, honey-scented, bell shaped flowers that grow in clusters between leaves at tops of stems. Green to black egg shaped berries. Shrub forms thick patches that block sunlight, out-compete native flora and alter the soil chemistry. The leaves, bark and berries are toxic to mammals.



Purple Loosestrife *Lythrum salicaria*

Herbaceous to woody perennial. Stiff 4-sided stems are simple or branched. Leaves are opposite or whorled and have smooth edges. Small magenta flowers with 5-7 petals on tall showy spikes. Can quickly develop into a large clump, diameter up to 5'. Provides no cover for nesting ducks. Recreational hunting or trapping grounds are lost, decreasing the value of operational wetlands.



Rural Roads

No Spray Zones

Property owners who object to chemical control of weeds in the rights of way may enter into an agreement with the County to control the weeds on their own. If you are interested in no-spray or a modified spray program, call Benton County Public Works at 541-766-6821.

Road Maintenance

Various types of roads are found in rural Benton County. Some are maintained by the County and others by different groups. Public county roads have a "P" on the road sign. The County has jurisdiction over these public roads but does not maintain them.

Private roads either say "private" or have only four numbers on them. The County has no authority on private roads, so it is up to private landowners to maintain them. Some roads are maintained by private landowner road associations.

Dust is common on gravel roads. Landowners can pay the County for dust control. While it is not a free service, some landowners may find it worthwhile.

Driveways

A driveway or access permit is required before any work can be done that connects an access to a public road. Before constructing a driveway, contact the County Public Works Department. They will inspect the proposed driveway location for safe sight distance, angles, grade and whether a culvert will be required.

Rural Road Safety

During planting and harvest seasons, farmers drive slow moving vehicles on public roads. This is a time to be cautious. Consult the Rural Road Safety brochure listed in Additional Resources for more information.



Slow moving vehicles usually display this cautionary symbol.

Fire Prevention

Fire needs three elements to occur: fuel, oxygen and heat. Remove any one of them and the fire will die out. Fuel is defined as anything that can burn. Many fires start from a single ember that lands on a fuel source. The



The Zone Concept
www.readyforwildfire.org/defensible_space/

reduction of fuel sources around a structure can greatly increase the chance that it will survive a wildfire. Benton County or the Oregon Department of Forestry will provide a free home site evaluation of defensible space upon request, as well as trainings for groups.

Fire Protection Districts

Regardless of where you live, if you have a fire emergency, call 911. If you live outside city limits in Benton County, you are served by a Rural Fire Protection District. For non-emergency communication, such as backyard burn advisories, contact your local fire district. If you aren't sure which district you are in, consult your property tax statement. A list of fire districts is at the end of this guide in Chapter 11: Resource Directory.

Fire Safety Checklist

If it can catch fire, don't let it touch your house, deck or porch.

Cover all vents with metal wire mesh to prevent sparks and ember entry.

Prune trees so the lowest branches are 6 to 10 feet from the ground.

Keep your lawn hydrated and maintained. If it is brown, cut it down to reduce fire intensity.

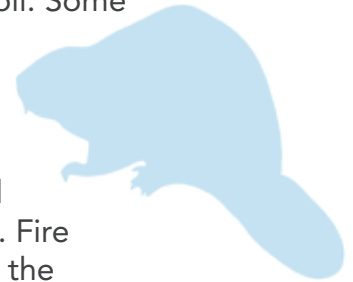
Inspect and replace or repair loose or missing shingles or roof tiles to prevent ember penetration.

Dispose of debris, dead vegetation, and lawn cuttings quickly to reduce fuel for fire.



Importance of Fire

Fire is mostly seen as a destructive phenomenon, but it is actually a beneficial part of a healthy forest ecosystem. Fire helps remove unwanted invasive species, parasites, diseases and insects, while the remaining ash provides needed nutrients to the soil. Some trees require the fire's high temperature to open their cones for seed dispersal and reproduction. Fire also helps reduce the amount of fuel in the forest, which means smaller, less severe wildfires.



Defensible Space

Defensible space, also called the Home Ignition Zone, is an area where vegetation and fire fuels have been modified to reduce or stop fire spread and save homes and lives. Defensible space provides an opportunity for firefighters to effectively defend the building. Defensible space includes the home itself and everything around it up to 100-200 feet away and is comprised of these three sub-zones:

Zone 1: 30 feet adjacent to the home and its attachments. This zone should be well-irrigated and fire-resistant.

Zone 2: 30 to 100 feet from the home. Plants in this zone should be low-growing, well-irrigated and less flammable.

Zone 3: 100-200 feet from the home. Thin this area, remove heavy accumulation of woody debris.



Firewise landscaping. ¹

Additional Resources



Benton County Community Wildfire Protection Plan
www.co.benton.or.us/cd/cwpp/

Firewise Website
www.firewise.org

Home Ignition Zone
www.firewise.org/wildfire-preparedness/be-firewise/home-and-landscape/defensible-space.aspx

Oregon Department of Environmental Quality Open Burning website
www.deq.state.or.us/aq/burning/openburning/openburn.asp

Oregon Department of Forestry Regulated Use Closure Information
www.oregon.gov/odf/pages/fire/public_use_restrictions.aspx

Philomath Fire Department Burn Guidelines
www.philomathfire.com/burn_guidelines.html

Rural Road Safety
www.oregon.gov/ODOT/TS/docs/roadway/ruralroadsafety.pdf

5

Wildlife & Habitat

Habitats.....	37
Living with Nature.....	39



Canada geese at Finley Wildlife Refuge. ²²

Habitats

Various habitats are attractive to different kinds of wildlife. No matter what you plan to do with your property, an understanding of your habitats' characteristics will help you manage the landscape appropriately. In Benton County, your property is likely to contain one or more of the following habitats.

Upland Prairie and Savanna

Upland prairies are among the most threatened ecosystems in Oregon. In the past, these open grasslands occurred across the Willamette Valley and were maintained by seasonal fires that Native Americans set. They are vegetated by perennial grasses and annual or perennial herbaceous flowering plants. When an upland prairie contains a few widely spaced, open grown Oregon white oaks, Douglas-fir, or ponderosa pines per acre, it is called a savanna. Upland prairies and savanna typically occur on sloped, well-drained soils near the valley bottom and into the foothills of the Cascades and Coast Range.



Deer are abundant in Benton County. ²⁵



Spawning salmon. ²⁵

Forests

Bottomland forests, riparian forests, oak woodlands, and mixed hardwood-conifer forests all occur in Benton County. They differ by species composition and landscape position. Learn more about forest habitats by visiting the Habitats page of the Benton SWCD website.

Riparian Areas

Riparian areas are defined by NRCS as ecosystems that occur along waterways and water bodies. They serve as the transition between aquatic and terrestrial zones. Properly managed riparian areas provide property owners and the environment with numerous benefits. For example, plant roots provide the bank with increased stability and minimize sediment runoff. Riparian buffers should be at least 25 to 100 feet wide depending on surrounding land uses. A healthy riparian area is highly vegetated with native shrubs and trees, shades the waterway, and contains an abundance of woody and organic debris.

Riparian Benefits

Improves water quality.
 Reduces flooding.
 Decreases erosion.
 Protects fish habitat.
 Provides nutrients.
 Enhances wildlife habitat.



Wetlands

Wetlands are important Willamette Valley habitats that provide shelter and breeding areas for thousands of species. They reduce flooding by storing water and improve water quality through their filtering and cleansing abilities. Wetlands are characterized by their hydrology, hydric soils and water-tolerant vegetation.

Wetlands used to cover much of the valley floor, but many acres have since been drained for agriculture or development. Because of their importance and rarity, they are protected. Before making changes to your property, contact Benton SWCD to determine if you have hydric soils. If hydric soils are present, check with Department of State Lands to see if you have a wetland. Wetlands are considered waters of the state. Projects that will add or remove 50+ cubic yards of soil require permits.



A managed wetland in Philomath.⁸

Additional Resources



BSWCD Habitat Descriptions

www.bentonswcd.org/resources/native-plants-database/habitats

NCSU Wetland Types

www.water.ncsu.edu/watershedss/info/wetlands/types3.html

ODFW Conservation Strategy – Willamette Valley

www.dfw.state.or.us/conservationstrategy/docs/document_pdf/b-eco_wv.pdf

US FWS National Wetlands Inventory

www.fws.gov/wetlands/index.html

Wetland Classification

<http://academic.emporiam.edu/aberjame/wetland/define/define.htm>

Wetlands/Waterways Removal-Fill Permits

www.oregon.gov/dsl/PERMITS/Pages/index.aspx



Wren using a birdhouse. ²⁶

Living with Nature: Backyard Wildlife

No matter what habitats exist on your property, you can encourage wildlife to visit by providing these three basic requirements:

- Food
- Shelter
- Water

Creating Wildlife Habitat

The best thing you can do to increase habitat for wildlife is to incorporate native plants into your landscape. Benton SWCD holds an annual native plant sale that distributes plants sourced from nurseries that specialize in native plants for the Willamette Valley.

As you plan your landscape, consider offering a variety of plant species and heights for perches and shelter. Many animals use snags for perching, nesting and food. Include plants that fruit and flower at different times of year. Some bare soil is good for birds and ground nesting pollinators. Design your yard to include open areas of varying sizes with grasses but no shrubs and trees.

Many features, such as bat and bird boxes, can be used by wildlife as shelter and can also be used for raising their young. For example, sturdy brush piles can be placed between two habitat types to benefit rabbits, turtles, juncos, quail and many other species.



Landscaping with native plants can be very beautiful. ²⁹

Water is another important habitat element. A water feature could be a pond, livestock watering facility, shallow bird bath, rain garden or even puddles for butterflies and birds. If you have a bird bath, change the water two to three times a week to avoid a mosquito infestation. If a pond is too deep it will attract invasive bullfrogs.

Pests and Predators

Netting, fences, and enclosures can help protect your vegetation from pests. Various products have been developed to deter wildlife from grazing your garden. Keep brush mowed around the base of trees so rodents don't girdle them. These small pests can be trapped and relocated. Select native landscape plants that are not preferred by wildlife.

If you have poultry or livestock, you may be concerned about predators. Common predators in Benton County include bobcats, great horned owls, cougar, raccoons, coyote, fox, hawks and skunks. Smaller livestock need a sturdy enclosure to keep out predators. Guard llamas



Domestic cats are very successful predators. ²⁵

are sometimes used to protect sheep, goats and other livestock from predators. If you have pets, bring them in at night for their safety.

Even the gentlest pets can be predators. According to a study published in 2013, free-ranging cats kill 1.3 to 4 billion birds each year. Consider converting cats to indoor-only lifestyles. Take steps to keep dogs from wandering off your property. It is legal to shoot dogs that trespass and pose a threat to livestock.

Additional Resources



Become a Certified Wildlife Habitat

www.nwf.org/How-to-Help/Garden-for-Wildlife/Create-a-Habitat.aspx

Benton SWCD Native Plant Sale

www.bentonswcd.org/programs/plant-sale

Gardening with Oregon Native Plants West of the Cascades

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19399/ec1577complete.pdf>

Oregon Department of Fish & Wildlife Home

www.dfw.state.or.us

Oregon NRCS Fact Sheets: see Enhancing Wildlife Habitat

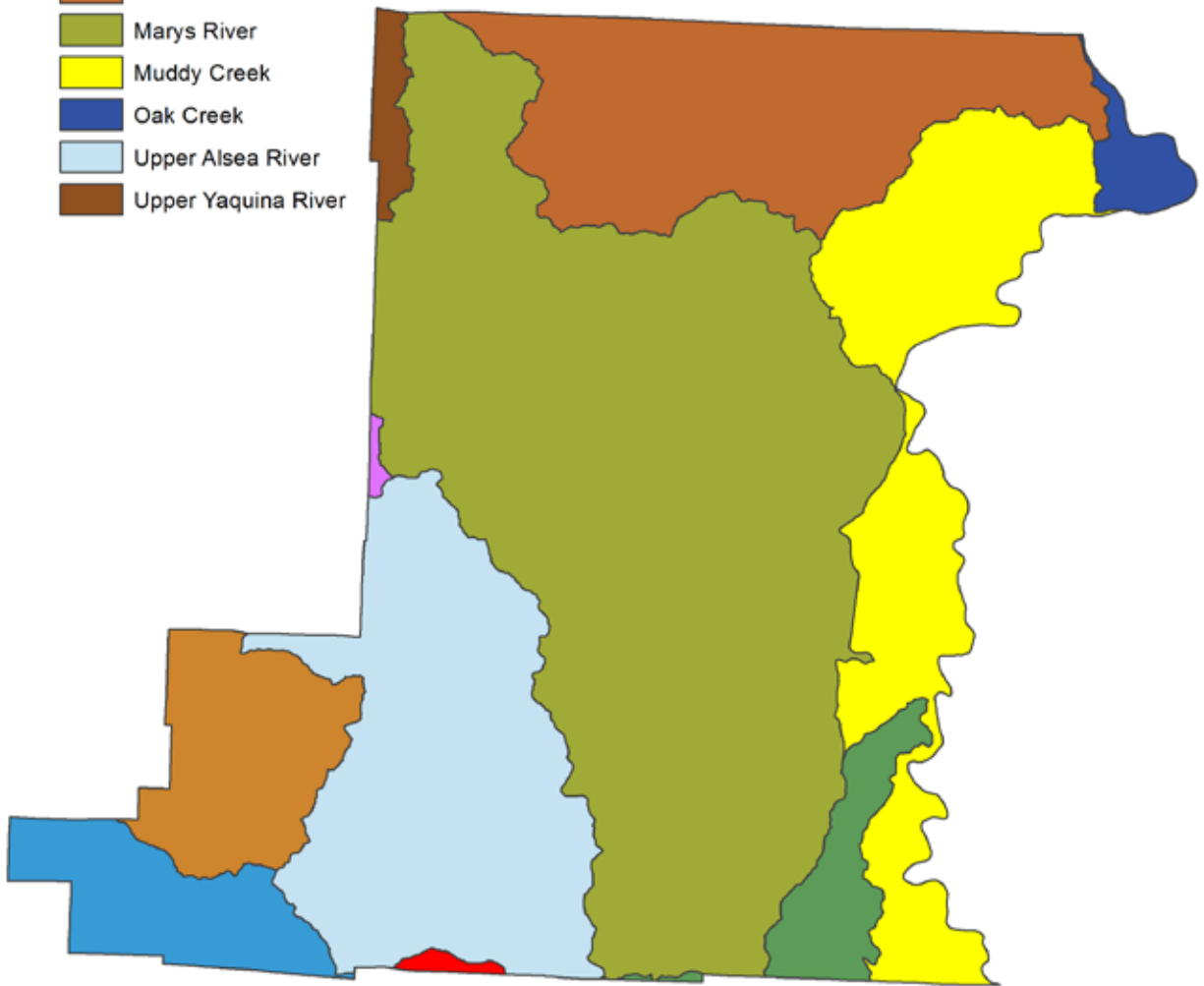
www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/?cid=nrcs142p2_046062

PlantNative Website: list of native plant nurseries in Oregon

www.plantnative.org/nd_or.htm

Benton County Watersheds²⁰

-  Big Elk Creek
-  Lake Creek
-  Five Rivers-Lobster Creek
-  Long Tom River
-  Lower Alsea River
-  Luckiamute River
-  Marys River
-  Muddy Creek
-  Oak Creek
-  Upper Alsea River
-  Upper Yaquina River









Chapter 6: Water

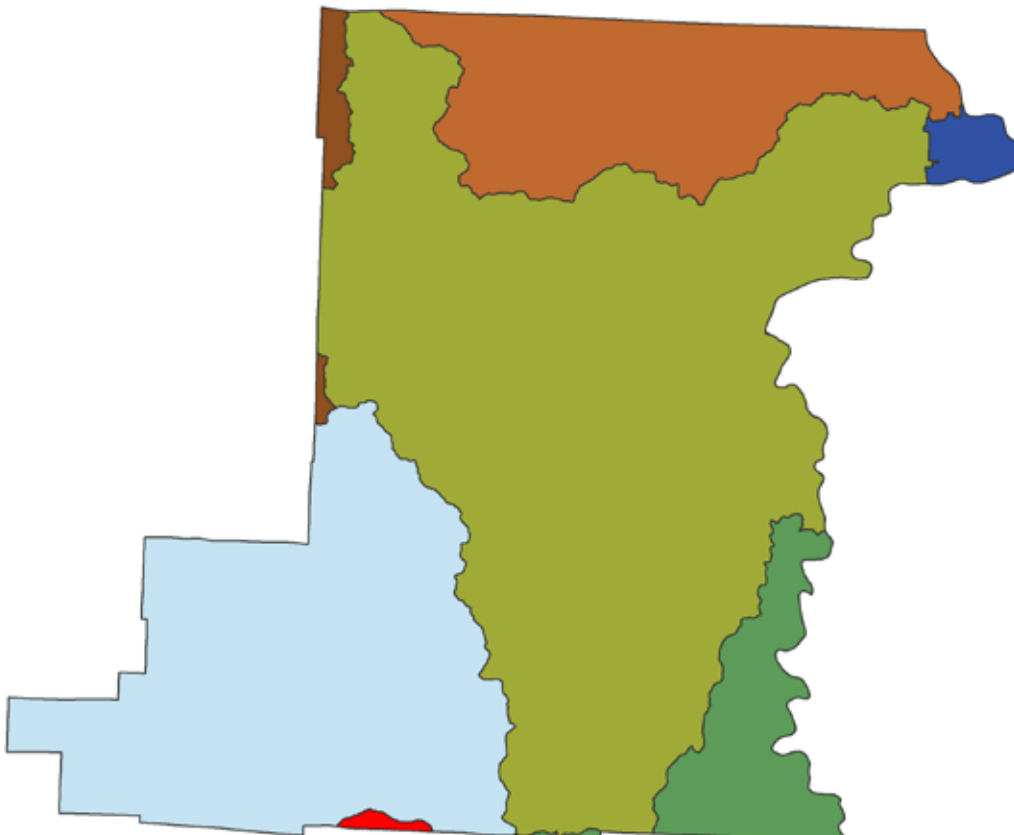
6

Water

Watersheds.....	43
Water Rights.....	43
Water Storage.....	43
Irrigation.....	46
Ground Water.....	48
Water Quality Management....	51

Benton County Watershed Councils ²⁰

 Aisea Basin Watershed Council	 Marys River Watershed Council
 Calapooia Watershed Council	 MidCoast Watersheds Council
 Long Tom Watershed Council	 Siuslaw Watershed Council
 Luckiamute Watershed Council	



Watersheds

A watershed is an area of land that shares a common drainage, such as a river or lake. Oregon's largest watershed is the Willamette Valley, which drains into the Willamette River. Roughly 70% of the state's population lives in this watershed. More than ten watersheds are found within the boundaries of Benton County, with Marys River covering the largest area. The map on page 41 shows all of the watersheds that intersect with Benton County. Each of these watersheds is served by a watershed council (see the map on page 42).

Water Rights

Under Oregon law, all water is publicly owned. 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 Oregon Water Resources Department (OWRD). With some exceptions, cities, farmers, factory owners and other users must obtain a permit or water right from OWRD to use water from any source - whether it is from an underground or aboveground source. Water rights are required if property

owners are interested in using surface or groundwater for non-domestic uses. A water right is required to irrigate more than a half acre. Most ponds require a water right to store water and a water right is also required to use the water stored in the pond. If you don't use your water right within five years, you could lose it. Property owners are encouraged to research their water rights by contacting OWRD.

Water Storage

Construction of any size pond or reservoir to store water requires a permit from OWRD. A secondary water use permit is required to use or divert the water that is being stored. Water storage is generally allowed from November through June. Reservoirs with a dam height of 10 feet or greater and that store at least 9.2 acre-feet of water require engineering plans and specifications that must be approved by OWRD prior to the construction of the reservoir. There is an expedited permitting process for individuals building reservoirs with a height of less than 10 feet and that store less than 9.2 acre-feet of water. Contact Benton SWCD for help.

Ground Water Exempt Uses

- Stock watering.
- Irrigation of less than ½ acre of noncommercial lawn or garden.
- Single or group domestic use of less than 15,000 gallons per day.
- Single commercial or industrial use of less than 5,000 gallons per day.



Surface Water Exempt Uses

- Qualified reclaimed water uses.
- Qualified stock water uses.
- Emergency fire-fighting.
- Certain forest management activities.
- Certain diversions that promote soil conservation.



How to Obtain a Water Right

Water rights are obtained in a three-step process.

1. Apply to OWRD for a water use permit. www.oregon.gov/owrd/pages/pubs/forms.aspx
2. Once a permit is granted, construct a water system and begin water use.
3. Hire a certified water right examiner to complete a survey, submit a map, and



file a report to OWRD. A water right certificate will be issued if water has been used according to the provisions of the permit.

Ponds

Ponds provide important habitat for turtles, frogs and many other species. However, warm pond water can impair downstream water quality and aquatic life if the pond is connected to a waterway. Furthermore, ponds can be a liability. Check your insurance coverage to assess the risk.

Pond Construction

Contact Benton SWCD to find sources of technical and financial assistance for pond construction. Remember to add the time and cost of proper pond maintenance to your budget. Once you have determined the pond

purpose and type, you'll need to evaluate the land for a suitable pond site and investigate the need for permits. Keep a record of the design and construction process.

Pond Maintenance

Ponds require a great deal of maintenance. Control structures must be maintained. Dikes should be kept clear of livestock and vegetation. Check the state noxious weed list or contact Benton SWCD Invasives Program before planting aquatic species. Aquatic invasive plants and fish alter aquatic ecosystems, outcompete native plants, disrupt native fish and wildlife habitat, interfere with recreational activities and decrease water quality. The careful choice of species you place in your pond will reduce maintenance costs and lead to a healthier pond. If you have trouble with algal blooms, contact a local specialist, such as a reputable nursery that sells aquatic plants, for advice.



Agricultural ponds like the one pictured store water for summer irrigation. ¹⁴

Rain Water Harvest

In the State of Oregon property owners may collect and use rain water gathered from impervious surfaces, such as rooftops or pavement, in aboveground enclosed tanks. Harvested rain water can be used for outdoor irrigation or outdoor cleaning of vehicles on private property without a permit. A permit is required in the following situations:

When using underground water pipes or tanks.

When using any individual tank that can contain over 5,000 gallons of water.



Ponds can serve multiple purposes like storing water, attracting wildlife and providing beautiful scenery. ⁴



Rainwater harvest tank at OSU's Oak Creek Center for Urban Horticulture. ¹⁴

When a tank of any size has a height greater than two times its smallest width.

When a tank is placed closer to the property line than the minimal setback requirements. Check with the presiding jurisdiction - City or County - to determine setback requirements.

If the collected rainwater is used for anything indoors or for any potable use.

If rainwater is collected in a pond for re-use.

How Much Water Do You Need?

Different activities require different amounts of water. Crop irrigation requires roughly 2-2.5 acre feet of water per acre during the June to September growing season. One acre foot is equivalent to 325,851 gallons. The size of the cistern needed will depend on the amount of water available, the quantity you want to collect, and what you plan to do with that water during a specific time frame.

Rainwater Catchment Formula

The rainwater catchment formula will help define how much water is available for collection from a roof.

Square Foot Roof Area x Inches of Annual Rainfall x 0.60 = Gallons of water per year that can be collected and stored in tanks.

Key Points for Rainwater Harvest

Pre-screen or filter rooftop runoff to prevent excessive sediment build-up or contamination in the tank from the roof.

Use screens to mosquito-proof all tank inlets and outlets.

Winterize the tank during hard freezes – particularly around the spigots. Never leave a tank completely full during a hard freeze. Any tank will crack if it is full under freezing conditions.

Always have an overflow pipe near the top, regardless of how big the tank is. Be sure the overflow is directed away from structures and toward a place that will not cause erosion.



Irrigation of an agricultural field. ⁴

Irrigation

In Benton County, irrigation is needed to maintain crops and yards during the summer months when rainfall is limited. The maximum irrigation efficiency you can achieve depends on the system and management used. An efficient irrigation water application system coupled with good water management can reduce energy costs.

Key Factors of an Irrigation System

- Crop water requirement
- Application uniformity
- Water supply reliability
- Operational precision
- Water use efficiency
- Economic returns



Irrigation Systems and Management

The type of irrigation system and the quality of management defines the achievable application efficiency. It is possible to install a high efficiency system and still have low application efficiencies due to improper management. The three commonly used irrigation methods in Benton County are surface, sprinkler and micro. When making your choice, take into account the required labor and operational maintenance associated with a particular system. Contact the OSU Small Farms Program to find out what irrigation system is best for your scenario.



Irrigation system with filters. ¹⁴



This pond is used to rear Oregon chub for reintroduction to native systems. ²⁵

Additional Resources



Advantages and Disadvantages of Aquatic Weed Management Techniques
www.aquatics.org/pubs/madsen2.html

An Introduction to Oregon's Water Laws
www.oregon.gov/owrd/pubs/docs/aquabook2013.pdf

Aquatic Ecosystem Restoration Foundation - Biology and Control of Aquatic Plants Handbook
www.aquatics.org/bmp.html

Energy Saving Tips for Irrigators
<http://attra.ncat.org/attra-pub/viewhtml.php?id=119>

How to Find Out If a Piece of Property Has a Water Right
www.oregon.gov/owrd/Pages/wr/property_wr_info.aspx

Irrigation Slideshow by Barbara Bellows, NCAT Soils Specialist
<http://extension.oregonstate.edu/sorec/sites/default/files/irrigation.pdf>

Measuring & Conserving Irrigation Water
<http://attra.ncat.org/attra-pub/viewhtml.php?id=332#intro>

On the Lookout for Aquatic Invaders
<http://seagrant.oregonstate.edu/sgpubs/H14001-on-the-lookout>

Oregon State University Small Farms Pasture Resources
<http://smallfarms.oregonstate.edu/pastures>

Oregon Water Resources Department
www.wrd.state.or.us

Rainwater Harvesting Calculator (see under Rainwater)
http://conservationdistrict.org/how/library?wpfb_cat=25#wpfb-cat-25

Water Weeds; Guide to Aquatic Weeds in Benton County
www.bentonswcd.org/assets/BSWCDcompleteAquaticWeedGuide.pdf

Western Oregon Irrigation Guides
<http://extension.oregonstate.edu/catalog/pdf/em/em8713.pdf>

Ground Water

Wells

Roughly 500,000 citizens in Oregon use a household well and need to protect, test, and purify the water as needed to keep their family safe. A basic knowledge of well mechanics and issues will help property owners identify and solve problems that arise.

Under Oregon law, ground water belongs to the public. Unlike the wells that farmers use, most residential wells are exempt from water right permit requirements. However, well water use is restricted in certain ways. For example, the maximum area that can legally be irrigated is one half acre.

Well Water Protection

If wells are not constructed or maintained properly, they can allow pollutants to migrate down to the aquifer and contaminate water supplies. Follow these guidelines to protect your drinking water:

Have protective housing around your well.

Do not allow animals near the well house.

Make sure the well casing extends at least 12 inches above ground and is sealed with a cap on top.

Make sure the ground slopes away from the well, so that runoff is directed away.

Do not store chemicals near the well house, and avoid using pesticides and fertilizers near the well house.



In some areas and at certain times of year, groundwater may be limited. Conserve well water by using native or other drought resistant vegetation in your landscape. Consult Benton SWCD for other water conservation practices.

Well Location and Tags

All wells, no matter their use, must be physically tagged upon the sale of the property. This is required by OWRD's Well Identification Program. If a well has no tag, the owner can contact OWRD to obtain a form titled Application for Well ID Number. Then the owner, well driller, or licensed pump installer will attach the stainless steel tag to the well.

Your well is most likely located under a three- to six-inch pipe sticking out of the ground near the house. You should also locate the pipe that connects the well to your house so you do not disturb it. Private locating companies can assist in locating the pipe and the well.

Well Logs

Well logs are kept by OWRD to track the current state of wells, including dry wells. Well logs can be used to get information about groundwater in an area prior to buying property or drilling a well. The well logs record when wells were deepened, the amount of water produced, and the water depth. OWRD's website has instructions on how to locate the well log for your property.

Well Testing and Drinking Water Quality

Be aware that some problems invisible to the naked eye, such as hardness, high nitrate levels or high bacterial counts, require treatment to make your drinking water safe. Other issues that are more obvious may not be detrimental to one's health and do not need to be treated.

Collect Baseline Well Performance Data

Wells that are deepened, drilled or altered are required to have a well tag. Well tags are provided by the OWRD. Wells should be tagged prior to selling a property.

What is the static water level in the well prior to use?

What is the pumping rate after a specified period of pumping?

What is the water level in the well after a specified period of pumping?

Is the water clear and free of sand and silt?

How rapidly does the water level recover after pumping?



If possible, have well water tested prior to purchasing a home. Chemical tests are recommended every two to three years. Biological tests should be performed annually. Owners of a permitted or certified well must conduct a pump test every ten years. This test can be administered by a well driller or a pump vendor. The seller of any Oregon home must send a copy of the arsenic, coliform, and nitrate results to the purchaser and to the Oregon Drinking Water Program.

Coliform Bacteria Water Testing

Coliform tests, indicate potential contamination by disease-causing organisms. If this test shows coliform bacteria are present, you will need to shock-chlorinate the well, then resample after flushing residual chlorine from your water system. See Additional Resources for a link to the shock chlorination procedure.

Nitrate Water Testing

Nitrate levels should be 10 parts per million (ppm) or lower. Higher levels reduce the oxygen supply to infants' vital tissues and should be avoided by pregnant women, infants, and nursing mothers. The general population may see negative health effects when the range of nitrate in drinking water reaches 100-200 ppm. Nitrate can be an indirect indicator of pesticides or chemical contaminants.



OSU Extension offers free nitrate testing at community events and at their office. ¹⁹

Additional Water Testing

Benton County Environmental Health recommends testing for arsenic and lead. Arsenic can cause skin damage, stomach pain, numbness in hands and feet, and blindness. Arsenic might also increase the risk of cancer. Lead can contribute to slow growth, behavior and learning problems, kidney or liver damage, and decline in cognitive function. Lead can enter drinking water from submersible pumps, brass plumbing fixtures, and soldered copper pipes. Benton County also recommends testing for the presence of herbicides and pesticides if you think the groundwater might be contaminated with these chemicals. If

you are on a low sodium diet, you might consider testing for sodium. Although they are not usually health concerns, you may consider testing for iron, which stains fixtures red; manganese, which stains fixtures black; hardness, which reduces soap foam and leaves a white deposit; and hydrogen sulfide, which smells like rotten egg.

In addition to regularly scheduled tests, have the water tested whenever its color, odor, or taste changes. Contact the Oregon Drinking Water Program for more information on contaminants, coliform disinfection, well water protection, certified laboratories, and a well construction diagram.

Septic Systems

Most rural properties are not connected to a municipal water treatment facility so they rely on septic systems to treat waste water on site. Licensed professionals can review the septic tank and absorption field to ensure proper function. An accurate and complete plot plan is useful for repair and development purposes. If the property has an alternative system, such as an ATT or sand filter system, be informed

Recommended Practices to Prolong Your Septic System's Life

Flush only easily digested organics and water down the drain. Place napkins, cigarettes, dental floss, pharmaceuticals, and similar items in the trash.

Minimize use of household soaps and chemicals.

Avoid driving or parking on top of the system.

Plant only grasses near or above the drain field and tank.

Animals should not graze on the drain field.

about proper maintenance requirements. Improper maintenance can greatly shorten the life of the system. If there is no septic system, a site evaluation must be performed before a lot can be developed. Call Benton County Environmental Health at 541-766-6841.



The wellhouse, at right, protects the well, pump, and water treatment equipment.¹⁴

Water Quality Management

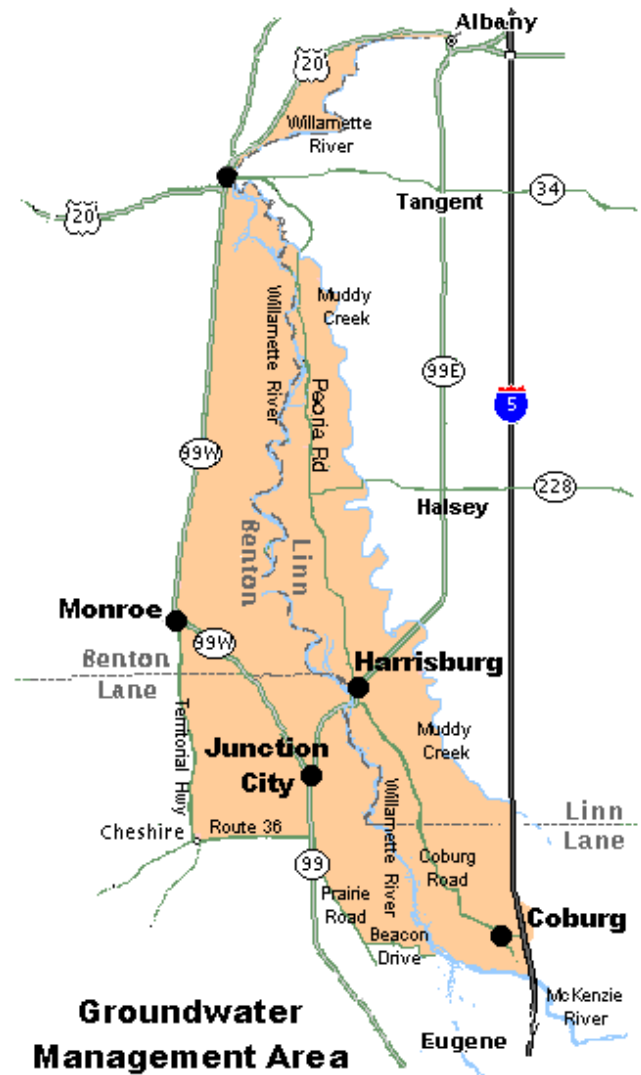
Agricultural Water Quality

In 1993, the Oregon State Legislature approved the Oregon Water Quality Management Act (Senate Bill 1010), directing ODA to help landowners reduce water pollution from agricultural sources and to improve overall water quality conditions. The focus of the Ag Water Quality Management program is on voluntary and cooperative efforts by landowners, Conservation Districts, Watershed Councils and others to protect and improve water quality. The Act outlines water quality conditions that agricultural activities are required to achieve.

To implement the Act, the state was divided into 38 areas and a plan was developed for each area. The plans outline recommended practices to address soil erosion, riparian vegetation, and crop nutrient/animal waste management. The local area plans and regulations can be found on the ODA website listed in Additional Resources. The map on their webpage will help you determine your Management Area. In Benton County, you could be in the Middle Willamette, Mid Coast or Upper Willamette Siuslaw Areas.

Ground Water Management Area

The Oregon Department of Environmental Quality has designated parts of Benton, Linn, and Lane Counties as a Ground Water Management Area (GWMA) due to elevated nitrate in drinking water. The major sources of nitrate are fertilizer and manure, leaking septic systems, and nitrogen-fixation from the atmosphere. The purpose of the GWMA is to raise awareness about the health risk associated with elevated nitrate levels,



This map is from <http://gwma.oregonstate.edu/maps/GWMAMap>.

establish voluntary programs to reduce ground water nitrate levels, and conduct research.

Floodplains

Flooding is a natural stream process. A floodplain is the nutrient-rich land that is inundated with water during floods. These areas allow flood waters to spread out and slow down, reducing their erosive force. This process encourages aquifer recharge as water seeps into the soil. A permit is required for all development in the 100-year floodplain.

Riparian Areas

Healthy riparian areas are vegetated borders found along streams, lakes and wetlands that provide the water body with shade, downed wood and organic debris. Although riparian areas cover only about 5% of the landscape, they are critical areas of plant and animal diversity. Typical riparian plants include alder, willow, cottonwood, salmonberry and sedges. Riparian vegetation provides key functions such as improved bank stability and water quality. Plants also slow the entry of rain and irrigation water into the stream and allow groundwater to recharge.

Riparian areas are protected under the Agricultural Water Quality Rules and Forest Practice Rules. It's very important to fence livestock away from riparian areas to help keep sediment, *E. coli* and other contaminants out of creeks. A riparian buffer should be at least 50 feet wide to trap eroding soils, 100 feet wide to filter pollutants, and 200-300 feet wide to provide wildlife with corridors for cover and travel. If you need to remove invasive plants from a riparian area, have a plan to replant the area promptly with native species. You may choose to eliminate weeds by mechanical



A riparian area was replanted with native trees and shrubs for erosion control and shade.²⁵



The view at Jackson-Frazier Wetland.⁷

means or use chemicals that are approved for use near water, Always follow directions on the label. Consider wildlife life cycles as you plan your management strategy. For example delay mowing grassy areas until late July when birds are done nesting.

Wetlands

A wetland is an area where the soil is saturated with water, either permanently or seasonally. Wetlands may be covered by shallow water all year, or they may dry out during the summer. The three defining traits of wetlands are groundwater within the root zone during all or part of the growing season, hydric soils, and water-tolerant plants. Swamps, marshes, and vernal pools are a few types of wetlands. These valuable natural systems help maintain the ecological balance of a region. Wetlands filter pollutants, provide flood control, recharge groundwater, and provide wildlife habitat. If you are going to alter a wetland, you need a permit from the Department of State Lands.

Additional Resources



- Benton County Environmental Health
www.co.benton.or.us/health/environmental_health/
- Benton County: Permits for Floodplain Projects
www.co.benton.or.us/sheriff/ems/flood/documents/benton_fp_permit_only.pdf
- Benton County Voluntary Program for Riparian Resources
www.co.benton.or.us/cd/riparian/index.php
- Drinking Water Requirements for Development in Benton County
www.co.benton.or.us/cd/documents/drinking_water_reqs.pdf
- Environmental Protection Agency: Septic Systems
www.epa.gov/septicmart
- FEMA Floods & Floodplain Management
www.fema.gov/pdf/floodplain/nfip_sg_unit_1.pdf
- Oregon Department of Agriculture Ag Water Quality Management Plans and Rules
www.oregon.gov/ODA/programs/NaturalResources/Pages/AgWaterQuality.aspx
- Oregon Department of Agriculture Agripedia. See the Section on Activities in Waters and Wetlands
www.oregon.gov/ODA/shared/Documents/Publications/Administration/Agripedia.pdf
- Oregon Department of Agriculture Water Quality Complaints
www.oregon.gov/ODA/programs/NaturalResources/Pages/NRCComplaints.aspx
- Oregon Department of Environmental Quality: Septic Information
www.deq.state.or.us/wq/onsite/aboutseptic.htm
- Oregon Department of State Lands: Wetlands Information
www.oregon.gov/dsl/WETLAND/Pages/wetlandfacts.aspx
- Oregon Drinking Water Program
503-731-4010 or online at <http://oregon.gov/DHS/ph/dwp/index.shtml>
- Oregon Health Authority: Shock Chlorination
<https://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Operations/Pages/shockchlorination.aspx>
- Oregon Water Resources Department Water Well Owner's Handbook
www.oregon.gov/owrd/gw/docs/water_well_booklet_2010.pdf
- Oregon Well Log Database
http://apps.wrd.state.or.us/apps/gw/well_log/
- Rural Development Planning: Protect Your Health and the Environment (Septics - pgs. 15-26)
www.co.benton.or.us/cd/documents/rural_development_planning.pdf
- Southern Willamette Valley Ground Water Management Area
www.deq.state.or.us/wq/groundwater/swvgwma.htm
- Southern Willamette Valley Groundwater Management Area Action Plan
<http://gwma.oregonstate.edu/sites/default/files/documents/GWMAActionPlan.pdf>
- The Health of Benton County: Community Health Assessment
www.co.benton.or.us/health/public_health/documents/community_health_assessment.pdf
- Water Efficient Plants for the Willamette Valley
www.bentonswcd.org/equipment/water-efficient-plants-for-the-willamette-valley

7

Soil

Importance of Soil.....	55
Management Practices.....	55
Soil Quality.....	56



Soil is alive and should be managed accordingly.
One cup of soil may contain billions of organisms. ¹⁴

Importance of Soil

Soil is an integral part of the environment and vital to life on Earth. It is slow to develop and difficult to rebuild. Soil performs essential ecosystem functions, including flood prevention, water storage and nutrient cycling for plant growth. Soil is home to myriad creatures of wondrous proportions and inconceivable diversity.

Management Practices

If you maintain a lawn, grow a garden, or manage a farm or ranch, employ these three steps to minimize soil degradation and loss of productivity.

Step 1: Get to Know Your Soil

Soil is an amazing three-dimensional body on the earth's surface that develops in place over time. The most recent survey of Benton County describes 180 different soil map units that vary based on these soil formation factors: 1) the temperature, moisture, plants and organisms



Willakenzie Soil Series profile exposed at a construction site. ¹⁴

in the mineral soil environment, 2) relief or topography of the landscape, 3) the organic matter or mineral parent material from which the soil evolves, and 4) the length of soil development time.

You can read the Natural Resources Conservation Service's description of your site's soils. Browse the Benton County Soil Survey or visit the NRCS Web Soil Survey, an online, interactive soil information source. These excellent references highlight physical and chemical properties, and water and soil features that influence agricultural and engineering considerations for land use.

Step 2: Monitor Your Soil

Field observations and routine analysis are the basis of an informed soil management plan. Observe your soil during the same month each year to watch for changes in soil over time. Use the Willamette Valley Soil Quality Card (EM8711) to document field observations such as structure, compaction, earthworms and weeds. This card is available online along with a user guide that describes assessments and management effects on soil.

Whether you perform home testing with a garden store kit or send a sample to a lab, the answer you receive is directly related to the soil you collect. To reduce variability in sample results, collect soil from one management unit only – that is an area of the landscape that has the same soil texture and the same management history. See Additional Resources for a soil collection guide link.

Laboratory soil analysis is like a medical blood test. The results indicate where to focus time and inputs that improve soil productivity. Parameters measured might include pH, calcium, phosphorous, potassium and organic matter.



A composite sample is collected from multiple spots within the same management unit. ¹⁴

Step 3: Improve Your Soil

Reduce soil disturbance.

Tillage has long been used for weed control and seed bed preparation. Too much soil disturbance leads to compaction and destroys the soil structure. Good soil structure has pore space for water storage, reduces erosion, and does not inhibit root growth.

Add organic matter.

Organic matter feeds the soil biological community that in turn builds soil structure. Increase soil organic matter through the direct application of amendments such as compost, manure or mulches, and through the use of cover crops. Frequent use of manure can result in high levels of soil phosphorus and potassium which can contribute to poor water quality.

Never leave the soil bare.

Keep living roots in the soil year-round. The use of cover crops is a key soil-building

practice. They protect the soil surface between cash crops or near perennials. Cover crops are planted to reduce erosion, attract pollinators, break up compacted soil, supply nutrients, smother weeds and discourage pests.

Grow a mixture of plants to support diversity of life below the soil.

Some organisms prefer green wastes while others use woody brown debris for energy and body building. Provide a variety of plant materials to restock the soil organisms' nutrient needs.

Use chemicals with caution.

The overuse of fertilizers and pesticides can impact soil organisms. Understand the effects of chemicals before you apply them and follow the 4R Nutrient Stewardship Concept: Right Source, Right Rate, Right Time, and Right Place.

Soil Quality

The definition of Soil Quality is the capacity of a soil to sustain plant and animal productivity; maintain or enhance water and air quality; and support human health and habitation.

The Benton SWCD Soil Quality Project (SQP) provides farmers with an assessment package that describes site-specific soil quality parameters. Understanding your soil quality can help guide your management decisions. For more SQP information visit the SQP website listed in Additional Resources.

Soil Quality Evaluation

Monitoring your soil has important benefits. The better you understand your soil, the more likely you are to adopt practices that increase water-holding capacity and improve plant health. Furthermore, an understanding

Soil Quality

of your soil's capability will help you lower production costs and reduce frustration. As you incorporate effective management practices, you will reduce environmental impacts with consequences far beyond the scope of your own property. For example, loss of prime farmland to urban sprawl is one Willamette Valley concern. When you maintain or enhance your soil, the land will have long-term agricultural value and is more likely to remain in the hands of farmers.



Annual rye grass and crimson clover planted together in a cover crop trial. ¹⁴

Additional Resources



4R Nutrient Stewardship Concept

www.tfi.org/introduction-fertilizer/environmental-stewardship/4r-nutrient-stewardship

Benton County Soil Survey

www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=OR

Fertilizer and Management Guides. Search OSU Publications and Multimedia Catalog for specific planting systems, from lawn to a wide range of crops.

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

Gardening with Compost, Mulches and Row Covers

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/18913/ec1247.pdf>

Laboratories Serving Oregon

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20037/em8677.pdf>

NRCS Web Soil Survey can be used to map soils on your property

<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

NRCS Soil Health webpages

www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health

OSU: A Guide to Collecting Soil Samples for Farms and Gardens

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/42799/ec628.pdf>

OSU Publication and Multimedia Catalog: browse for cover crop publications

<http://extension.oregonstate.edu/catalog/pdf/em/em8710-e.pdf>

Soil Health Key Points

www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1082147.pdf

Soil Test Interpretation Guide

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/22023/ec1478.pdf>

Soil Quality Project Webpage

www.bentonswcd.org/programs/soil-quality/soil-quality-assessment/

Willamette Valley Soil Quality Card a system for tracking in-field observations of soil quality

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20036/em8711.pdf>

8

Agriculture

Small Farms.....	59
Agricultural Certification Programs.....	60



Sunburst over a Willamette Valley wheat field. ²⁶

Small Farms

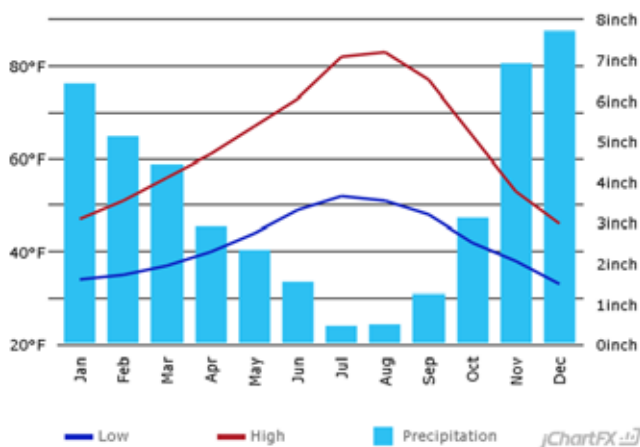
Developing a small farm on your property is like starting any small business. It requires long hours, determination and commitment. Consider these initial factors to help shape your farm plans: farm goals, climate, site resources, and financial considerations.

Farm Goals

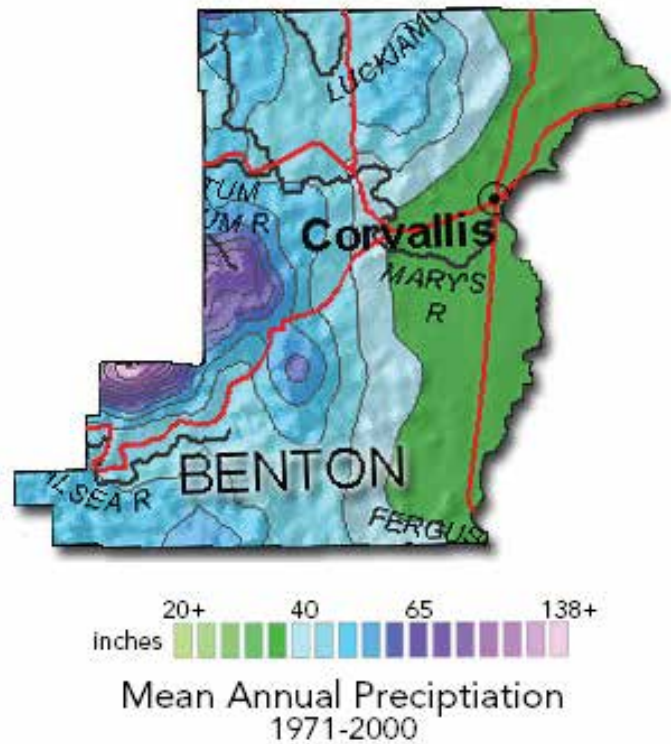
Before you take the plunge into an agricultural business, identify your motivation for becoming a farmer: lifestyle, creation of supplemental or regular income, or tax deferral. This decision should be based on site conditions, available labor, your financial situation, your family’s abilities, and your knowledge of agricultural practices. Start small and expand slowly as knowledge about your crops and site increase.

Climate

Benton County has a maritime climate that is characterized by cool wet winters and warm dry summers. The county’s growing season is long. Fifty percent of the annual rainfall in the county occurs between December and February.



Corvallis Climograph generated at www.usclimatedata.com OSU.



Map created by PRISM Climate Group, OSU.

Irrigation is required for most agricultural production. Frost is a common agricultural issue in the county and may require additional management techniques to extend the growing season. A single property can have multiple micro-climates caused by the terrain, wind direction, elevation and other natural features.

Site Resources

The characteristics of a site such as soil type, orientation to the sun, topography, elevation, water availability and micro-climates may restrict the types of crops that can be grown. Match crops with the capability of the land to increase your farm’s chances for success.

Financial Considerations

An agricultural tax deferral lowers the property tax burden on lands that produce income from farming. A property owner can acquire a tax deferral for agriculture, forestry, wildlife

habitat and some state and federally funded conservation easements. In order to receive and maintain an agricultural tax deferral, farms must meet specific annual income requirements for three out of five years; otherwise the deferred taxes will need to be repaid. Before buying a piece of property, check with the local tax assessor about the property's current tax deferral. The tax liability created by the previous owner can be passed on to the new owner.

Agricultural Certification Programs

As consumer interest in sustainable products grows, agricultural producers and organizations pursue agricultural certification to meet market demand. Below is a small selection of the many certifications available to help you market your products to sustainably-minded audiences. Visit Oregon Department of Agriculture's Sustainability webpage for a complete list.

USDA Organic

USDA organic certified operations follow the USDA National Organic Program requirements. Over 100 agents are authorized to certify farms and businesses to the USDA organic regulations. You may work with any USDA-



Organic produce at the Farmers' Market. ¹⁴

accredited certifying agent. To find a certifier near you, visit the List of USDA-Authorized Organic Certifying Agents.

Oregon Tilth

Another organic certification program is offered by Oregon Tilth, a nonprofit research and education organization dedicated to biologically sound and socially equitable agriculture. Oregon Tilth certification is available to international organic growers, processors, and handlers.

Food Alliance

Food Alliance provides a third-party certification program that ensures safe and fair working conditions, humane treatment of animals, and careful stewardship of ecosystems.

Low Input Viticulture and Enology, Inc (LIVE)

Partnered with Salmon Safe, LIVE, Inc. provides education and independent third-party certification of vineyards and wineries using international standards of sustainable viticulture and enology practices in wine-grape and wine production.

Fair Trade

The Fair Trade certification ensures equitable trade practices. To be labeled Fair Trade, companies must buy from certified farms and organizations. This means the farmers and workers are justly compensated for their labor.

Salmon Safe

Salmon Safe works with farmers to encourage the adoption of ecologically sustainable agricultural practices that protect water quality and native salmon.



High tunnel production extends growing season. ¹⁴

Additional Resources



ATTRA- National Sustainable Agriculture Information
www.attra.org

Benton County Assessor's Office
www.co.benton.or.us/assess/index.php

Fair Trade USA
<http://fairtradeusa.org>

Food Alliance
<http://foodalliance.org/>

LIVE, Inc. Low Input Viticulture and Enology
<http://liveinc.org/>

NOAA National Weather Service
www.nws.noaa.gov

Oregon Agripedia Website: download the entire document (PDF, 4.5 MB)
www.oregon.gov/ODA/shared/Documents/Publications/Administration/Agripedia.pdf

Oregon Farm Bureau: more information and to find the county organization nearest you
www.oregonfb.org

Oregon State University Extension Small Farms
<http://smallfarms.oregonstate.edu>

Oregon Tilth
<http://tilth.org>

Salmon Safe
www.salmonsafe.org

U.S. Climate Data
www.usclimatedata.com

USDA Organic Certification Tips
www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5101547

Chapter 9: Livestock Management

9

Livestock Management

Species Requirements.....	63
Fencing.....	63
Pasture & Grazing Management.....	64
Manure Management.....	66
Mud Management.....	67



The old red barn - an iconic vestige of the agricultural landscape. ²⁶

Species Requirements

Raising animals can provide environmental benefits and economic vitality to a piece of property. Goats, for example, can assist with brush management, produce marketable milk and cheese, and provide manure that can be used as a soil amendment. Depending on the species you raise, your livestock will need different amounts of water and other elements to be healthy and keep the land healthy. Contact a specialist at OSU Small Farms, NRCS, or Benton SWCD to determine the carrying capacity of your pastures for various livestock species.



A Jersey steer helps manage nutrients. ¹⁴

Livestock Considerations

Species	Animal Weight ^A	Daily Water Use (gal.) per Animal ^B	Annual Manure Production (ft ³ /yr) per Animal ^A	Other Considerations
Sheep	100	1-2	37	Require winter shelter, yearly wool clipping and vaccinations.
Goats	100	1-2	37	Require good nutrition and many acres to roam to stay disease and worm free.
Cattle	1000	10-20	493	Prefer grass over forbs (grazing cattle with sheep is a good management tool to keep down weeds).
Horses	1000	12-15	365	Need good shoes, vaccinations and shelter.

A. Manure Production and Bedding Used Calculator. Northeast Recycling Council
http://nerc.org/documents/manure_management/manure_generation_calculator.xls

B. How Much Water Do My Animals Need Each Day? University of California Cooperative Extension
<http://ucanr.edu/sites/placernevadasmallfarms/files/90846.pdf>



Electric fence confines cattle to pasture. ¹⁴

Fencing

Benton County is entirely a livestock district, or closed range district, which means the livestock owner must keep livestock on their own property. There is no open range. High tensile electric fence is most commonly used in Benton County. Barbed wire is becoming more uncommon.

Types of Fencing

Type	Advantages	Disadvantages
4-Strand Barbed Wire	Good control of cattle. Wire may be placed to allow wildlife to safely pass.	Can injure horses, llamas, and wildlife. Labor and material costs are high. Periodic maintenance required.
Woven Wire	Good control of sheep. Add 2 upper strands of barbed wire for cattle. May keep some predators out.	Extremely unsafe for wildlife. Limit use to small areas near buildings. Labor and material cost high. Some maintenance necessary.
High Tensile Electric	Good for establishing pasture rotation program on small acreage. Lightweight, portable, easy to set up or dismantle before and after irrigation. Less expensive.	Durable and easy to repair. Needs solar or electric power source.

Pasture & Grazing Management

Pastures are complex biological systems that consist of sun, soil, water, plants, and animals. To be an effective pasture manager, think of yourself as a grass farmer. The forage is the crop and the grazing animals are the harvesters. A healthy pasture provides nutritious forage that will improve the livestock's ability to thrive and resist disease.

Proper grazing avoids compaction, improves soil structure, increases organic matter, decreases erosion and increases infiltration, thereby improving water quality and soil health. These conditions contribute to plant vigor and improved root structure. Healthy forage inhibits weed invasion and reduces the need for pesticides. Properly grazed pastures provide wildlife habitat during pasture rest periods. Improve or protect the health of your pasture to increase the property's value and reduce the amount of polluted runoff that leaves the land.

Grazing Strategies

Continuous grazing should be avoided. Animals that are allowed to roam the entire property will choose the type of forage they want to eat. Since they prefer the new, tender forage, continuous grazing leads to exhaustion of good forage species, proliferation of weedy species, and development of muddy bare patches.

A better method is rotational grazing, where pastures are subdivided and animals are frequently rotated to allow forage to rejuvenate. Temporary electric fencing is a low-cost way to sub-divide the pasture into paddocks before you invest in permanent cross fences.

When grass production will not support your animals, move them to an all-season pen and provide supplemental feed. See Mud Management Sections for heavy use area details.

Grazing Height Rule of Thumb

To maintain healthy grass pastures and livestock, a general rule of thumb is to manage grass height so that it ranges between two to eight inches high. Rotate grazers into paddocks when grass is six to eight inches high and out when grass is two to three inches tall. These management heights vary by grass species and season.

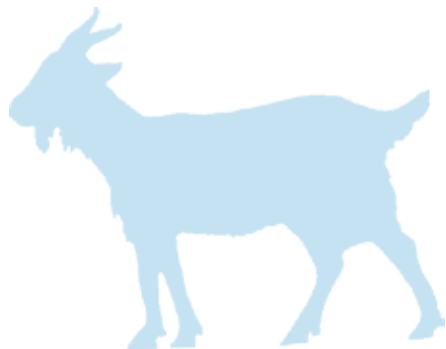
Signs of Good & Poor Grazing Management

Good Management

- Animals confined to winter use area when pasture is wet.
- Large pastures subdivided into smaller pastures.
- Animals fenced out of streams.
- Water provided in each pasture.
- Presence of a vegetative buffer between streams and pastures.
- Forage is never less than 2-3 inches in height.

Poor Management

- Bare ground filled with weeds.
- High browse lines on trees and shrubs.
- Trampled stream bank.
- Animals grazing through the fence.
- Livestock on wet soil.
- Animals ankle deep in mud or manure.



Plants are overgrazed when carbohydrate reserves are continually depleted without enough time for the plant to replenish its stores. Overgrazing reduces root development so plants can't effectively access water. Proper grazing height optimizes animal nutrition and minimizes threats of parasites.

Irrigation

Proper irrigation can help improve a pasture's productivity. Pastures with healthy plants will be able to access deeper water reserves. Daily plant water requirements vary based on factors such as air temperature, solar radiation, day length, wind, and growth stage of the plant. The Agrimet Crop Water Use Program predicts water use or evapotranspiration (ET) on a daily and weekly basis. OSU Extension Service, NRCS and Benton SWCD can provide information on irrigation principles and management.

Fertility

Pasture plants need nutrients, such as nitrogen, phosphorous, potassium, and sulfur to grow properly. Balanced grazing prevents the concentration of soil nutrients within the pasture; therefore a fertility plan should be developed. Test the soil to determine nutrient and pH levels and apply amendments every three to four years.

Healthy Pasture Practices

Changes in grazing practices, irrigation, soil fertility, and weed management can be inexpensive, successful ways to improve pasture productivity.

- Adjust animal numbers and management based on pasture production and regrowth.
- Irrigate pastures following grazing rather than prior to grazing.

Minimize compaction: do not graze pastures in wet winter months. Compacted soil restricts root growth and prevents water from moving into and through the soil to the roots.

Provide adequate drinking water for animals.

Have water, salt and minerals strategically located to distribute livestock evenly across pastures.

Fence off streams so that manure and other pollutants are kept away from water resources.

Set up grass and tree buffers along stream/river banks to prevent erosion.

Avoid soil disturbance, which can activate previously dormant weed seeds and compromise soil health.

Manure Management

If manure is not properly managed, bacteria, parasites, nitrogen and phosphorous can create problems for livestock, people, streams, irrigation water and wells. Fresh manure may have strong odors and breed flies. Horses and cattle can suffer from respiratory problems when exposed to dried manure. Excess manure can cause over fertilization of grasses.

Manure Considerations

Keep manure away from wellhead.

Keep animals fenced away from flowing water sources and wells to keep out fecal matter and other health hazards.

Divert surface runoff around animal yards to help prevent manure from entering water sources.



This manure pile should be composted or covered during the rainy season.²⁵

Because of the water quality risks associated with improper manure management, Federal and State laws forbid discharge of animal waste into water. However, properly managed manure is a valuable resource that can improve pasture productivity.

Manure Application

To make manure as beneficial as possible, follow these guidelines:

Store it under cover and away from water sources. Keep the pile contained and on a hard surface to prevent leaching of nutrients, especially during the wet season.

Compost it to create a beneficial soil amendment that increases soil organic matter and water holding capacity.

Spread composted manure on pastures. Test manure and soil to determine the appropriate application rate. If you have more manure than your pastures can accommodate, export either manure or compost.

Harrow or drag pastures to break down manure, return nutrients to the soil, and exposes parasite larvae to sun and air.

The Benton SWCD can help property owners develop a manure composting/storage facility.



Cattle can quickly turn a wet pasture to mud. ²⁵

Mud Management

Mud can make chore time unpleasant, increase fly breeding areas, transmit diseases, create unsafe footing and increase polluted runoff. The best protection against mud is prevention. Use these strategies to help prevent mud.

Fencing

Fence animals away from wetlands, streams, and ditches. Rotate water tank areas to avoid mud and manure build up.



Fences keep livestock from compromising stream water quality. ²⁵

Firm Footing

Barn entrances, lanes, gates, loafing areas, and wet paddocks that are grazed become muddy. You can install concrete in these areas. However, geotextile fabric and gravel will provide an all-weather surface at one-third the cost of concrete. Geotextile fabric allows water to infiltrate but stops mud from working up through the gravel. NRCS recommends using a layer of geotextile fabric next to the soil, a 6-8 inch layer of 3 inch minus crushed rock with 4-6 inches of 3/4 inch minus crushed rock on top to provide a firm surface. If the area will receive vehicle traffic in addition to animal traffic, use the larger numbers.

If you would like comfort for your animals, cap the area with hog fuel (shredded bark) or pea gravel. Hog fuel decomposes and needs to be periodically replaced. As hog fuel decomposes it releases acids that may leach into water, so avoid using it near wetlands, streams, or ditches.



This hard-rocked heavy use area keeps horses from damaging the rest of the pasture. ²⁵

Heavy Use Areas

Heavy use areas are key components of livestock operations in our seasonally wet Willamette Valley. A heavy use area is a reinforced animal yard for times when livestock could damage pastures, such as in rainy weather or when grass is less than three inches tall. Locate heavy use areas on high ground and at least 100 feet away from wells and open water. Follow the firm footing guidelines listed in the previous section when constructing a heavy use area.

Runoff

Prevent clean surface water from entering your animal yard by diversion to wetlands, ditches, and streams. Slope the animal yard with a four to six percent grade and use a southern aspect for quick drying. Use a buried pipe to carry water past animal yards. Place a concrete curb or earthen berm around the yard to keep clean and contaminated water separate. Plant a vegetated buffer, such as a bioswale, to filter the runoff. Widen the buffer if the heavy use area slopes or is located near wetlands, streams or ditches.



A three bin compost facility prevents manure runoff contamination to the nearby stream. ²⁵

Roof Gutters and Downspouts

Install roof gutters and downspouts to divert clean water from the animal yard. Design gutters to handle the amount of rainfall in your area (see Rain Map in the Introductory Section.) For example, one inch of rain on a 20-foot by 50-foot roof will produce 620 gallons. Protect downspouts from animal and equipment damage by using heavy PVC pipe, a hot wire or a permanent barrier. Empty downspouts into a stock watering tank, rain barrel, dry well, tile line, road ditch or bioswale.



This retention pond diverts runoff to a vegetated area that filters the flow. ¹⁴



Sheep graze in Corvallis' Oak Creek watershed. ⁸

Additional Resources



Agrimet Crop Water Use Program
www.usbr.gov/pn/agrimet/or_charts.html

ATTRA: Pastures: Sustainable Management
<http://attra.ncat.org/attra-pub/sustpast.html>

Benton County Planning Division
www.co.benton.or.us/cd/planning/contact_us.php or 541-766-6819

Composting: An Alternative for Livestock Manure Management
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/29173/em8825.pdf>

Living on the Land: Pasture and Livestock Essentials
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19672/ec1634.pdf>

NRCS: Animal Manure Management
www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/rca/?cid=nrcs143_014211

NRCS Web Soil Survey: determine grazing yields for your soil types.
<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

OSU Extension Publication: Managing Small Acreage Horse Farms
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19670/ec1558.pdf>

OSU Extension Service Catalog (Search "pasture management")
<http://extension.oregonstate.edu/catalog/>

Pasture and Grazing Management in the Northwest: A Pacific Northwest Extension Publication
www.cals.uidaho.edu/edComm/detail.asp?IDnum=1587

10

Forestry

Oregon's Forest Practices Act.....	71
Small Woodland Management...	71
Permits.....	72



Misty Douglas fir forest. ²⁶

Oregon's Forest Practices Act

The Forest Practices Act was implemented in 1971 and was the first act of its kind in the nation. It outlines management practices that foresters must consider when planning timber harvests on state or private lands. The Act regulates road construction and maintenance, written plans, reforestation, and clear-cutting. It also protects water resources and wildlife habitat. Forest regulations and practices are updated regularly based on scientific research. Oregon Department of Forestry (ODF) administers the Oregon Forest Practices Act, which guides all non-federal forest activities in the state. Stay informed by visiting the websites listed in Additional Resources.

Small Woodland Management

A healthy forest is characterized by vigorous trees that are resistant to disease, insect infestation, and animal damage. The forest consists of a diverse mix of plant species and the trees are spaced far enough apart to allow sunlight to reach plants on the forest floor. Good forest management requires consideration of every aspect of the forest habitat – including shrubs, herbs, grasses, fungi, insects and wildlife. Active woodland management can help protect your home from wildfires and the forest from pests and pathogens. Whether you are a small woodlands owner or a major corporation, your forest will benefit from a forest management plan. Your management plan will reflect your management goals, which might include attraction of wildlife, income from timber sales, or tax incentives.



Woodland management in action. ⁹

Diversity

By maintaining a diversity of trees appropriate to the site, you will encourage the overall health of the forest. Tree species should be selected based on soil and climate conditions. Soil information can be found on the Web Soil Survey. New trees require protection from competing vegetation to help improve their survival rate. In addition to species diversity, forests should also have trees of various ages.

Thinning

Thinning is the process of removing trees to improve the forest's vigor. Thinning creates more light, water, and nutrients for the remaining trees. It reduces the loss of trees due to pathogens and increases resistance to wildfire, drought, and insect infestations. Site objectives should be taken into consideration when determining stand density.

Diseases and Pests

Root disease, beetles and Sudden Oak Death are some of the most common issues in this region that can spread and destroy a stand. If you think your forest is diseased, contact ODF for assistance in identifying the problem and taking the proper actions for treatment.

Pruning

Pruning is a management technique that enhances tree value, makes trees look nicer and more knot-free for mills, lessens the impact of blister rot in white pines, reduces the incidence of leaf diseases and can reduce fuel loads. Pruning should be done on broadleaves during the dormant season.

Replanting

Replanting is another important part of your management plan. Consider your soil type to decide which tree species will grow best. Contact ODF in Philomath at 541-929-3266 for technical advice and information about cost-share programs. ODF regulates forest management on private lands and provides fire protection.



Forest canopy. ¹⁴



Planting seedlings. ¹⁸

Permits

A notification of operation/application for permit is required when conducting any activity related to growing or harvesting trees including spraying, road construction, and use of machinery. File an application with the Oregon Department of Forestry fifteen days prior to starting work. The application is electronically sent to the Department of Revenue by ODF for tax purposes.

You are encouraged to file the Permit to Operate Power-Driven Machinery if you are working in or within 1/8 mile of a forest protection district, even if the forestry practices being conducted are not related to for-profit forestry. This permit reduces an individual's liability when using power-driven machinery. If this application is not filed and you cause a forest fire, you are 100% liable for all damages.



Fairy Slipper (*Calypso bulbosa*) is an elusive understory orchid found in our local forests. ²⁶

Additional Resources



Benton County Chapter of the Oregon Small Woodlands Association
www.oswa.org/blog/benton/

Oregon Department of Forestry: Forest Rules & Laws
www.oregon.gov/ODF/Pages/lawsrules.aspx

Oregon Department of Forestry: West Oregon District
www.oregon.gov/ODF/pages/field/phil/aboutus.aspx

Chapter 11: Resource Directory

11

Resource Directory

Conservation Programs.....	75
Waste Management.....	76
Local Groups.....	77
Local Events.....	81
Contact List.....	83



You are likely to see Benton SWCD sharing information at community events. ⁴

Conservation Programs

Wildlife Habitat Resources

United States Fish & Wildlife Service – Partners for Fish and Wildlife Program

www.fws.gov/pacific/ecoservices/habcon/partners/index.html

ODFW Wildlife Habitat Enhancement and Protection Programs

www.dfw.state.or.us/lands/

Oregon Watershed Enhancement Board (OWEB) grants for wildlife habitat enhancement projects

Restoration Project Application Materials

www.oregon.gov/OWEB/GRANTS/Pages/restoration_apps.aspx

Small Grants Information and application materials

www.oregon.gov/OWEB/GRANTS/Pages/smgrant_main.aspx



Newton Creek Wetlands in Philomath. ¹⁴

Riparian Habitat Protection and Enhancement Programs

Conservation Reserve Enhancement Program

www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep

Riparian Lands Tax Incentive

www.dfw.state.or.us/lands/tax_overview.asp

Benton County Riparian and Wetland Projects

www.co.benton.or.us/cd/riparian/index.php

NRCS Conservation Easement Programs

Agricultural Conservation Easement Program (ACEP)

www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/

Healthy Forests Reserve Program (HFRP)

www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests/

Water Quality Protection

ODA Agricultural Water Quality Program (Rules and Plans)

www.oregon.gov/ODA/programs/NaturalResources/Pages/AgWaterQuality.aspx

Department of Environmental Quality Water Quality TMDLs Program

www.deq.state.or.us/wq/tmdls/tmdls.htm

Waste Management

Recycling & Transfer Stations

Recycle Depot at Coffin Butte Landfill Public Area

28971 Coffin Butte Road, Corvallis, OR 97330
Open Monday- Saturday, 8 AM – 4 PM

Monroe Transfer Station

24785 Highway 99W., Monroe, OR
Open second Saturday of each month, 8 AM – 4 PM

Wren Monthly Recycling Collection

Across from Mid-Valley Tire.
First Saturday of each month, 9 AM – 2 PM

Hazardous Waste

Republic Services

110 NE Walnut Blvd, Corvallis
Household hazardous waste events are in
February, May, August, and November.
All events run from 9 AM – 2 PM

Composting

Pacific Region Compost (PRC)

Drop off clean wood and yard debris at the Coffin Butte Landfill public area and pick up finished compost in the same location (see address below).
Open Monday- Friday, 8 AM – 5 PM

Coffin Butte Landfill Public Area

28971 Coffin Butte Road, Corvallis, OR
Open Monday - Saturday, 8 AM – 5 PM

Dead Animals

Call Republic Services at 541-754-0444.

Electronics Recycling

Coffin Butte Landfill Public Area

28971 Coffin Butte Road

Corvallis Republic Services Recycle Depot

110 Walnut Blvd NE, enter on Belvue Street



The Pacific Region Compost Facility turns yard debris and food waste into rich compost that you can purchase. ²¹



A compost pile in Philomath. ¹⁴

Local Groups

Alsea Watershed Council

www.alseawatershedcouncil.org

The mission of the Alsea Watershed Council is to help manage the natural resources of the Alsea watershed. The AWC is a non-profit, volunteer organization run by local people and welcomes the participation of all who are concerned with being good stewards while considering the economic and social needs of Benton, Lincoln, and Lane Counties. The AWC provides a forum for people to work through differences and come to common ground.

Benton County Chapter of Oregon Small Woodlands Association

www.oswa.org/blog/benton

The Oregon Small Woodlands Association (OSWA) is a member-based association that represents small woodland owners in Oregon. Regular Members own between one and 5,000 acres of land with trees growing on their property. They also have an Associate Membership for those who do not own woodlands in Oregon, but are interested in the best interests of small woodland owners.

Benton County Historical Society & Museum

www.bentoncountymuseum.org

Since 1951, the Benton County Historical Society (BCHS) has been preserving historical artifacts, photographs, and manuscripts. Philomath citizens prevented the demolition of the 1867 Philomath College building and it was subsequently placed on the National Register of Historic Places. BCHS opened the building to the public in 1980 as a history museum, research library and art gallery.

Benton Soil & Water Conservation District

www.bentonswcd.org

The Benton SWCD's mission is to provide leadership to Benton County residents through education and technical assistance for conservation and responsible use and management of soil, water, and related resources.

Calapooia Watershed Council

www.calapooia.org

The Calapooia Watershed Council (CWC) was created by residents of the watershed in 1999, and is a community organization that promotes voluntary actions to improve the health of the watershed. The Council was originally formed due to initial concerns about agricultural regulations and the listing of threatened fish species, namely spring Chinook and winter steelhead.

Cascade Pacific Resource Conservation and Development

www.cascadepacific.org

Cascade Pacific Resource Conservation and Development (CPRC&D) is a non-profit

organization established in 1989 to support local communities. CPRC&D is part of a national network of RC&Ds, authorized by Congress over 45 years ago. CPRC&D works at the grassroots level with citizens of local communities to develop innovative projects that enhance those communities through social, economic, educational, and environmental improvements.

Corvallis Environmental Center

www.corvallisenvironmentalcenter.org

The Corvallis Environmental Center (CEC) is a 501(c)(3) that was founded in 1994 as a grassroots effort to take action on a number of environmental issues. Their mission is to educate, engage, and inspire people to get involved in creating a healthy, sustainable community. The CEC fills an important niche in our community—educating and assisting people in the areas of local food security, environmental education, and energy conservation. Every year they directly reach more than 10,000 people through core program activities.

Corvallis Sustainability Coalition

<http://sustainablecorvallis.org>

The Corvallis Sustainability Coalition is a network of organizations and individual volunteers in Corvallis, Oregon, who are working together to create a sustainable community. It includes businesses, non-profits, faith communities, educational institutions, and government entities that are committed to creating a community that values environmental quality, social equity, and economic vitality. Their primary purpose is to foster communication and collaboration to accelerate progress toward a sustainable future.

Grange Halls in Benton County

www.orgrange.org/find-a-grange/#Benton

Since 1873, the Oregon State Grange has been a grassroots, non-partisan advocate for agriculture, rural issues, and American values. Community Grange Halls are great meeting locations and the social center of rural communities.

Greenbelt Land Trust

<http://greenbeltlandtrust.org>

Greenbelt Land Trust is a local land conservation nonprofit organization focused on protecting ecologically, agriculturally, and historically significant lands in the mid-Willamette Valley. They work strategically to secure significant natural areas in accordance with a careful plan. They strive for connectivity, linking protected natural areas with parks and public spaces to provide wildlife corridors, protect valuable natural resources, and expand opportunities for low-impact recreation and renewal. Protected—and connected—these natural areas make communities more desirable as places to live and work, and help preserve Oregon’s distinctive landscape and character.

Institute for Applied Ecology

<http://appliedeco.org>

The Institute for Applied Ecology is a 501(c)(3) nonprofit organization with a mission to conserve native species and habitats through restoration, research, and education.

Long Tom Watershed Council

www.longtom.org

The Long Tom Watershed Council is a leader in science and community-based watershed protection and restoration, working across traditional boundaries to complete education and restoration projects that document and improve local water quality and fish and wildlife habitat. They have also developed and partially implemented a watershed Action Plan.

Luckiamute Watershed Council

www.luckiamutelwc.org

Since 2001, the Luckiamute Watershed Council has been partnering with local agencies, landowners and businesses to improve water quality and habitat conditions in the Luckiamute River and Ash Creek watersheds.

Marys Peak Group of the Sierra Club

http://oregon.sierraclub.org/groups/marys_peak

The Marys Peak Group operates from Corvallis, Oregon and serves the region of Benton, Lincoln, Linn, Marion, and Polk Counties - from Yachats to Otis on the Pacific Coast to the High Cascades. Their name comes from nearby Marys Peak, the highest mountain in the Coast Range.

Marys River Watershed Council

www.mrwc.org

From Marys Peak to the Willamette River, from forests to farms, prairies to ponds, backyards to school yards, the MRWC is cultivating strong neighborhood ownership of the watershed's health by inspiring and supporting voluntary stewardship of the Marys River watershed.

Native Plant Society of Oregon, Corvallis Chapter

<http://corvallis.npsoregon.org>

The Corvallis Chapter of the Native Plant Society of Oregon covers Benton, Lincoln, and Linn counties, spanning from the Oregon Coast to the crest of the Cascades.

Oregon Association of Nurseries

www.oan.org

The Oregon Association of Nurseries (OAN) is a non-profit trade association that represents nearly 1,000 individual nursery stock producers, retailers, landscapers and related companies serving the nursery and greenhouse industry. The OAN is the main voice for Oregon's nursery and greenhouse producers, re-sellers, transporters, retailers, and suppliers.

Oregon Christmas Tree Growers Association

www.christmastrees-or.com

Founded over 20 years ago, the Oregon Christmas Tree Growers Association is an independent grower network providing fresh quality Christmas trees. Member farms are family owned and operated, but work together to provide buyers the variety and benefits similar to working with a large grower. Contact members directly to obtain price lists.

Oregon Farm Bureau

www.oregonfb.org/about/county-farm-bureaus/benton-county-farm-bureau

The Oregon Farm Bureau (OFB) is a grassroots, nonpartisan, nonprofit organization representing the interests of the state's family farmers and ranchers in the public and policymaking arenas. As Oregon's largest general farm organization, its primary goal is to promote educational improvement, economic opportunity, and social advancement for its members and the farming, ranching, and natural resources community as a whole. "Locally grown and growing strong," OFB works to find solutions that will benefit all of the state's agriculture producers.

The County Farm Bureau is the foundation for Farm Bureau at the state and national levels. Oregon has 32 organized, active county Farm Bureaus covering all 36 Oregon counties. Each County Farm Bureau has its own board and officers and is a vital link between the organization's membership, its policy development, and implementation efforts.

OSU Extension 4-H Clubs

<http://extension.oregonstate.edu/benton/4h>

Benton County 4-H is a youth organization with a mission of engaging youth to reach their fullest potential while advancing the field of positive youth development. It is open to all 4-12th graders. K-3rd graders can join a non-competitive Cloverbuds program.

OSU Extension Master Gardeners

<http://extension.oregonstate.edu/benton/horticulture/mg>

The Master Gardener program started in 1978. It strives to teach volunteers about technical horticulture, the Extension Service, and sources of information at Oregon State University. It provides Master Gardeners with tools to become better gardeners, a network of fellow gardeners, and a means of service to others. Extension Agents enjoy watching Master Gardeners become more confident, outgoing and aware of the need for their knowledge.

OSU Extension Service of Benton County

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

Benton County Extension Service faculty, staff, and volunteers deliver research-based information to help youth and adults solve problems, develop life skills, and manage resources wisely. They coordinate tours, conferences, short courses, workshops, and demonstrations, and provide brochures and publications with specific research-based information on a variety of subjects.

OSU Extension Small Farms

<http://smallfarms.oregonstate.edu/south-valley/intro>

The Small Farms Program serves commercial small farm entrepreneurs as well as non-commercial small acreage landowners. They focus on both organic/biological and conventional farming systems and emphasizes three areas: small acreage stewardship, commercial small farms, and community food systems.

Siuslaw Stewardship Groups

www.fs.usda.gov/detail/siuslaw/workingtogether/partnerships/?cid=fsbdev7_007261

Stewardship groups are comprised of individuals and organizations from the local area working with the Forest Service and Bureau of Land Management to promote forest restoration that meets the needs of the local community. The Siuslaw National Forest collaborates with four stewardship groups: Hebo, Alsea, Marys Peak, and Siuslaw Basin.

Visit Corvallis Website

<http://visitcorvallis.com>

Visit Corvallis is a private non-profit organization marketing Corvallis and Benton County as a destination and targeting conventions, meetings, sporting events, leisure travelers, tour operators and travel writers. They are funded partially by transient occupancy tax through a contract with the City of Corvallis and membership fees.

Willamette Women's Farmer Network

<http://extension.oregonstate.edu/benton/smallfarms/wwfn>

The Willamette Women's Farmer Network (WWFN) is a community of women from the central and southern Willamette Valley of Oregon who are actively engaged in farm and ranch activities. Together they further their knowledge of farm and ranch related issues both in the market place and in agricultural practices. They work together to enhance their economic self-sufficiency through shared experience, resources, and visions of how farm work will impact themselves and their community. They provide each member a safe, supportive environment and opportunity to learn safety and lawful practices regarding farming/ranching that promotes responsibility, profitability and conservation of the land.

Local Events

Benton County Fair

www.bentoncountyfair.net

The Benton County Fair takes place mid-summer at the Benton County Fairgrounds. The Fair offers 4-H exhibits, rides, a rodeo, concerts and other entertainment and fair food!

Bounty of Benton County

<http://bountyofbentoncounty.com>

The Bounty of Benton County is a self-guided tour of different places and experiences in rural Benton County. Bounty tourists visit wineries, distilleries, local food producers, restaurants, and natural areas! Purchase of a Bounty Passport includes complimentary items at each location.

BSWCD Annual Native Plant Sale

www.bentonswcd.org/programs/plant-sale

Each February BSWCD distributes native plant seedlings at low cost to encourage the use of native vegetation for erosion control, windbreaks, landscaping and wildlife habitat enhancement. Orders are accepted between November and the end of January.

Corvallis Fall Festival

<http://corvallisfallfestival.org>

Corvallis Fall Festival is a not for profit event with the mission to help sustain local arts and crafts while serving, supporting and showcasing the Corvallis community.

Corvallis-Albany Farmers Markets

www.locallygrown.org

The Corvallis-Albany Farmers' Markets are outdoor farmers' markets with a strong emphasis on farm-direct marketing of agricultural products in a six-county area.



Bouquets at the Corvallis Farmers' Market. ⁴

daVinci Days

www.davincidays.org

da Vinci Days is Oregon's premier arts and science festival. It is organized by da Vinci Days Inc., a non-profit organization founded in 1988.

Natural Areas Celebration Week

<http://sustainablecorvallis.org/action-teams/natural-areas/natural-areas-celebration-week>

This is a week-long springtime celebration of the incredible natural resources in our community. Enjoy a hike, walk, workshop, or lecture! Every event is family-friendly, free and open to the public, so come and spend some time exploring the natural world around us...

Philomath Frolic & Rodeo

www.philomathrodeo.org

This community event, which was first held in 1953, is always on the second full weekend in July. The Frolic Arena, built in 1983, meets the standards and is sanctioned by the Northwest Professional Rodeo Association.

Red White and Blues Festival

www.downtowncorvallis.org/experience/calendar.php?eventid=34

Bring your family and friends to the Downtown Corvallis Riverfront on First Street between Van Buren and Monroe Avenue for this fun-filled, family festival featuring live music throughout, a delightful array of food vendors, colorful crafts booths, kids activities, and Oregon wines and microbrews. Stay for the spectacular Corvallis Jaycees fireworks display after dusk on the 4th!

Spring Garden Festival

<http://madisonavenuetaskforce.org/springgardenfest.html>

Each year, this festival features dozens of vendors and information booths offering gardening products, advice and inspiration that will help you limber up your green thumb.

Contact List

Fire Districts, EMS Services

Adair Rural Fire & Rescue
(541) 745-7212

Albany Fire Department
(541) 917-7700

Alsea Rural Fire Protection District
(541) 487-8701

Blodgett/Summit Rural Fire Protection District
(541) 453-4841

Corvallis Fire Department
(541) 766-6961

Hoskins/Kings Valley Rural Fire Protection
(541) 929-2356

Monroe Rural Fire Protection District
(541) 847-5170

Philomath Fire & Rescue
(541) 929-3002

Oregon Dept of Forestry, West OR District
(541) 929-3266

Siuslaw National Forest:
(541) 750-7000

Benton County Government

Assessment
(541) 766-6855

Building Division
(541) 766-6819

Animal Control
(541) 766-6789

Dog Licenses
(541) 766-6831

Public Works/Road Maintenance
(541) 766-6821

Health
(541) 766-6835

Planning
(541) 766-6819

Sheriff
(541) 766-6858

Federal Agencies

Bureau of Land Management, Salem District
(503) 375-5646

Farm Service Agency
(541) 967-5925

Natural Resources Conservation Service
(541) 967-5925

US Fish & Wildlife, Pacific Region
(503) 231-6120

USDA Wildlife Services
1 (866) 4USDAWS

US Forestry Service
(541) 750-7000

Oregon State University Extension Office

Benton County
(541) 766-6750

Oregon State Agencies

Department of Agriculture
(503) 986-4550

Department of Environmental Quality
(503) 229-5696

Department of Fish & Wildlife
(541) 757-4186

Department of Forestry
(541) 929-3266

Department of Land Conservation
and Development
(503) 373-0050

ODA: Natural Resource Division
(503) 986-4700

Water Resources Department
(503) 986-0900

Oregon Watershed Enhancement Board
(503) 986-0178



Marys Peak, located in Benton County, is the tallest mountain in the Coast Range. ²⁵

Handbook Credits

Handbook Project Coordinator

Heath Keirstead, Youth Education & Invasives Program Coordinator

Benton SWCD Authors

Heath Keirstead, Youth Education & Invasives Program Coordinator

Donna Schmitz, Resource Conservationist

Teresa Matteson, Soil Conservationist

Rural Living Handbooks

We relied heavily on, and in many cases borrowed directly from, the guides produced by these SWCDs: Polk, Marion, Linn, Hood River, Deschutes, and Jackson.

Formatting and Layout

Laura Peckyno, The Imaginaurium, imaginaurium.com

Rural Development Planning: Protect Your Health and the Environment

www.co.benton.or.us/health/environmental_health/documents/rural_development_planning.pdf

Oregon Explorer

oregonexplorer.info

The Health of Benton County: Community Health Assessment

www.co.benton.or.us/health/public_health/documents/community_health_assessment.pdf

Text Edits and Content Contributors

Kristin Anderson, Associate Planner, Benton County Community Development

Chris Bentley, Senior Planner, Benton County Community Development

Holly Crosson, District Manager, Benton SWCD

Crystal Durbecq, Willamette Mainstem Coordinator & Plant Specialist, Benton SWCD

Marvin Gilmour, Farmer & BSWCD Director, Zone 2

Betty Malone, Sunrise Tree Farm

Pat Malone, Sunrise Tree Farm & BSWCD Director, Zone 1

Anne Marie Moss, Communications Director, Oregon Farm Bureau

Emily Phillips, Recycling Coordinator, Republic Services

Michael Powers, Water Quality Lead Policy Specialist, Oregon Department of Agriculture

Tom Snyder, District Conservationist, Natural Resources Conservation Service

Laurie Starha, Engineering/Survey Program Manager, Benton County Public Works

Mike Totey, District Forester, Oregon Department of Forestry

Waiver of Liability

This handbook is an attempt to offer accurate and complete information as of the date of the publication. Licenses and/or permits may be required for surveying, engineering, real estate, pesticide application, and other land-use practices; always check with your local city/county/state authorities to determine license and permitting requirements. Due to constantly changing laws and regulations, this handbook does not relieve any responsibility of the users to know and comply with the most current laws and regulations.

Photography Credits

Thanks to the many photographers and GIS specialists whose works beautify this guide. Each number is referenced in the caption of the corresponding photographer's image.

- 1 Chris Bentley
- 2 Nanna Borchardt, Sitka Conservation Society
- 3 Eric Coombs, Oregon Department of Agriculture
- 4 Holly Crosson, Benton SWCD
- 5 Joseph M. DiTomaso, UC Davis
- 6 Crystal Durbecq, Benton SWCD
- 7 Liz Graham, Benton SWCD
- 8 Heath Keirstead, Benton SWCD
- 9 Katie Isacksen
- 10 Rick Johnson, Thurston County
- 11 Alain Jotterand, Wikimedia Commons
- 12 Jeff Locke
- 13 Leslie J, Mehrhoff, University of Connecticut
- 14 Teresa Matteson, Benton SWCD
- 15 James H. Miller, USDA Forest Service
- 16 Andrew Napier
- 17 Natural Resources Conservation Service
- 18 Oregon Small Woodlands Association
- 19 OSU Extension Service, Benton County
- 20 Laura Peckyno, The Imaginaurium
- 21 Emily Phillips, Republic Services
- 22 Paul Rentz
- 23 Doug Sackinger, Benton County
- 24 Jan Samanek, State Phytosanitary Administration
- 25 Donna Schmitz, Benton SWCD
- 26 Richard Schmitz
- 27 Michael Shephard, USDA Forest Service
- 28 Linda Wilson, University of Idaho
- 29 Beth Young, Beth Young Garden Design

Equal Opportunity Statement

The Benton Soil & Water Conservation District is an equal opportunity employer, providing services to the public without regard to race, religion, color, sex, sexual orientation, gender identity, national origin, mental or physical disability, marital status, age, or other protected status or activity in accordance with applicable law.

Benton County Rural Living Handbook



Sunset from Fitton Green Natural Area. ²⁶