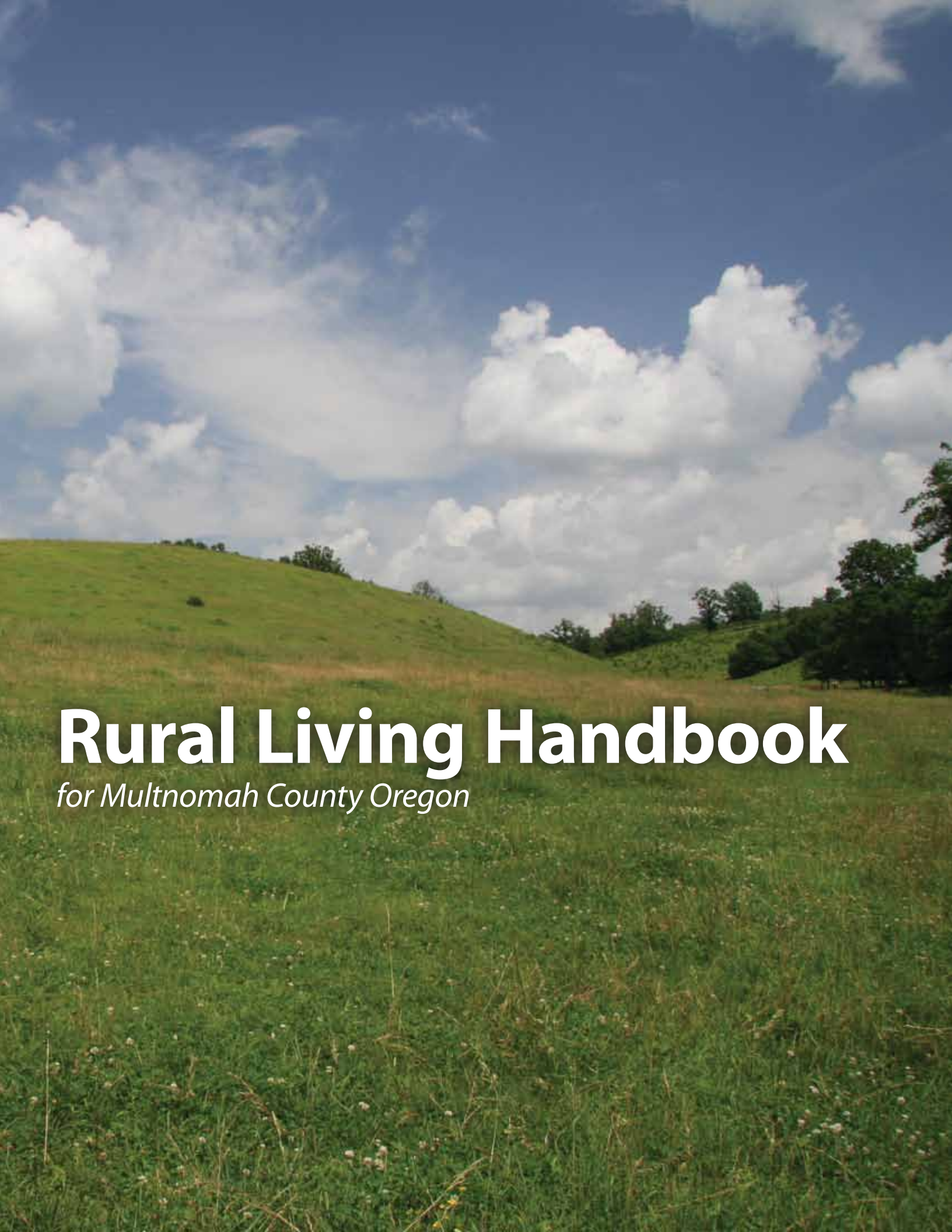


A photograph of a rural landscape featuring rolling green hills under a bright blue sky filled with large, white, fluffy clouds. The foreground is a lush green field with some small white flowers. The hills in the background are covered in green grass and have some trees scattered along their ridges.

Rural Living Handbook

for Multnomah County Oregon

RESOURCE DIRECTORY

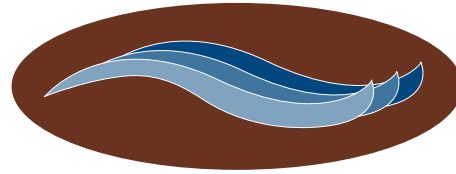
Your local **Soil and Water Conservation Districts** provide assistance with all of the topics covered in this handbook. We can also help you acquire grants and financial aid for conservation projects. All of our services are provided free of charge. Give us a call today!



East Multnomah SWCD

Serving Multnomah County residents east of the
Willamette River
503-222-SOIL (7645) • info@emswcd.org
<http://www.emswcd.org>

WEST MULTNOMAH



SOIL & WATER CONSERVATION DISTRICT

West Multnomah SWCD

Serving Multnomah County residents west of the
Willamette River
503-238-4775 • info@wmswcd.org
<http://www.wmswcd.org>

Natural Resources Conservation Service is a federal agency that helps agricultural landowners with soil and water conservation projects. For landowners who want to participate in federal cost-share programs, staff provide technical advice on irrigation, pasture management, riparian restoration, wetland management, and other conservation practices.

Local field office: 503-326-3941 • <http://www.or.nrcs.usda.gov>

Oregon State University Extension Service provides research-based information in the areas of livestock, crops, horticulture, irrigation, hay, pasture management, soil fertility and small farms, forestry, natural resources, home gardens, nutrition, and 4-H youth development.

<http://extension.oregonstate.edu>

They also provide useful publications, many of which are referenced in this handbook.

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

Oregon Department of Agriculture oversees food safety, protection of natural resources, and marketing of agricultural products. Staff implement the Agricultural Water Quality Management program, issue permits, and help producers comply with confined animal feeding requirements.

<http://oregon.gov/ODA>

Oregon Department of Fish & Wildlife biologists can help enhance fish and wildlife habitat on your property. They also advise you on dealing with wildlife pests. Their cost-share programs can benefit you and the wildlife habitat you want to enhance.

<http://www.dfw.state.or.us>

Oregon Department of Forestry's Stewardship Foresters provide on-the ground assistance to forest landowners. They also oversee cost-share dollars for forestry projects on private land. Invite a Stewardship Forester out to your property for a walkthrough.

<http://oregon.gov/ODF>

Multnomah County is responsible for many items that impact rural landowners including roads, zoning, libraries, elections, land use planning, emergency management, law enforcement, and animal services.

<http://web.multco.us>

East and West Multnomah Soil & Water Conservation Districts prohibit discrimination in all their programs and activities on the basis of race, color, national origin, age, disability, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisals, or because all or part of an individual's income is derived from any public assistance program. EMSWCD and WMSWCD are equal opportunity providers and employers.

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Rural Living Handbook For Multnomah County

INTRODUCTION

This handbook is designed to introduce current and prospective landowners to life in rural Multnomah County. The issues to be considered in owning rural land are varied, and newcomers are often surprised by the complexity of managing rural property. Use this handbook as a resource as you manage your land. It contains information about agencies and organizations that can help clarify the regulations and decisions that come with rural life. Whether your goals are for recreational enjoyment or to make use of your land for a myriad of agricultural activities, this handbook can be the first stop to find answers to the many questions or concerns you might have. The topics covered will help you learn more about managing your land and the natural resources of rural Multnomah County.

Your local Soil and Water Conservation District plays an important role in the conservation and use of our natural resources. Every county has a Conservation District, and in Multnomah County we have two. If you live on the west side of the Willamette River in Multnomah County or on Sauvie Island, you live in the West Multnomah Soil and Water Conservation District. If you live east of the Willamette you are in the East Multnomah Soil and Water Conservation District. Both Districts work entirely on a voluntary, non-regulatory basis and are not involved with enforcement of environmental laws. Instead we use a cooperative, non-regulatory approach to voluntary natural resource conservation. All of our work is geared toward keeping water clean, conserving water, and keeping soil healthy.

Your Conservation District works with landowners of all types – nursery and produce growers, livestock operators, hobby farmers, or simply residents with rural acreage. We provide technical assistance to help you manage livestock, pastures, weeds, manure, nutrients, forests, streams, wetlands, wildlife, or other issues with which you need assistance. Our free services including workshops, technical assistance, and site visits can help you implement your goals on your property. We trust you will find this handbook helpful and informative.

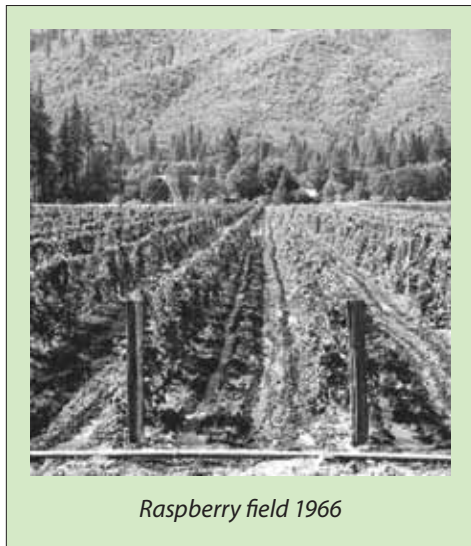
Multnomah County History & Facts

Multnomah County was created on December 22, 1854. It was the thirteenth county created in the Oregon Territory. The county was named after the Multnomah Indians who were part of the Chinookan tribe that lived on the eastern tip of what is now Sauvie Island. The Multnomah County Commissioners met for the first time on January 17, 1855.

Multnomah County is the smallest county in Oregon, with only 465 square miles. It is bounded by Columbia County and the Columbia River on the north, Washington County on the west, Clackamas County on the south, and Hood River County on the east. Multnomah County is very diverse with Portland in the west and the Columbia Gorge in the east.¹

¹ Oregon State Archives

The dawn of the automobile age saw the construction of the spectacular Columbia River Highway running east from Troutdale in Multnomah County. The highway, built between 1913 and 1922, blended engineering and art with a vivid appreciation for the magnificent Columbia River Gorge landscape. Engineer Sam Lancaster applied lessons from some of the great European highways but drew his biggest inspiration from the idyllic surroundings. His goal was to build a modern transportation route that would take full advantage of every natural aspect, scenic feature, waterfall, viewpoint, and panorama. Contemporaries described the results of his work as a “poem in stone” and called the highway the “king of roads.” It was designated a national historic landmark in 2000.²



The first farm in Multnomah County is believed to have been a nursery of young fruit trees on the east bank of the Willamette River. In the mid 1800s, this nursery supplied a great deal of the orchard stock to early pioneers in Oregon.³

Multnomah County has the fifth largest gross sales in Oregon for nursery and greenhouse crops at \$42 million in 2008 from 165 operations on 5000 acres. This includes container, ball and burlap, bare root, and greenhouse operations. Other commercial crops include cane berries, blueberries, strawberries, vegetables, eggs, forage, grains, and cattle. The majority of farms are small in size, with an average size of 51 acres.⁴

Weather conditions in the Multnomah County are typically mild with cool, wet winters and warm, dry summers. Temperatures are mild throughout the year, ranging from 34°F-80°F. The predominant winter precipitation is in the form of rain. The mean annual precipitation ranges from 37-50 inches and increases with elevation.

Is Rural Living for You?

Living a rural lifestyle is a wonderful experience and will give you ample opportunity to engage in a host of activities not generally available to our city cousins. If you have a desire to raise some sheep, ride horses, or plant an orchard, you will have that chance. While a rural lifestyle is definitely not for everyone, it has a certain appeal for many and may be a rewarding experience. Sometimes during the quest for a rural lifestyle the focus becomes blurred toward the idyllic view of country life. There is more involved than the scenic picture of rolling farmland.

If you are a newcomer to rural living you may be surprised to find:

- You don't have access to the irrigation water that runs across your own land.
- You lose a pet or livestock to a predator.
- You are responsible for a fire that starts on your land and spreads to other properties.
- The deer, voles, and gophers eat everything you just planted.
- You wake at 5 a.m. to the sound of the tractor on the neighboring nursery.
- You don't have enough time or energy to mow fields, maintain fences, spray weeds, feed livestock, deal with muddy facilities, doctor sick animals, vaccinate animals, etc.
- Your neighbor sprays his nursery in the middle of the night to avoid winds during the daylight hours.
- You spend more time and money driving to town than you ever expected.
- Your domestic or agricultural water source has dried up.
- You must spend time learning about and maintaining your well, pump, septic system, irrigation system, etc.
- You discover that your property's access road is not publicly maintained and is your responsibility.
- Minerals or pollutants have entered your well.
- You learn that the forested land next to yours will be logged.

²National Scenic Byways Program | Oregon State Archives Exhibit

³ USDA/Soil Conservation Service. Soil Survey of Multnomah County. 1976.

⁴ 2009 Oregon Agripedia and 2007 Census of Agriculture

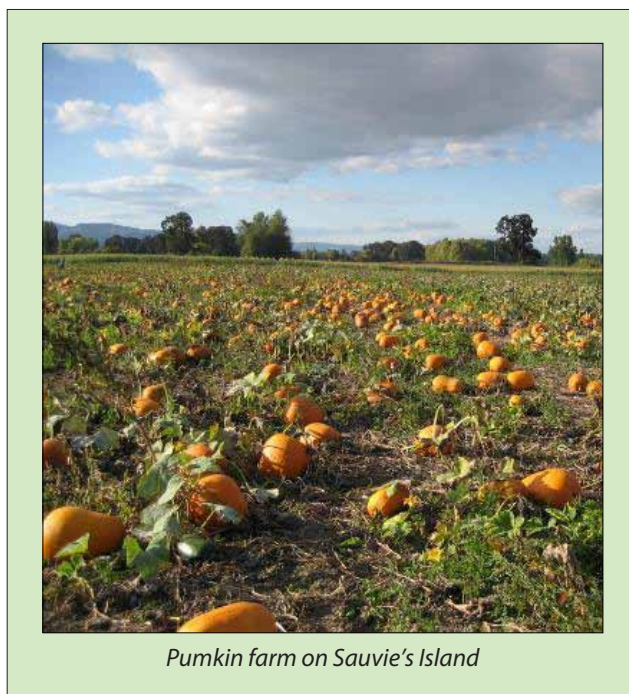
- There is no garbage service where you live.
- You discover that there are laws regulating what you can do with your land.

Buying Rural Property

Living in a rural area can be a satisfying experience. Whether you raise crops and livestock or just enjoy the open space, this section offers some tips to help first-time, rural-property buyers or those new to Oregon with their acquisition plans. It is important to have reasonable expectations of rural living. If you have not lived in the country before, you may consider renting before investing in a piece of land.

Land Values

Land values fluctuate based on local and national market conditions. The presence of irrigation water can greatly influence the value of land. Work with a real estate agent who specializes in rural properties. He or she should be familiar with land-use restrictions, be aware of water problems, and know where to get answers to your questions. It is in your best interest that the agent is the buyer's, not the seller's, agent. 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.



Pumpkin farm on Sauvie's Island

Emergency Services

Law enforcement and residential fire protection services are different in rural areas. The County Sheriff's Office provides rural law enforcement, and rural fire districts provide residential fire protection to properties within their district boundaries. Before buying, find out what services are provided at your property.

Reliable Water

Unlike city property with water and sewage connections, you will need to know if there is a reliable water source for home use, livestock water, and farm irrigation. Some rural areas are served by a domestic water district. If the property has a well, it should be professionally tested for purity and adequate flow. If there is no well, you may make the sale of the property contingent on successfully drilling a well. It may be less expensive to pay for a dry well than to buy the property and find out that there is inadequate water. It is also important to fully understand irrigation water rights that may apply to the property and the method of irrigation. A domestic well can serve only half an acre of lawn and garden. For information concerning irrigation water rights, contact the Oregon Water Resources Department.

Septic System

If there is a septic system, it should be professionally tested to assure that it works properly. If there is no septic system, percolation tests should be professionally done before you buy the property to assure that a new septic system will be approved for installation and will work. For more information, contact the Multnomah County Land Use Planning at (503) 988-3043.

Easements and Access

Be sure to check and understand vehicular access and easements that pertain to the property. Utility and access easements may allow others some legal use of your property. Not all rural property in Multnomah County has been recently surveyed, which means fences and driveways that appear to be on a parcel of land may not be. If you find that the driveway isn't on the property, you may want sale closure dependent on securing an easement from the legal owner.

Land Maintenance

Is your new country property a size that you can reasonably manage yourself? Do you have and know how to safely operate the equipment necessary to maintain it?

Neighboring Land Use

Understand the current use of the neighboring properties. If your neighbor farms their property, you can expect noise from farm animals or equipment at any hour. The forest next door may be logged someday. Over time, land use rules change and more homes may be built on nearby land. Talk to your potential neighbors about their plans for the future.

Communications

Access to the internet, cell phone coverage, and TV reception vary.

Building

Buying a vacant parcel requires a bit more homework. You need to be certain that the parcel was created legally and that access and utilities are available. The parcel must be approved for a septic system. You must also understand the land use laws that pertain to the property. Is the use you are proposing allowed?

Power

Power hook-ups can be expensive in rural areas. The ideal home site may require a costly power run. If you are on a tight budget, check the cost of hooking up to power prior to making an offer on the property. Also, remember to include the telephone lines. Some families have chosen to generate their own power.

Before you buy make sure you know the answers to these questions:

- Is it a legal parcel?
- What is the zoning of the property?
- Is it in the National Scenic Area?
- Are there any easements on the parcel?
- Have the property lines been surveyed?
- Can I use the property as intended?
- Have all new buildings, additions, remodels, and/or alterations of structures been permitted by the County Building Department? Check to be sure.
- Is any part of the property within the 100 year flood plain?

Understanding Rural Living: Be a Good Neighbor

Problems arise when people don't understand what is happening and the reasons why. Avoid potential conflict by understanding some basic principles:

- Get to know your neighbors and make an effort to understand more about their operation. With communication, many problems can be avoided.
- Ask permission before entering private property. If you are granted permission to travel down private roads, be sure to leave gates as they are found (closed or opened). Pay attention to "No Trespassing/Private Drive" signs.
- Realize that people who live in rural areas prize their privacy and their space.
- Recognize that being good neighbors is a two way street.
- Respect your neighbors' endeavors, including their right to farm.
- Realize that fences may belong to one or the other neighbor, or may be shared. Clarify fence ownership with neighbors before altering them.
- Control your pets and livestock to ensure that they do not harass or harm your neighbors' animals or property. Alert neighbors if their livestock is on your property.



Control your pets to ensure that they do not harass or harm your neighbors' animals

- Prevent noxious weeds from moving from your property to your neighbors' land by wind, water, or other means. See the "Weed Management" chapter for more information.
- Realize that your trees may impact your neighbors and vice versa. Work cooperatively when managing vegetation on property borders.

Dogs

Dogs must be under control and on your property at all times. Free roaming dogs are a threat to livestock and wildlife. Farmers have the right to protect their livestock and in some cases will destroy animals that are caught chasing, threatening, killing, or otherwise injuring livestock. If your dog is responsible for the injury or death of livestock, you will be held financially responsible, and your pet may be euthanized. It is also your responsibility to license and vaccinate your dog against rabies. Your pet should also have a collar and identification tags.

Fences

Fences and property lines are potential sites of conflict. Yet by working with your neighbors to maintain these areas, there is an opportunity to improve cooperation and build a relationship with neighbors. Properly maintained fences are important for the protection of livestock and wildlife, which may become entangled, injured or killed. Remember, fences do not always indicate property lines. Know where your lot lines are.

Resolving Conflict

Of course, the best approach is to avoid an issue before it arises. If something does come up, talk to your neighbor.

Try taking some of these proactive steps towards a good outcome:

- Talk directly.
- Choose an appropriate time.
- Plan ahead.
- Don't blame or name call.
- Give information.
- Actively listen.
- Talk it through.
- Work on a solution.
- Follow through.



Cane berry operation near homes

Living Next to Agriculture

Many farmers depend on their land to make a living; it is important for non-farming neighbors to have a clear understanding of an agricultural-based lifestyle.

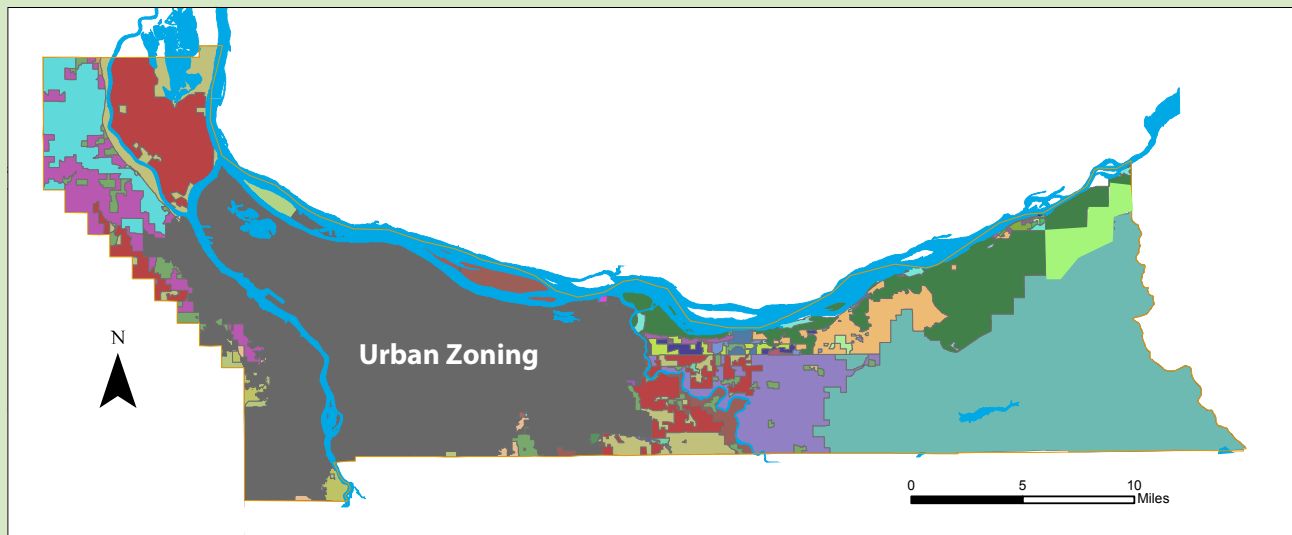
Right-to-Farm

Agricultural operations are protected by Oregon's right-to-farm law, a policy that seeks to protect the investment farmers have made in their agricultural operations. Neighbors in rural communities understand the following principles regarding agricultural lands:

- Farm operations may involve practices that result in noise, dust and odor.
- Agricultural operations are sometimes conducted outside of normal business hours.
- Pesticides are commonly used in raising crops and their use is strictly regulated by state and federal governments.
- Agricultural equipment has the right of way on public roads. Farm equipment often uses public roads to travel from field to field. Slow down, be patient, and move over to make room for this equipment.
- Farmers often work around the clock, especially during planting and harvest. Understand that some practices, such as running frost fans, applying sprays, and running machinery after dark are common farming practices.

LAND USE IN RURAL MULTNOMAH COUNTY

The state of Oregon has strict land-use laws which are implemented at the county level through local land use plans. It is important to understand the land use rules that apply to the parcel you are considering and to the properties in the vicinity. Things can change; some properties can be sub-divided into smaller parcels and forests can be logged. Not all zones allow for a new house as a matter of right. If a property doesn't have a satisfactory home or is vacant, you will want assurances that you will be allowed to build a new one at the location you desire or remodel the old one before purchasing. Building or altering a structure, ground disturbing activities and/or altering a property's configuration may require both land use and building permits in unincorporated Multnomah County. You can discuss your proposal with the County's planner to determine whether a permit is required for a project in unincorporated Multnomah County.



As you can see from the map above, our county is divided up into many land use zones. Contact the Multnomah County Land Use Planning Division for information on zoning, land-use regulations, and permits specific to your location and desired projects:

Multnomah County Land Use Planning Division
1600 S.E. 190th Avenue, Portland, OR 97233
(503) 988-3043 • land.use.planning@co.multnomah.or.us
<http://www2.co.multnomah.or.us>

**All proposed building on your property must be reviewed and approved by
Land Use Planning prior to any work.**

Land Area Classifications

Rural centers: areas with concentrated rural residential development combined with limited rural commercial and industrial development and limited public services.

Rural residential: areas not primarily suited to agriculture or forestry and where limited large lot development is not detrimental to the resource base.

Agricultural: Lands with predominantly class i-iv soils and identified by the agricultural capability classification system of the U. S. Soil Conservation Service, and where existing uses, the parcelization pattern and service levels are supportive of full-time commercial agricultural activities.

Multiple use-farm: lands with predominantly class i, ii or iii soils as identified by the agricultural capability classification system of the U. S. Soil Conservation Service, but where the existing uses, topography and parcelization pattern are not supportive of full time commercial agriculture but where small commercial and hobby farming can take place on parcels of 20 acres or less.

Commercial forest: lands with predominantly Douglas Fir cubic foot site class i, ii or iii, as identified by the woodlands groupings of the U. S. Soil Conservation Service, and where the primary activity is the raising and harvesting of timber for commercial purposes.

Multiple use-forest: land with predominantly Douglas Fir cubic foot site class i, ii or iii, as identified by the woodlands groupings of the U. S. Soil Conservation Service, but where the development influences preclude the raising and harvesting of timber as the only permitted principal use but where physical limitations exist for more intensive development.

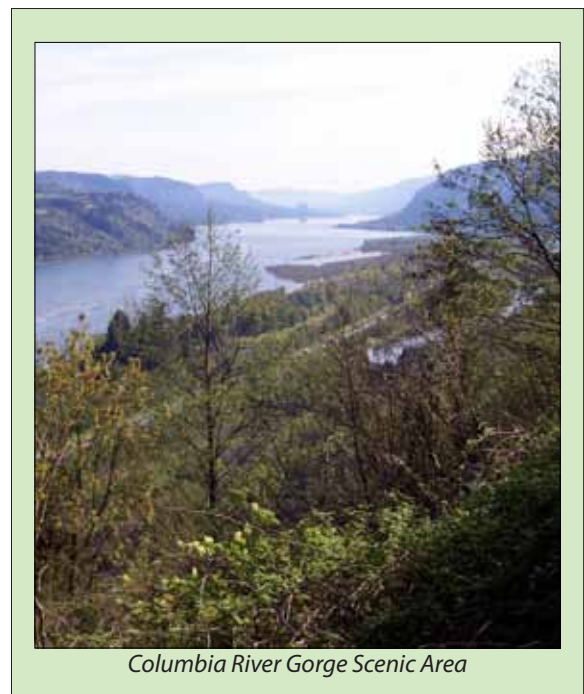
Additional protection is given to natural resources under the overlay called “Significant Environmental Concern” which includes water resources and wetlands, open space, mineral and aggregate resources, fish and wildlife habitat, scenic views and sites, historic resources, cultural areas, wild and scenic waterways, and recreation trails.

Columbia River Gorge National Scenic Area

In 1986 Congress passed the Columbia River Gorge National Scenic Area Act which designated 292,600 acres in six counties in the states of Oregon and Washington as a National Scenic Area. Approximately 33,280 acres of that area are within Multnomah County beginning at the Sandy River and extending east to the County line. Generally, areas inside the National Scenic Area include lands adjacent to the Columbia River, along the dramatic gorge cliffs and on the plateau above the gorge. Construction and new uses proposed in this plan area are carefully reviewed to evaluate potential impacts to scenic, natural, historic, and cultural resources unique to the National Scenic Area.

In order to determine the effect of the land designations on individual parcels of land or on proposals for development, the following steps can be followed¹:

1. Determine the Land Area Classification that applies to the parcel of land and read the related plan text and policies.
2. Call the County Land Development Section and ask for the zoning designation on the property by providing them with the legal description (i.e., the Section Township Range and Lot Number).
3. If the plan and zoning accord with what you want to do, check with the Land Development Section to determine if there are any other applicable regulations.
4. If the plan or zoning prohibits the proposed use, request a pre-application conference with the Land Development Section staff for assistance in determining all of the alternative courses of action.



¹Source: Multnomah County Comprehensive Framework Plan

KEEPING WATER CLEAN

The water that hits your property flows downhill and is part of a larger area, known as a watershed, which drains to a stream, river, wetland, or lake. Activities on all of the properties in a watershed affect water quantity and quality.

Table 4.1: Water quality problems and impacts in rural Multnomah County

Problems	Impacts
Warm water temperatures	Increases susceptibility to disease, reduces growth, decreases spawning success in trout and salmon
High fecal bacteria counts	Ingestion by humans can cause gastrointestinal illness. Children are especially vulnerable.
Low dissolved oxygen levels	Very low levels affect survival of fish and other aquatic life; low levels increase susceptibility to toxins
High nutrient levels	Causes low dissolved oxygen levels
Toxics	Pose a risk to human health through contact and fish consumption, to livestock through water consumption, and to the development and survival of fish and other aquatic life

Watersheds come in all shapes and sizes. All of the land in Multnomah County eventually drains to the Columbia River via the Willamette River, the Sandy River, the Tualatin River, or directly. There are hundreds of small streams and creeks in the rural areas of our county that drain to these rivers.

We all live downstream, and we all rely on water. To make sure this resource is safe and available for people, fish, and wildlife, water is a highly regulated resource. Ultimately the responsibility for improving water quality rests with everyone who lives, works, or recreates in the watershed.

Runoff can carry pollutants to streams, rivers, wetlands, ponds, and lakes. The Federal Clean

Water Act requires that surface waters meet water quality standards, and a plan to clean up the water must be developed and implemented if standards are not met. In Multnomah County most of the surface water does not meet the standards.

Different land uses have different impacts on water quality. In rural Multnomah County the land use is agriculture, forestry, residential, or some combination of these.

Water Quality and Agriculture

Having clean water is vital to water your livestock, garden, and crops. To insure that agricultural activities don't impair water quality, Oregon has an agricultural water quality program, administered by the Oregon Department of Agriculture (ODA). Many of our actions can pollute local waterways. Elevated water temperature is considered a pollutant according to the Oregon Department of Environmental Quality (ODEQ). Water temperatures can increase dramatically when the tree or shrub shade canopy is removed along waterways, threatening the fish in the system. Bacteria and nutrients from improperly managed manure, septic systems, or unrestricted livestock access to streams, as well as chemicals from pesticides, fertilizers and herbicides, can easily make their way into the stream or into groundwater.

Table 4.2: Examples of water quality problems and reductions needed to meet DEQ water quality standards in Multnomah County

Watershed	Stream Name	Issue	Change needed
Lower Willamette River	Johnson Creek	Bacteria	78% decrease
		Toxics (bound to sediment)	94% decrease in sediment deposition in the creek
		Temperature	40% increase in shade
Sandy River	Beaver Creek	Bacteria	86% decrease
		Temperature	15% increase in shade

Oregon's agricultural water quality management laws require landowners to prevent these kinds of water pollution by using good agricultural management practices. Under the direction of local advisory committees, ODA developed agricultural water quality management plans and administrative rules for our area. The plans address water quality concerns and provide recommended management practices to prevent and control pollution.

The four management areas that include parts of Multnomah County are the Lower Willamette, Sandy, Tualatin, and the North Coast. The plans and rules vary. As a landowner you should be aware that you are responsible for

water quality issues on your property. Go to ODA's website to read the plan and rules for your area: http://egov.oregon.gov/ODA/NRD/water_agplans.shtml

Be pro-active in managing your land, as voluntary compliance with the law is preferable. A staff person from East Multnomah SWCD or West Multnomah SWCD can visit your site, help you identify any water quality concerns, and provide technical assistance. Cost share may be available to help you take action. We are non-regulatory which means you can talk to us without worrying about getting in trouble.

The following agricultural water quality issues have been identified in Multnomah County:

Soil Erosion: Sediment in surface water degrades fish habitat. Soil can enter surface water through eroding banks and soil-laden runoff. You must prevent soil from eroding into streams and rivers. You also need to prevent soil from entering ditches that drain to public road ditches or to surface water.

Nutrients: Nutrients are elements like nitrogen and phosphorus found in manure and fertilizer. They help plants grow, but in excess they can cause algae blooms that remove the oxygen needed by aquatic life to survive. Excess nitrogen can also pollute drinking water in wells. You must prevent manure and fertilizers from leaving your property and entering surface water, either directly or by ditch.

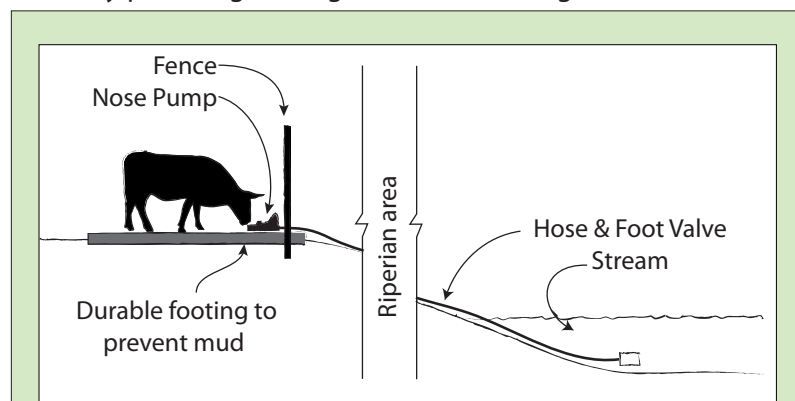
Pesticides: Improper application of pesticides can harm people, livestock, fish, and wildlife. Pesticides must be applied as indicated on the label.

Bacteria: *Escherichia coli* is a type of bacteria that is found in manure and can harm humans. You should prevent manure from entering groundwater, creeks, and irrigation ditches to protect yourself and your neighbors. Stored animal waste could leave your property via runoff from rain. Paying attention to where you put your manure pile, covering it, and keeping runoff water away from it are all easy ways to stay in compliance with this rule.

Composted manure can be applied to your fields or shared with your friends and neighbors. The Manure Connection section of our web site (<http://www.emswcd.org/manure-connection>) is designed to bring together gardeners searching for sources of local, organic fertilizer with livestock owners and managers with excess fresh and composted manure.

Streamside Vegetation: Establish, Maintain, Protect

Adequate riparian (streamside) vegetation is a vital part of good water quality. Vegetation controls water pollution by providing cooling shade, minimizing streambank erosion, and filtering sediments and nutrients from overland flows. It also slows water flowing across the land so it has an opportunity to soak into the soil rather than running off into the stream. In Multnomah County, agricultural activities must allow the establishment, growth, and maintenance of sufficient streamside vegetation to provide these functions. The best way to protect water quality is to keep the existing native vegetation. In areas that lack vegetation, control invasive plants and plant appropriate native vegetation. Plants must also be protected from grazing animals. Fencing livestock away from the riparian area is a great way to protect the plants. Provide water for livestock at a small access on the stream or better yet, at a nose pump or trough in the pasture. Horses and livestock will be healthier if they have access to clear, unpolluted water. Technical assistance, and



Nose pumps are usually a cast-iron body with a water bowl and sturdy lever arm. To drink from the bowl, animals must push the lever arm out of the way with their nose to reach the water. Movement of the lever arm causes a rubber diaphragm or piston to move back and forth, creating suction to draw water to the bowl.

Nose pumps tend to be one of the more economical ways of pumping water. Since the animals themselves supply the power for pumping, there is no need for power at the site. Nose pumps are small and light so they can easily be moved from one water source to another in rotational grazing systems.

overland flows. It also slows water flowing across the land so it has an opportunity to soak into the soil rather than running off into the stream. In Multnomah County, agricultural activities must allow the establishment, growth, and maintenance of sufficient streamside vegetation to provide these functions. The best way to protect water quality is to keep the existing native vegetation. In areas that lack vegetation, control invasive plants and plant appropriate native vegetation. Plants must also be protected from grazing animals. Fencing livestock away from the riparian area is a great way to protect the plants. Provide water for livestock at a small access on the stream or better yet, at a nose pump or trough in the pasture. Horses and livestock will be healthier if they have access to clear, unpolluted water. Technical assistance, and

potentially cost share assistance, are available from the SWCDs to help you manage riparian areas to protect water quality.

Water Quality and Forestry

Private and non-federal public lands are regulated by the Oregon Forest Practices Act. The Oregon Department of Forestry (ODF) administers the Act which guides all forest activities in the state. A Notification of Operations and permit application must be submitted to ODF before initiating a forest operation. Forest practice rules require tree retention along many streams, wetlands, and lakes. Operators must protect soils, fish and wildlife habitat, and water quality. See: <http://egov.oregon.gov/ODF/privateforests>

Residential Water Quality

The biggest potential impact to water quality from a residence is a failing septic system. Excessive use of pesticides and fertilizers can also lead to ground water pollution. Please see the 'Septic and Wells' chapter for more information.

Water for Irrigation

Under Oregon law, all water is publicly owned. In order to use the water that flows past, through, or under your property you must have a permit, or water right, from the Oregon Water Resources Department. Irrigation water rights are attached to individual parcels of land, and your land may already have a water right. Irrigation water rights should be disclosed on the sale of a property. You can contact our local Watermaster to verify a water right. See: <http://www.oregon.gov/OWRD>

If your land does not have an irrigation water right, you can apply for a permit through the Oregon Water Resources Department. A water right is not needed if you want to use well water for domestic use or to water less than ½ acre of lawn or non-commercial garden. A water right is always required before you divert any water from a stream, even if the stream crosses your property.

The water right will include the total volume that can be used or diverted. Read your water right carefully. To make the most of your water right, check out the 'Irrigation' section.

Managing Riparian Areas and Wetlands

If you have a stream, creek, river, or wetland on your property you have something special in your care. Cool, clean water in our local waterways is essential for fish and wildlife. Healthy streams benefit landowners too – in terms of aesthetics and enhanced property values.

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. Swamps, marshes, bogs, and vernal pools are different types of wetlands. These valuable areas filter pollutants, provide flood control, recharge groundwater, and provide wildlife habitat.

A riparian area is the area of land adjacent to a stream, river, or creek. It can often be identified by the water loving vegetation that lives there.

Healthy riparian areas:

- Improve water quality by filtering out sediment
- Reduce the chance of flooding and erosion
- Increase water availability for drinking and irrigation
- Provide food and shelter for fish and wildlife
- Provide shade to keep the nearby water cool in the summer
- Reduce water pollution by filtering out sediment, chemicals, and nutrients from runoff

Examples of "non-typical" streams



Blackberries choke out tree seedlings.



Without trees and shrubs to filter out pollutants, this stream is not protected.

Don't judge your waterway by its size or configuration. A "ditch" is often just a small stream. Many local creeks, springs, and wetlands were converted years ago to drainage ditches. Those that flow year-round often have fish and other aquatic life in them. Surprisingly, many seasonal creeks are also extremely important to fish, wildlife, and aquatic insect species. Remember that even fishless ditches and seasonal creeks flow into fish-bearing streams.

So what can you do to preserve good water quality?

- Keep new buildings as far away from creeks as possible. This will help reduce erosion and flooding problems.
- Keep a buffer strip of native trees and shrubs along the creek. Studies show that widths of 50 feet trap eroded soils, 100 feet filter pollutants, and 200-300 feet provide wildlife corridors.
- Do not install rock, riprap or gabions along your stream bank. While these features may give your streamside a more landscaped appearance, they can reduce the water quality in your stream and damage your downstream neighbor's property. If you have erosion issues, try planting native riparian plants.
- Preserve the natural features of the creek. Fallen logs and meanders in the stream are essential physical structures that stabilize the stream. There is no need to clean up this natural debris unless it is threatening you or your property. If so, be sure to consult ODFW or the county before going to work.
- Keep horses and livestock away from streams. They break down stream banks causing erosion, and their waste pollutes the water. Provide water for livestock at a small access on the stream or better yet, at a nose pump or trough in the pasture.
- Do not divert a spring or creek to build a pond (even for irrigation use) without a permit. Ponds raise water temperatures, promote algal growth, tend to fill with sediment, and are very expensive to maintain. Impounding water without a permit is illegal. See the section 'Ponds' in this chapter for more details.
- Avoid filling ravines or slopes above creeks with dirt, grass clippings, or other debris. Storms will carry this debris down slopes and into waterways.
- Remember, water flows downstream. How you treat the section of stream on your property affects water quality on your neighbors' property downstream, just as the actions of your neighbors upstream affect you and your property.

Technical assistance and potentially cost share assistance are available from the SWCDs to help you manage riparian areas and wetlands to protect water quality.

Threatened and Endangered Fish in Multnomah County



Chinook salmon



Coho salmon



Steelhead trout



Chum



Columbia River smelt

What is a Wetland?

Most people recognize that swamps, marshes, and bottomland forests are wetlands; however, some wetlands can be hard to spot. A wet pasture full of reeds could be a wetland. When in doubt, check it out with a wetland specialist. The USDA Natural Resources Conservation Service makes wetland determinations on farmland. Wetlands are areas that have these three conditions:

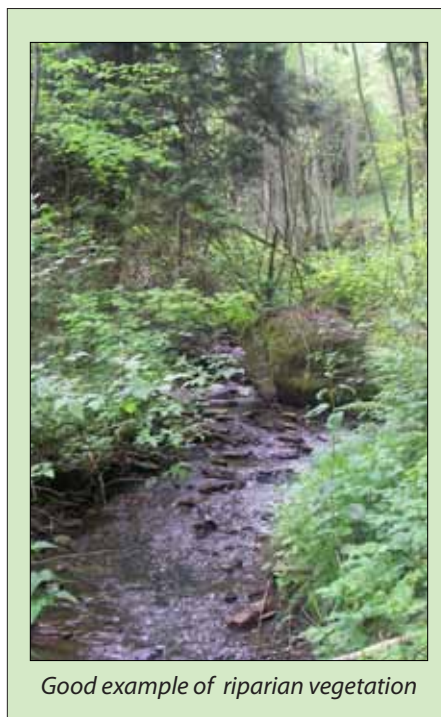
1. Water either covers or saturates the soil during the growing season. (Caution! Many wetlands do not have standing water or waterlogged soils during at least part of the growing season.)
2. Presence of plants that can grow in saturated soils for at least part of the growing season. Examples of such plants are rushes, sedges, cattails, and willows.
3. Presence of soils that have developed under waterlogged conditions. Signs of waterlogged soils include peat or muck layers, a bluish-gray or gray color, sandy layers with dark streaks, or a rotten-egg odor.

Wetlands can filter polluted runoff, reduce flood damage, protect banks from erosion, provide wildlife habitat, and enhance our quality of life. Agencies and landowners give wetlands special attention because of these values.

Flooding

If you live near a waterway, chances are you will face the natural rise and fall of the water level in that waterway. Flooding is a natural stream process. A floodplain is the land that is inundated with water during floods. This area allows flood waters to spread out and slow down, reducing their erosive force. When a stream is able to naturally expand into its floodplain, it rejuvenates the ecosystem by replenishing nutrients and recharging aquifers. However, many of the streams in Multnomah County have lost their connection to their floodplain by being confined into ditches and culverts. When this happens, property damaging flood events are often the result, and houses and buildings in the floodplain fall victim. The “perfect storm” of spring snow melt and marine storm systems moving across our region can cause water levels to rise quickly. Flow changes can also be driven by alterations in type and density of vegetation, roads, and buildings as well as in soil infiltration rates (how quickly water can seep into the ground). These changes can affect the magnitude, duration, and impact of floods.

So what does it mean? Maintaining floodplain connectivity and a healthy riparian area can drastically reduce chances of sustaining damage from a flood event. Building above the floodplain will greatly reduce flood damage to structures. Preserving wetlands can also reduce flood damage.



Good example of riparian vegetation

Working in Wetlands or Riparian Areas¹

To provide for the best possible use of water resources in this state, we must strike a balance between protection and human use. This is the purpose of Oregon’s regulations governing activities in waterways, wetlands, and their riparian areas. When planning a project in wetlands or waterways, you should check first with the Multnomah County Land Use Planning (503-988-3043) and the Department of State Lands (DSL, 503-378-3805) to determine what, if any, regulations may apply. Staff will be able to help you understand the range of permits that may be required for your water-related project. If you are unsure about the need for a permit, your regional DSL coordinator is available to provide guidance. You can also find more detailed information on types of permits on the DSL website at: <http://www.oregon.gov/DSL>.

The permitting process can take time. Remember to allow up to 120 days for DSL to process your application for a permit. In Oregon the Removal-Fill Permit administered by the DSL is the most common state requirement for projects in wetlands or waterways. It often links you to other water-related requirements that may apply to

¹ Article written in cooperation with Jess Jordan, Department of State Lands

your project. The permit is required for all projects removing and/or filling 50 cubic yards or more of material in any calendar year in a wetland or waterway or for any project in a state scenic waterway or essential salmonid habitat. This law includes installation of bank stabilizing structures. Any installation of rock, riprap, or gabions without a permit is a violation of the removal/fill law and may result in a fine from state and federal agencies.

While it may seem cumbersome to go through this step, you will be glad you did. There are both criminal and civil procedures for violations. Removing or filling without a permit or contrary to the conditions of a permit is a criminal misdemeanor punishable by a fine of up to \$2,500 and one year in jail. Violations are also subject to a civil penalty of up to \$10,000 per day of violation. DSL's resource coordinators work with landowners to find ways to correct activities that may have occurred without a permit and to resolve issues without taking legal action. But, the best plan of action is to play it safe and ask for guidance before you dig or dump.

Ponds

In some parts of the US, natural ponds are very common. Not so in Multnomah County. The majority of ponds are constructed for agricultural, aesthetic, recreational, or wildlife use. The most common natural ponds in our area are behind beaver dams. Research shows that these are best for fish & wildlife and are less of a threat to water quality. But what a beaver builds instinctively is not so easily replicated. While most ponds provide habitat for wildlife, they can impair water quality and aquatic life downstream. A poorly designed or maintained pond can be breached during a storm event, causing property damage. Ponds that are connected to a waterway can fill with sediment and are very difficult and expensive to maintain. Ponds can also be attractive to children and pets. Consider these potential liabilities and costs and decide if the benefits outweigh the risks.

Investigating, planning, permitting, and building a pond on your property will be a complex, time consuming, and expensive effort. The permit and approval process can take years to complete. For starters, you need a water right to construct a reservoir or pond of any size to store water. In addition, any fill or removal activity in stream channels (perennial or intermittent) or wetland areas will require a permit from the Department of State Lands prior to any construction.

If you want to enjoy the aesthetics of a pond without the hassles of permits, maintenance, and liability, consider putting a small water feature on your property. A fountain, birdbath, or water garden would be filled with domestic water, not water from a stream or irrigation sources. Water gardens are typically small, sometimes no larger than 3 to 4 feet in diameter and 18 to 24 inches deep. Water features are effective in drawing wildlife to your backyard. They are also a natural, relaxing, and scenic addition without the hassles of a full-size pond.

SOILS AND EROSION

Multnomah County has about fifty different kinds of soil. While most of these soils are very good for growing a variety of crops, many are subject to erosion. Knowing the characteristics of your soil is very important for learning how best to use and manage your land.

The Soil Is Alive

Every cubic inch of topsoil contains millions of creatures – mostly bacteria, fungi, and other microbes. These tiny creatures recycle dead plant matter back into nutrients that support plant growth. When the upper 8 inches of soil stays put, this living layer produces:

Nutrients

Studies show a healthy soil has up to 200 percent more nitrogen and phosphorus and 20 percent more potassium than an eroded soil.

High Plant Yields

In general, healthy, protected soils have 25 percent higher yields than severely eroded soils. Studies have shown 31 percent higher alfalfa yields and 86 percent higher barley yields on protected soils versus eroded soils.

Clean Waterways and Fish Habitat

Studies show that we can save \$1 for each ton of soil that stays on the land. With erosion control, clean gravel beds produce healthy fish populations, cities reduce filtration costs for drinking water, and harbors can lower their dredging costs.

Know Your Soil

Soils vary in texture, drainage, susceptibility to erosion, and water holding capacity. These characteristics and how they affect the potential of a soil are described in the soil survey for each county. Printed copies are available at both the West Multnomah and East Multnomah SWCD offices, but we recommend you use the online version at <http://websoilsurvey.nrcs.usda.gov>. This site allows you to create a soil map of your property and gives you access to loads of information about your soils.

A good soil test is essential to understanding the chemistry of your soil. A basic test will give you the levels of nutrients present and the acid level or pH. Many soils in Multnomah County are somewhat acidic and may need additives like lime to increase the pH level. See the 'Nutrient Management' chapter of this handbook for more information.

Dirt Alert: Signs of Erosion¹

Some soil erosion is natural, but accelerated erosion is not. A canopy of trees and shrubs, a thick leaf layer, or dense stand of grass protects soil in its natural state when raindrops fall or winds blow. We speed up erosion by removing this protective blanket when we use poor management during tillage, grazing, timber harvest, or construction. Wind and water erosion create sterile soils, fill the air with dust, plug road ditches, carry pollutants, and clog fish habitat. It pays economically and environmentally to keep soil in place.

A raindrop is like a miniature water bomb; it hits the ground at 20 miles per hour. When raindrops hit bare soil, water can splash soil up to 6 feet away, carry particles off the field, and drop sediment into drainage ways. Wind also dislodges, moves, and transports soil particles, especially in dry, windy climates.

Erosion pin

An erosion pin is a long metallic or decay resistant pin or stake with a large washer that is driven into a field to act as a stationary point of reference to measure the amount of erosion. This widely-used, inexpensive method consists of driving a pin into the soil so that the top of the pin gives a point from which changes in the soil surface level can be measured.



¹ Based on Fact Sheet number 13 in the *Tips for Small Acreages in Oregon* series.

Most Oregon soils begin to lose their ability to support plants when they erode more than 5 tons of soil per acre each year. This usually occurs through a process called sheet erosion, the gradual loss of a thin layer or “sheet” of soil. Since 10 tons of soil lost per acre equals the thickness of a dime, sheet erosion can be very hard to see!

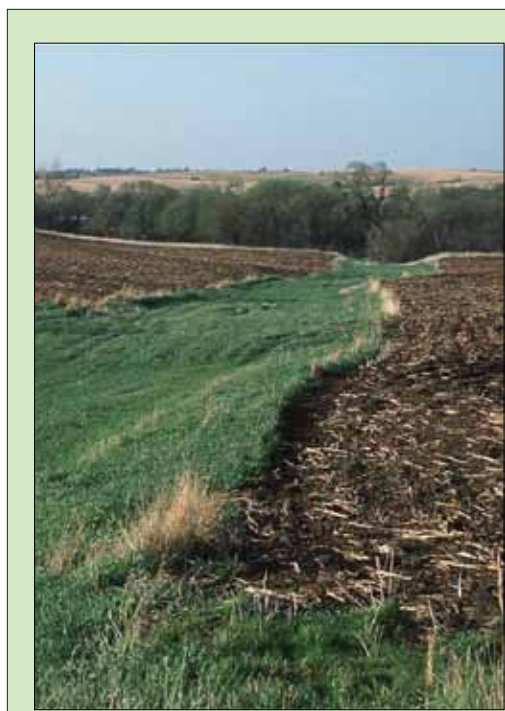
Look for these clues of sheet, gully, and streambank erosion:

- Small rills or gullies begin to show.
- Dust clouds appear.
- Soil collects along fences.
- Cloudy or muddy water flows down the field, road, or driveway.
- Pebbles and plant pieces are supported on “pedestals” of soil because the surrounding soil has been eroded away.
- Soil splashes on windows, walls, and plants.
- Sediment builds up at low spots in the field.
- Streams and rivers run cloudy after a rain.
- Streambanks crumble and fall into stream.

Erosion Control: Keeping Soil on Your Land²

One conservation practice does not fit every erosion problem. Your soils, climate, topography, and land use will require a unique set of measures. Here’s a sampling of conservation measures that can be used whether you have a large garden or a field crop. They are often more effective in combination than alone.

Buffers of trees, shrubs, and/or grass slow water speed, filter pollutants, and trap sediment. They are used to protect streams, lakes, ponds, and ditches, and to stop sediment at the lower edge of field crops. Grass filter strips are effective on slopes less than 10 percent. Contour buffer strips combine contour farming with strips of permanent grass. A ratio of cultivated to buffer strip width between 4:1 to 9:1 is best. Riparian buffers of native trees and shrubs protect streams, ditches, lakes, and ponds and may be 40 to 300 feet wide, based on site conditions and your goals.



A grassed waterway prevents erosion.

A **grassed waterway** is a flat-bottomed, wide, shallow channel with grass that slows water and prevents gullies. Farm equipment can drive over gentle side slopes.

Conservation tillage reduces the amount of tillage and leaves at least 30 percent cover from crop residue after harvest and during winter months. Soil loss is reduced by 50 percent compared to bare soil. (Stretch a 100-foot tape across the field and count how many times a stem, leaf, or root touches the 1-foot marks. The total equals the percent cover.) Contour farming runs rows “on the level” around the hill rather than up and down the slope. Crop rows form hundreds of small dams that slow water and reduce soil loss up to 50 percent compared to farming up and down a slope.

Cover crops temporarily protect the soil until the main crop is planted. Cover crops also add organic matter, hold nitrogen, and reduce weed growth. Plant cereal grains and legumes for winter cover crops. Buckwheat is a good summer cover crop.

Pasture management balances livestock numbers, forage, and water for a healthy farm income and environment. Pastures with at least 70 percent plant cover have little erosion and produce more forage. Set aside a “sacrifice area” where animals are held to protect pastures when soils are wet or plants are recovering from grazing.

² Based on Fact Sheet number 4 in the *Tips for Small Acreages* in Oregon series.

Windbreaks are tree or shrub rows that slow wind, manage snow, protect livestock, and provide wildlife habitat. Windbreaks are spaced at intervals of 5 to 20 times the height of each windbreak and perpendicular to the prevailing winds.

We can help.

We provide technical assistance to help you address erosion problems. Call us today. If you live east of the Willamette River, call 503-222-7645. If you live west of the Willamette River, call 503-238-4775.

Protecting Streambanks from Erosion

Stream bank erosion is a natural process. All river systems have erosion, but the rate of natural erosion is generally much slower and of a smaller scale. Too much erosion can pollute water supplies, cover fish habitat, and threaten property. When a stream is healthy, it balances water flow, the sediment it can carry, and its shape and energy (the same energy used in hydroelectric dams). Flowing water tends to move from side to side as seen in meandering streams. Stream meanders and plants growing along the banks reduce the erosive energy of a stream and trap sediment.

Any change in the watershed feeding the stream, in the floodplain, or in the stream itself can upset this delicate balance. The three major causes for increased streambank erosion are:

Land Use Change: When we build houses, sidewalks, and roads over soil, we reduce the amount of water that can enter the ground. Consequently, water runs off faster, at higher temperatures, and with more erosive energy into streams. Streams become “flashy,” erosive, and flood-prone. When we remove trees and vegetation next to a stream and allow livestock to trample banks, this exposes the soil. As a result, streambanks may erode more rapidly and slump into the water.

Dams: When we build dams, the dams trap sediment and change the amount of sediment and energy in the stream below. Streams must move sediment, so the stream looks for a new source - the banks!

Straightening Streams: When we straighten a winding stream, we remove the meanders that reduce the erosive power of water. In the past, streams were channeled to move water quickly through flood-prone or erosive areas. But instead of solving a problem, it only moved the problem downstream with even greater force.

Streams are very complex. In most situations, you should work with a professional to repair your streambank. The local soil and water conservation district (SWCD) and USDA Natural Resources Conservation Service (NRCS) may provide on-site advice and costshare funding to plant, fence, and repair eroding streambanks. Contact your local SWCD and NRCS office for more information. Private consulting engineers may obtain permits on your behalf, design projects, and help you meet your streambank protection goals. Check the yellow pages in the phone book for consultants.

Logjams: Wood is Good

In the past, woody debris was removed from streams to drain floodplains, float timber, and allow boat traffic. Now we recognize some logjams are “good” and should be left alone because they have the following benefits:

- Provide cover for fish
- Stabilize channels by trapping sediment
- Redirect flow to create scour pools and open gravel
- Increase groundwater levels

Remember!

Removing woody debris from streams requires approval from the Oregon Department of State Lands. Other regulations may apply.

However, woody debris can float downstream, collect, and create “bad” logjams. Hazardous logjams that are causing or could cause severe flooding or severe erosion should be removed.

When removing woody debris, consider these stream-friendly tips:

- Work from the streambank and keep equipment out of the stream
- Anchor log debris to side for bank protection and aquatic habitat
- Salvage log debris for stream restoration projects
- Leave stump and roots behind when cutting down trees that may rip out banks

A Buffer is the Best Long-term Protection

A streamside buffer of trees, shrubs, and grass protects land and water in the following ways:

- Slows floodwaters
- Blocks flood debris from entering fields
- Protects banks
- Filters overland pollutants
- Provides wildlife habitat

Buffers work! Studies show that a dense tree stand at the top of the bank can cut meander erosion in half. Consider preserving or planting trees and shrubs near your stream.

Do Not Install Used Construction Materials

Broken pavement, car bodies, asphalt slabs, concrete blocks, bricks, rotting lumber, and scrap metal are impractical to sort by type and impossible to anchor to streambanks. These materials can float downstream, leach pollutants, and lower property values with their presence. They have flat, hard surfaces that do little to dampen the erosive power of water. Dumping many of these items near or in water may be illegal and result in fines.



Multiple rows of trees and shrubs combine in a riparian buffer to protect the creek.

IRRIGATION

We are reminded of the importance of water during the hot, dry summer months in Oregon. Irrigation is necessary to satisfy crop water demand. Over-irrigation wastes water, electricity, and money. It creates runoff that carries soils, fertilizers, and pesticides into streams. It can also leach water and fertilizers below plant roots, leading to groundwater contamination.

A Water Right is a Must

To irrigate more than a half-acre of land, you need to have a water right. To find out whether your property has a water right, contact your local watermaster with the Oregon Water Resources Department at 503-722-1410 or use their web page to look it up at <http://www.wrd.state.or.us/OWRD/WR/wris.shtml>. Have your tax lot number handy.

A Water Source is a Must

Before you invest in an irrigation system, find out if you have an adequate water source. Many private wells supply 5 to 10 gallons per minute. In general, you will need 5 to 20 gallons per minute from a well or stream or 2 to 4 acre-feet of water in a farm pond per acre irrigated. Low volume systems, like drip, require less water.

Check out Your Irrigation System

Good irrigation management includes good system upkeep. This is the best way to ensure uniform, efficient applications of water. Before spring start-up, make sure that pumps, valves, sprinkler heads, and other parts are in good working condition. During the irrigation season watch the system operate, repair worn or broken components, check uniformity of application, and reposition system spacing for better coverage. Worn nozzles and leaks are the most common water wasters. Consider adding a flow meter to help you track water use and after the irrigation season winterize your system.

Your local soil and water conservation district and USDA Natural Resources Conservation Service can provide on-site advice to help you improve irrigation management. The Oregon State University Extension Service offers publications on irrigation management and crop production.

Irrigation Scheduling: Using your water wisely.

Good irrigation scheduling means applying the right amount of water at the right time. Scheduling maximizes irrigation efficiency by minimizing runoff and percolation losses. It also results in lower energy and water use, maximizes the effectiveness of fertilizers, and produces optimum crop yields.

Ideally, irrigation should be scheduled by continuously monitoring the soil moisture and starting irrigation when measurements so indicate. Because soil moisture monitoring requires equipment, this approach is not for everyone. Instead, soil moisture usually is measured infrequently, and estimated between measurements to produce an irrigation schedule.

One of the simplest forms of irrigation scheduling is called the “checkbook method”. Instead of balancing dollars in and dollars out, we are balancing water in the soil with plant water use. Evapotranspiration, or “ET” for short, accounts for the withdrawals from the soil moisture account, and irrigation or rainfall are the deposits to the account.

The description of this method was based on *Water Management: The Pacific Northwest Irrigator’s Pocket Guide* (available from your local SWCD office or online at http://www.ncat.org/pdf/PNW_Water_Mgt.pdf) and *OSU Extension Publication EM 8713, Western Oregon Irrigation Guide*. The information presented here is general and will need to be adjusted for your own situation including crop type, soil texture, flow rate, uniformity, and rooting



Saving Fish, One Fish Screen at a Time

What’s wet, deadly, and eats young fish? The answer: An unscreened irrigation diversion. Unscreened diversions suck in young fish and reduce our fish populations even further. State law requires irrigators to screen diversions that divert more than 30 cubic feet per second. In some areas of the state, the Oregon Department of Fish and Wildlife (ODFW) cost-shares fish screen installations on diversions less than 30 cubic feet per second. See <http://www.dfw.state.or.us/fish/screening/index.asp> for more information.

depth at the current crop stage. Watch carefully how your crops are responding, and make adjustments as needed.

How to Determine Scheduling

Step 1. Estimate the plant-available water of your soil.

If you begin your checkbook in the spring, you can assume your soils are at field capacity. In this case you can use the plant available water for your soil type from the county Soil Survey published by the USDA Natural Resources Conservation Service, or online at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Table 6.1 lists some average ranges of plant-available water for common soil types.

Step 2. Find the percent Management Allowable Depletion and the Effective Root Zone for the crop at its current growth stage.

The percent Management Allowable Depletion or ‘% MAD’ is the percent of water in the root zone that plants can utilize before experiencing stress or yield loss. See the table for examples for our area. The effective root zone is depth in which crops get about 70% of their water. Remember that this depth will change as the crop grows. You can monitor the depth of your crop’s roots during the growing season, or Table 6.2 will give you some average values for mature plants.

Multiply the plant available water for your soil from step one by the effective root depth from step 2 to get the available water capacity for your crop. If the crop is newly planted, reduce the effective root depth. As the crop matures increase the effective root depth.

$$\text{Plant-available Water (in/ft)} \times \text{Effective Root Zone (feet)} = \text{Available Water Capacity}$$

Now, to get the Management Allowable Depletion in inches (MAD) for your irrigation checkbook multiply the available water capacity you just calculated by the % Allowable Depletion for your crop.

$$\text{Available Water Capacity} \times \% \text{ Allowable Depletion} = \text{Management Allowable Depletion (MAD)}$$

Let’s look at an example of this calculation:

You want to irrigate mature blueberry bushes on a silt loam soil. Plant available water for a silt loam is 2 inches per foot of soil (see table 3.1). The effective root zone for blueberries is 3 feet and the %MAD is 50% (see table 6.2).

$$\text{Available Water Capacity} = 2 \text{ in/ft} \times 3 \text{ feet} = 6 \text{ inches available water in the effective root zone at field capacity}$$

$$\text{Management Allowable Depletion (MAD)} = 6 \text{ inches} \times 0.50 = 3 \text{ inches available water}$$

Enter this value as your beginning balance.

Table 6.1: Average ranges of plant-available water for common soil types

SOIL		Plant-available water in inches/ft
General Description	Texture Class	
Light, Sandy	Coarse Sand	0.7
	Fine Sand	0.9
	Sandy Loam	1.2
Medium, Loamy	Fine Sandy Loam	1.5
	Loam	1.8
	Silt Loam	2.0
Heavy, Clay	Clay Loam	2.2
	Clays; Peats/Mucks	2.4

Table 6.2: Average values of Effective Root Zone and % Allowable Depletion for mature plants

Crop	Effective Root Zone (ft)	% Allowable Depletion
Beans, dry	2.5	40
Beans, green	1.5	40
Corn, grain	3.0	50
Corn, sweet	3.0	40
Blueberries	3.0	50
Broccoli	1.5	30
Caneberries	3.0	50
Carrot	1.5	50
Cauliflower	1.5	40
Corn	2.0	50
Cucumber	2.0	50
Garlic	1.5	30
Grass seed	3.0	50
Lettuce	1.5	40
Mint	2.0	40
Nursery stock	3.5	50
Onions	1.0	30
Pasture/Turf	2.0	50
Peas	1.5	50
Potatoes	2.0	35
Small grains, spring planted	3.0	55
Spinach	1.0	25
Squash, summer	2.0	35
Squash, winter	3.0	60
Strawberry	1.0	50
Tree fruit	3.0	50

Let's use this format for the checkbook:

Date	Daily Crop Water Use (-)	Rainfall (+)	Net Irrigation(+)	Available water in inches
June 21				3.0

Step 3. Track daily crop water use and rainfall.

In the Pacific Northwest, we are fortunate to have the AgriMet system which provides this information on a daily basis in 'Crop Water Use Charts' at http://www.usbr.gov/pn/agrimet/or_charts.html.

First, look up the code for your crop under the 'identify chart crop codes' link. Next, read the information on how to use the chart under the 'More about the Charts' link. Then click on the name of the nearest weather station, look for your crop code in the left column, find the crop water use value for the day in the next column, and enter it in your checkbook. Agrimet also provides rainfall amounts at the weather stations (see <http://www.usbr.gov/pn/agrimet/wxdata.html>) or use a rain gauge to measure rainfall on your property. If less than 0.05 inches falls, ignore this amount.

Step 4. Track the available balance.

Reduce the available water in inches each day by the daily crop water use. Increase the available water by the amount of rainfall. Use the far right column to keep a running total. The Management Allowable Depletion in our example is 3 inches, which means we do not want the available water to drop by more than this amount.

Date	Daily Crop Water Use (-)	Rainfall (+)	Net Irrigation(+)	Available water in inches
June 21				3.0
June 22	0.19	0	0	

Step 5. Decide when to irrigate and how much water to apply.

As you can see from the example, 0.5 inches of water is available by July 3rd. It is time to irrigate. When you irrigate, do not apply more water than it takes to get back to your beginning balance. Overwatering will lead to deep percolation of water beyond the reach of the plant roots, or runoff which will cause soil erosion. Either way water is wasted. For our example we need to apply enough water to bring the balance back to 3 inches:

$$3 \text{ inches} - 0.5 \text{ inches} = 2.5 \text{ inches}$$

Date	Daily Crop Water Use (-)	Rainfall (+)	Net Irrigation(+)	Available water in inches
June 21		3.00		3.0
June 22	0.24	0	0	2.76
June 23	0.22	0	0	2.54
June 24	0.27	0	0	2.27
June 25	0.19	0.3	0	2.38
June 26	0.26	0	0	2.12
June 27	0.27	0	0	1.85
June 28	0.29	0	0	1.56
June 29	0.27	0	0	1.29
June 30	0.28	0	0	1.01
July 1	0.14	0.1	0	0.97
July 2	0.23	0	0	0.74
July 3	0.24	0	0	0.5

Now you need to know how much water your irrigation system applies per hour. Use a flow meter to measure the amount of water going into your irrigation system. Then determine how much is reaching the field. For this step, we will look at a sprinkler system first, then drip.

Step 6a-Sprinklers. Determine how long you need to water to apply the amount needed.

For a sprinkler system with new nozzles, you can use the rate given by the manufacturer and multiply it times the number of nozzles in the field. For an older sprinkler system, you may want to take some measurements in the field to verify the output.

Place four identical, straight-sided cans between irrigation heads in a field. Operate the sprinklers for 15 minutes. Pour water from three of the cans into the fourth. Use a ruler and measure, in inches, the depth of water collected in can four. Because each can represents 15 minutes or one-quarter hour of collection time, the total water in the fourth can represents four times 15 minutes or one hour of collection. Therefore, the water measured in can four

is the sprinkler application rate in inches per hour for that field. To convert sprinkler application rates to the run time for a field, divide the water you want to apply in inches by the application rate calculated in inches per hour.

$$\text{Sprinkler Run Time (in minutes)} = \frac{\text{Water you want to apply (inches)}}{\text{Sprinkler Application Rate (in/hr)}}$$

For example, we want to apply 2.5 inches and the amount of water in the cans totaled 2 inches after one hour.

$$\text{Sprinkler Run Time} = (2.5 \text{ inches} \div 2 \text{ in/hr}) = 1.25 \text{ hours or 1 hour and 15 minutes}$$

After you irrigate, enter the amount applied and add it into the available water.

Step 6b. Drip tape or tubing.

First, determine the application rate of the tape or tubing in inches per hour. Use the flow rate of gallons per hour per 100 feet given by the manufacturer.

$$\text{Drip Application Rate (in/hr)} = \frac{(\text{Emitter Flow Rate (gal/hr/100 feet)} \times 0.193)}{\text{Space Between Rows (in)}}$$

Second, calculate the time needed to apply the amount you need.

$$\text{Hours of Application} = \frac{\text{Amount Needed (inches)}}{\text{Application Rate (in/hr)}}$$

We need to apply 2.5 inches. Let's say we have drip tape with an emitter flow rate of 27 gallons per hour per 100 feet. Our rows are 36 inches apart.

Date	Daily Crop Water Use (-)	Rainfall (+)	Net Irrigation(+)	Available water in inches
June 21		3.00		3.0
June 22	0.24	0	0	2.76
June 23	0.22	0	0	2.54
June 24	0.27	0	0	2.27
June 25	0.19	0.3	0	2.38
June 26	0.21	0	0	2.17
June 27	0.27	0	0	1.9
June 28	0.29	0	0	1.61
June 29	0.27	0	0	1.34
June 30	0.28	0	0	1.06
July 1	0.14	0.1	0	1.02
July 2	0.23	0	0	0.79
July 3	0.24	0	0	0.55
July 4	0.26	0	2.5	2.79

$$\text{Drip application rate} = (27 \text{ gal/hr/100 feet} \div 36 \text{ inches}) \times 0.193 = 0.14 \text{ inches per hour}$$

$$\text{Hours of Application} = 2.5 \text{ inches} \div 0.14 \text{ in/hr} = 18 \text{ hours}$$

An application time of 18 hours may or may not work on your farm. Consider how many other fields you have to irrigate in a week and the capacity of your water source. It is easy to adjust the checkbook method to your specific situation. Also, most drip systems are designed to keep the soil fairly moist with more frequent irrigations.

Need help?

Contact your SWCD for assistance with irrigation scheduling.

Using our example, let's say the preferred application time is 8 hours. With the 0.14 inches per hour application rate, we would apply 1.12 inches in 8 hours. In our checkbook, we would use this amount as the beginning balance for the maximum allowed depletion. In our example, we approached this amount on June 26th.

DRAINAGE

You know the saying “everything flows downhill”? Well in a way that saying summarizes drainage law in Oregon. The description below is from the State of Oregon’s web site. It is included here because we regularly get questions about this issue from rural landowners. This information is not legal advice and is not a substitute for legal counsel.

Excerpt from Oregon.gov

(http://www.oregon.gov/ODOT/HWY/ENGSERVICES/docs/2003e/Rev_E_chapter10.pdf?ga=t)

Oregon drainage law, which originates from common law or court-made law, has developed without legislative action, and it is embodied in the decisions of the courts. Therefore, there are no Oregon Revised Statutes to cite pertaining to Oregon drainage law.

Oregon has adopted the civil law doctrine of drainage. Under this doctrine, adjoining landowners are entitled to have the normal course of natural drainage maintained. The lower owner must accept water that naturally comes to his land from above, but he is entitled not to have the normal drainage changed or substantially increased. The lower landowner may not obstruct the runoff from the upper land if the upper landowner is properly discharging the water.

For a landowner to drain water onto lands of another in the State of Oregon, one of two conditions must be satisfied initially:

- 1. the lands must contain a natural drainage course; or,*
- 2. the landowner must have acquired the right of drainage supported by consideration (i.e., a purchased drainage easement).*

In addition, because Oregon has adopted the civil law doctrine of drainage, the following three basic elements must be followed:

- 1. A landowner may not divert water onto adjoining land that would not otherwise have flowed there. “Divert water” includes but is not necessarily limited to:*
 - a. water diverted from one drainage area to another; and*
 - b. water collected and discharged which normally would infiltrate into the ground, pond, and/or evaporate.*
- 2. The upper landowner may not change the place where the water flows onto the lower owner’s land. (Most of the diversions not in compliance with this element result from grading and paving work and/or improvements to water collection systems.)*
- 3. The upper landowner may not accumulate a large quantity of water, then release it, greatly accelerating the flow onto the lower owner’s land. This does not mean that the upper landowner cannot accelerate the flow of water at all; experience has found the drainage to be improper only when the acceleration and concentration of water were substantially increased.*

Drainage Districts

The Sauvie Island Drainage District is the only drainage district in rural Multnomah County. They maintain the levee system to protect the island from floods and other high water events; maintain a series of ditches and pumps for adequate drainage and irrigation needs; coordinate with landowners and other agencies for water usage, bank stability, and other issues; and prepare for and coordinate emergency response efforts in flood situations in cooperation with other agencies and the community.

Contact information: Tim Couch @ 503-621-3397 email: tim@sidrainage.org web: <http://www.sidrainage.org>

WILDLIFE¹

One of the benefits of living in the country is having an abundance of wildlife. While most wildlife do not pose a threat, some can become a nuisance. This section discusses attracting wildlife and how to avoid nuisance wildlife problems.

Wildlife Habitat = Food + Water + Cover

If your land offers these three components, most likely you will attract some wildlife. Food requirements will vary by species, from seeds and berries for birds to grasses and shrubs preferred by deer and elk. Water on or near your property will increase the variety of wildlife you will attract. Cover is also needed for hiding from predators, nesting, and shelter.

By growing a diversity of native vegetation and maintaining a water source you will provide the necessary elements of good habitat. The type of plants you use to provide food and cover will determine the type of wildlife species that are attracted to your property.

What you may see as an untidy brush pile or fallen tree can be wonderful habitat for backyard wildlife. Dead trees provide homes to many species of birds, mammals, reptiles, and amphibians. Brush piles and border vegetation (hedges, windbreaks, etc.) can also provide needed shelter in managed landscapes. Consider leaving snags, brush piles, peripheral vegetation, and other woody material on your property unless they pose a safety hazard.

Nuisance Wildlife

Wildlife of all sizes are common in Multnomah County including black bear, cougar, bobcat, coyote, elk, deer, beavers, raccoons, weasels, gophers, squirrels, and skunks - to name just a few. It is important to keep in mind that your property may be part of their territory. While most predators avoid humans, their natural instinct is to kill easy prey, which can include livestock and pets. Other wildlife may simply enjoy grazing in your garden or snatching your chicken eggs. Precautions can be taken to avoid conflict.

Just as you can attract wildlife by providing food, water, and shelter, you can deter wildlife by not providing these essentials. The most common nuisance animals reported in the county are raccoons and skunks. Both are attracted to residences by the lure of an easy meal such as pet foods and compost piles. A simple solution is to not leave pet food outdoors and locate your compost pile away from your home. To ensure your home remains pest free, seal all openings that could allow wildlife to move in.

Livestock

While larger livestock are rarely attacked, smaller animals are more vulnerable. All animals need shelter from the elements with smaller animals needing protection at night when most predators are active. A sturdy enclosure is a good investment to protect

A Few Common Multnomah Species



Baby raccons are called kits.



Coyote scouring a field for small mammals



Female Anna's hummingbird feeding



Beaver dam on Latourell creek

¹ This article was written in cooperation with: Jeremy Thompson, Oregon Department of Fish & Wildlife and Elizabeth Daniel, OSU Extension Service

your animals. Keep in mind that if you have fowl to protect, skunks, weasels, and other small predators can enter through very small openings.

Dealing with Pests

While deer and elk are beautiful to watch, they are also attracted to gardens. You may wake up to find your prize roses were browsed by hungry deer, or that everything you planted in your garden has disappeared. Netting can be draped over plants as a deterrent, but you can also select landscaping varieties that deer do not prefer. A tall fence around a vegetable garden is recommended.

For more tips on how to deal with nuisance animals and avoid wildlife conflicts call your local Oregon Department of Fish and Wildlife office or visit the Living with Wildlife section of their webpage at http://www.dfw.state.or.us/wildlife/living_with.

FIRE PREVENTION

Fire has been a natural occurrence in forests throughout history. According to the US Forest Service, four out of five wildfires are caused by people. Wildfires can start during dry summer months from natural causes such as lightning strikes and can also be started by human causes such as motor vehicles or escaped campfires. Although you can't eliminate every threat of fire, you can take steps to create a fire resistant home and landscape.

If your home is on a forested property, fire resistant building materials are the best protection against fire. Studies show that the portion of a home most vulnerable to wildfire is the roof.

- Roof your home with nonflammable roofing materials. Use a simple hip or straight gable roof design when building in a wooded area.
- Cover attic and foundation vents with 1/8th inch screening to prevent embers from entering vents
- Keep your roof, gutters, and deck free of debris during the dry season.
- Store fire wood and lumber at least 30 feet away from your home.
- Non-combustible exterior wall materials such as stucco, cement board, or masonry can lower fire risk.
- Choose fire resistant materials for deck construction. Create fire barriers by wrapping decks that are higher than 24 inches from the ground with nonflammable siding.



Photo compliments of wildlandfire.com

The plants in the landscape near your home can also add fuel to the fire, literally. Plants with resinous, oily, waxy, or aromatic foliage contain compounds that can increase the intensity of a fire. Examples include sage and juniper. Plant selection, placement, spacing, and maintenance are crucial to creating a fire resistant landscape.

Locate groupings of plants so that at their expected mature size there is at least 10 feet of clear space between plants and from structures. This will prevent fire from spreading across planted areas. Prune back tree branches within 10 feet of walls and roofs. Trim limbs of coniferous trees that are within 30 feet of structures so that none of the limbs are closer than 6 feet from the ground. This reduces the chances that a ground fire can spread into the canopies of your trees. Maintain plants so that they are free of deadwood and litter. Remove plants that are diseased or infested. Dispose of debris away from structures and natural wooded areas.

Avoid using bark mulch near structures. Rake ground covers such as bark mulch, wood chips, compost, and tree litter away from flammable structural components of your home. Even though ground covers generally only smolder, homes can be damaged by a creeping fire which can ignite structural components.

Remove invasive, nuisance plants, and prohibited plants from your landscape because they can be highly flammable and can serve as "ladder" fuels. This includes European hawthorn, Himalayan Armenian blackberry, Scot's broom, English holly and English ivy. If you do not water the lawn through the summer season, or if seasonal water shortages call for a temporary end to irrigation, let your lawn turn brown and then cut your grass as low to the ground as possible.

Fire resistant plants do not readily ignite from a flame or other ignition sources. These plants can be damaged or even killed by fire, however, their foliage and stems do not significantly contribute to the fuel, and therefore, don't add to a wildfire's intensity. Most deciduous trees and shrubs are fire resistant; however, both native and ornamental plants can be highly flammable. Select native plant species that are naturally fire resistant. These plants require little maintenance and provide a relatively low volume of total vegetative fuel load.

Characteristics of Fire-resistant Plants

Little seasonal accumulation of dead wood

Open, loose branching habit

Non-resinous if woody

Leaves are moist and supple.

Sap is water-like and does not have a strong odor

Fire-resistant Native Plants

Shrubs:



Vine maple, *Acer circinatum*

Rocky mountain maple, *Acer glabrum*



Serviceberry, *Amelanchier alnifolia*



Kinnikinnick, *Arctostaphylos uva-ursi*



Red osier dogwood, *Cornus stolonifera*



Beaked hazelnut, *Corylus cornuta* var. *californica*

Oregon wintergreen, *Gaultheria ovatifolia*



Salal, *Gaultheria shallon*



Oceanspray, *Holodiscus discolor*



Black twinberry, *Lonicera involucrata*



Oregon grape, *Mahonia aquifolium*



Indian-plum, *Oemleria cerasiformis*

Oregon boxwood, *Paxistima myrtifolia*



Mock orange, *Philadelphus lewisii*



Pacific ninebark, *Physocarpus capitatus*



Pacific rhododendron, *Rhododendron macrophyllum*

Western azalea, *Rhododendron occidentale*



Red flowering currant, *Ribes sanguineum*



Nootka rose and baldhip rose, *Rosa nutkana* and *Rosa gymnocarpa* (illustrated)



Blue elderberry, *Sambucus nigra*



Douglas spirea, *Spiraea douglasii*



Huckleberries, *Vaccinium membranaceum*, *V. ovalifolium*, *V. ovatum*, *V. parvifolium* (illustrated)



Red elderberry, *Sambucus racemosa*



Snowberry, *Symphoricarpos albus*

Highbush cranberry, *Viburnum edule*

Trees:

Conifers and other large trees that are next to the house should be pruned to a height of 15–20 feet above the ground, or to just above the lower roof line, to help prevent fire from reaching the house or tree crowns.



Big leaf maple, *Acer macrophyllum*



Oregon ash, *Fraxinus latifolia*



Chokecherry, *Prunus virginiana*



Red alder, *Alnus rubra*



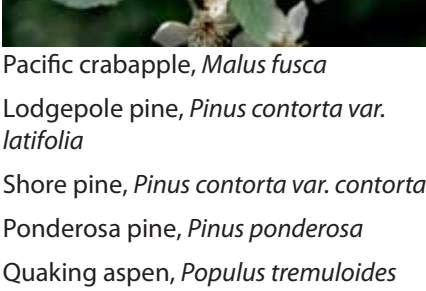
Western larch, *Larix occidentalis*



Oregon oak, *Quercus garryana*



Paper birch, *Betula papyrifera*



Pacific crabapple, *Malus fusca*



Water birch, *Betula occidentalis*

Lodgepole pine, *Pinus contorta* var. *latifolia*

Shore pine, *Pinus contorta* var. *contorta*

Ponderosa pine, *Pinus ponderosa*

Quaking aspen, *Populus tremuloides*

Bitter cherry, *Prunus marginata*



Cascara, *Rhamnus purshiana*

Willows, *Salix lucida*, *S. scouleriana*, *S. sitchensis*

Perennials

These are just a few examples of the many native perennials that are useful in a fire-resistant landscape.



Maidenhair fern, *Adiantum pedatum*



Oregon iris, *Iris tenax*



False Solomon's-seal, *Smilacina racemosa* and *S. stellata*



Western columbine, *Aquilegia formosa*



Twinflower, *Linnaea borealis*

Goldenrod, *Solidago canadensis*
Fringecup, *Tellima grandiflora*



Foam flower, *Tiarella trifoliata*

Sea pink; thrift, *Armeria maritima*
Deer fern, *Blechnum spicant*

Common camas and great camas,
Camassia quamash and *C. leichtlinii*



Bleeding heart, *Dicentra formosa*



Oxalis; wood sorrel, *Oxalis oregano*

Cascade penstemon, *Penstemon ser-rulatus*

Sword fern, *Polystichum munitum*

Wild strawberry and woodland straw-
berry, *Fragaria virginiana* and *F. vesca*



Blanket flower, *Gaillardia aristata*

Alumroot, *Heuchera micrantha* var.
micrantha



Stone crops, *Sedum* spp.

Golden eyed-grass and blue eyed-
grass, *Sisyrinchium californicum* and *S.*
idahoense



Trillium, *Trillium ovatum*

This information was compiled from:

1. *Fire Resistant Plants for Home Landscapes*, OSU extension publication PNW 590 <http://extension.oregonstate.edu/catalog/abstract.php?seriesno=PNW+590>
2. OSU's Managing Your Oregon Forest Land website, Fire section <http://forest-owner.forestry.oregonstate.edu/fire>
3. *Fire Resistant Landscape Plants for the Puget Sound Basin* <http://www.kingcounty.gov/environment/waterandland/forestry/forestfire.aspx>
4. Oregon Department of Forestry, Educational Assistance for Homeowners http://oregon.gov/ODF/FIRE/cwpp_ed.shtml
5. Washington Association of Conservation Districts, Fire Resistant Plants Brochure <http://www.wadistricts.org/documents/Fire-Resistant-Plants-Final.pdf>
6. King County Native Plant Guide <http://green.kingcounty.gov/gonative>

HORSES AND LIVESTOCK

Our rainy climate demands unique strategies for raising animals. Whether you have a couple of horses, a few head of cattle, or a commercial operation, we can help you address the most common challenges: manure management, pasture health, mud, and water quality.

Table 10.1: Average pounds of manure produced in 6 months

Type of Animal	Weight of Animal	Cubic feet manure for 6 months
Beef Cattle	900	150 cu ft
Beef Cattle	500	80 cu ft
Horse	1200	175 cu ft
Sheep	90	10 cu ft
Alpaca	130	16 cu ft

Manure, Manure, and More Manure

It just keeps piling up, literally. A 1000 pound horse or cow can produce 50 pounds of manure per day. Livestock and horse manure management is a challenge on most of the properties we visit. A few key practices can help you turn this waste product into an excellent fertilizer source.

Location, Location, Location

The manure pile should be located in a dry, flat area as far away from downspouts, ditches, streams, rivers, wetlands, ponds, and the property line as possible. Water plus manure makes a muddy mess, and can be a source of water pollution. Another important consideration is to choose a spot that is convenient for you to haul the manure to.

If you plan to use a tractor to load, move, and turn the pile be sure to put the pile in a spot that you can access with machinery year round. If you plan to use a wheelbarrow, locate the pile closer to the barn. If your current pile is in a wet, muddy, difficult to access location, tarp the pile and do not add any more manure to it. Create a new manure pile in a better spot, and let the old pile breakdown until you can spread it during the dry season.

Cover Your Pile

Covering your manure pile will help it decompose faster, keep it drier in the winter, and reduce mud. It also is a crucial step for protecting water quality in our local streams and rivers. Bacteria and nutrients from manure piles can move off your property in rain water and make their way into a stream or river. This is known as non point source pollution and is regulated by the Oregon Department of Agriculture under the Agricultural Water Quality Rules. Many streams in our area drastically exceed the state standard for bacteria. The Department of Environmental Quality estimates that in order to meet the state standard, we need an 86% reduction in the amount of bacteria in some tributaries to the Sandy River (Beaver & Kelly Creeks) and a 78% reduction for Johnson Creek (including the upper main stem west of Gresham and Kelley Creek).

A tarp is the most inexpensive way to cover your pile. Plan to weight the tarp down with tires, boards, or sand filled milk jugs to keep it in place. Stapling a board into one end of the tarp allows the tarp to be rolled back more easily when you need to add to the pile. Some landowners have found that they prefer to have two tarped piles; one that they add to and one they let compost. Others have built three sided bins to support the sides of the pile, with a tarp over the top. Since we live in a windy area, many landowners have found that the easiest way to cover the manure pile is to build a small shed. The shed should have a metal roof and three walls. A concrete floor is optional, but it will make emptying and turning the piles much easier. The shed can be divided into 2 or more bins to allow you to fill one bin and let the manure compost while you fill the others. Contact us if you need help designing a manure storage shed. We have examples of some designs to give you ideas.

How much space is enough?

The USDA Natural Resources Conservation Service has developed the following calculation to help you determine the volume of your manure pile. They recommend a storage area that is big enough to stockpile 6 months worth of manure during the wet months.

$$\text{No. of animals} \times \text{cubic feet manure for 6 months (table 10.1)} = \text{volume of manure for 6 months}$$

$$\text{Lbs/month of bedding} \times \text{cu. ft. bedding/lb (table 10.2)} \times 6 \text{ months} = \text{volume of bedding for 6 months}$$

Table 10.2: Volume of bedding

Type	Cubic feet/lb of bedding
Hay	0.24 cu ft/lb
Straw	0.35 cu ft/lb
Wood Shavings	0.11 cu ft/lb
Sawdust	0.08 cu ft/lb

$$\text{Approximate storage needs for 6 months} = \text{volume of manure} + \text{volume of bedding}$$

$$\text{Square feet of area needed for storage for 6 months} = \frac{\text{approximate storage need}}{\text{height of pile}}$$

This calculation assumes that you are collecting manure from stalls, heavy use areas, and pastures and piling it in one spot. Use the last formula to determine the square footage needed for manure storage. Pile height is usually limited by the equipment used. If you use a wheelbarrow to haul manure to the storage pile, be practical about how high you can pile it. A pile height of 3 to 4 feet is practical with a wheelbarrow; a higher height will be possible if you use a tractor with a front end loader. The pile must be at least 3 feet high to compost properly.

Take It to the Next Level

There are two approaches to manure storage: a passive system or an active composting system. The manure will naturally breakdown either way. The advantages of composting are less odor, the pile size will decrease more quickly, and the heat from the pile will kill insect eggs, larvae, weed seeds, and pathogens. Composting requires air, heat, and moisture. The best way to get air into the pile is to turn it regularly. Even if you only turn the pile once or twice a year, you will speed up the decomposition process which will help the pile shrink. Turning the pile also helps maintain the proper temperature. If you can't turn the pile because you don't have a tractor and the thought of turning the pile with a shovel is overwhelming, you can get some air into the pile by placing 4 inch perforated pipes across the pile every 2 feet of pile depth. The ends of the pipe must extend past the edge of the pile. A minimum pile size of 3 feet tall by 3 feet wide will help achieve the proper composting temperatures. Keep the pile moist, but not saturated.

These practices will help turn manure into an excellent source of nutrients and organic matter for your pastures and gardens. Manure should be applied when the weather is dry and plants are actively growing.

Pasture Health

When you grow a pasture, you are farming grass. If you understand how the grass crop responds to grazing, you'll have more success. By maintaining green plant cover, plants are better able to use energy from the sun for root and leaf growth. If plants are grazed very short, they will grow very slowly and productivity will be low. Continual grazing damages the health of the root system, allows weed growth to occur, and reduces the pasture's ability to produce new top growth. This process is known as "overgrazing" your forage plants. By avoiding overgrazing and instead adjusting to provide adequate time for plant recovery, your forage productivity will increase.

The growing point of a grass is at the base of the plant. New leaves are pushed upward from this point. Grasses are better able to withstand grazing and mowing because removal of the top growth rarely removes the growing point of the plant. In fact, regular removal of the top growth keeps the grass healthy and in the vegetative state but overgrazing removes all reserves and slows growth. This is why limiting the amount of grass removed and allowing adequate re-growth are so crucial to good pasture management.



Horses were allowed on this wet pasture for only five days.

Let it Grow

If you don't monitor carefully, livestock will graze re-growth as soon as it is available, as they prefer it to the older, less palatable plants. While the re-growth is very nutritious, there's not enough of it to support many animals, and repeated grazing of the same plants damages the roots. Meanwhile, plants that have never been grazed continue to grow and become increasingly unpalatable. Animals need to be encouraged

to eat all the forage available in a pasture and should then be removed to allow re-growth to occur. You need to match the number of animals to pasture size while limiting the time of access to the pasture and moving your animals to allow re-growth. After the animals have been moved to another pasture to allow for re-growth, mow plants that were not eaten. They will then produce new, more palatable growth. To use the lawn analogy, you wouldn't mow your lawn in a mosaic pattern, leaving half really short and letting the remaining half produce a seed head.

If, instead, you move animals frequently to fresh pasture, their forage consumption will be high, and the forage quality will also be good. Remember that you can always pen animals up in a heavy use area while waiting for grass to re-grow. Animals do not need continuous access to pasture forage; two to three hours morning and night will meet their nutritional needs. Fencing animals away from recovering grass is the only way to assure that the plants are getting a chance to re-grow.

Also, consider creating smaller pastures by adding cross fencing. Divide your pasture up into different grazing areas, each with access to a water trough, using permanent or temporary electric fences. Smaller, more manageable pastures are easier to monitor for grazing and plant re-growth heights. It is also easier to control selective grazing and may keep your horses and livestock from getting fat!

To get the most out of your pastures:

- Manage grazing to maintain a forage height of at least 4 inches. This will reduce mud, weeds, and the need to buy feed.
- Avoid grazing during wet conditions. Keep animals confined to a heavy use area (also known as a sacrifice area or winter paddock). See the next chapter or contact us for more information.
- Consider fencing off riparian areas and providing water away from creeks or streams to protect animal health and water quality. Options include pumping water to a watering trough or using a nose pump. We have a nose pump available if you want to try one out.
- Have your soil tested for nutrient levels and pH every 3 years. Use the test results to develop a nutrient management plan.

Pasture Calendar

Healthy, unstressed plants will begin to grow earlier in the spring, produce more during the summer, and continue later in the fall. Pasture management is crucial in the fall because it drives forage production in the spring. If pastures are overgrazed, the grass plants do not get a chance to produce roots and shoots for spring growth. During the winter, grass plants are dormant and will not recover well from excessive grazing.

In Spring

- Start animals grazing early on firm, well-drained pastures.
- Graze fields 1 to 2 times in the early spring and hay later.
- Put animals in when grass is 6 to 8 inches. Take them out when grass is 3 to 4 inches.
- Make hay or bring in additional animals to take advantage of increased growth in the spring.

In Summer

- To maximize forage production, use rotational grazing and only graze pastures when the grass is in the optimal grazing zone of 6 to 8 inches in height. This will encourage increased forage cover, reduce weed infestations, and produce the highest quality forage.
- Feed hay and grain to rest a cool-season pasture that is not irrigated.
- Mow to remove weed seed heads and keep grass height under 8 inches.
- Drag a chain over the pastures to spread out manure droppings to expose parasites.
- Plan now to reduce mud problems next winter.
- Spread stored manure when plants are actively growing and pastures have dried out enough that equipment will not cause damage.

- Spot-spray troublesome weeds, following label directions. Do not use herbicides near surface water (streams, wetlands, etc.) or within 100 feet of a well. The label will indicate how long to keep livestock off the pasture after application.
- As fall approaches, graze dormant or mow pastures low enough to expose the plant crown to fall rains.
- Repair fences and install cross fencing as needed.

In Fall

- Graze animals on fall growth and leave at least 4 inches of grass.
- Take animals off pastures by November 1 if soils are wet or grass is short.

In Winter

- Keep animals off of wet soils and confine them to a heavy use area or a well-drained pasture. This is one of the most important things you can do for pasture health and forage production. Deep hoof prints and a chopped up ground surface are signs that soils are too wet to pasture. Saturated soils are common from November through March.
- Use controlled grazing on well-drained pastures where grasses are actively growing. Light cattle or sheep grazing will control winter annual weeds. Graze no lower than 3 inches.
- The winter is a great time to evaluate what worked and what didn't work last season and to schedule a site visit from our staff.

Managing Mud

For most horse and livestock owners, dry weather brings welcome relief from the mud and mess of the rainy season. "At least I don't need to worry about that until next winter" is a common refrain. But without good planning and decisive action during the summer, next winter will be a frustrating rerun of last year's problems.

Mud is more than a messy inconvenience to feeding, watering, and cleaning; it harbors bacteria and fungi that cause serious skin and hoof infections and is a perfect medium for the transmission of viral and parasite infections. It also contaminates runoff water with bacteria and nutrients which can degrade water quality in our streams and rivers and put you in violation of agricultural water quality laws.

What can you do about it?

Learn about some techniques that have worked for other horse and livestock owners. You may not be able to eliminate mud, but you can reduce the amount of mud by managing rain water and manure.

Install Roof Gutters

Install roof gutters and downspouts to divert clean water from the animal yard. A 1-inch rain on a 20-foot by 50-foot roof will produce 620 gallons of water; with 40 inches of rain per year that's 25,000 gallons of water! Design gutters to handle the amount of rainfall in our area.

Protect Downspouts

Protect downspouts from animal and equipment damage by using heavy polyvinyl chloride (PVC) pipe, a hot wire, or a permanent barrier. Empty downspouts into a watering trough and direct any overflow to a vegetated area that the animals cannot access.

Control Runoff

Locate new animal yards at least 100 feet from wetlands, ditches, and streams. Divert clean water around animal areas. Close open ditches with a buried pipe to carry water past animal yards. Divert animal yard runoff away from wetlands, ditches, and streams and into a vegetated area that can filter the flow. Use grassed buffer strips around animal yards and heavy use areas. The grass will trap sediment and nutrients that may runoff from this area.

Fence Animals

Install fencing to keep animals away from wetlands, streams, and ditches. Rotate water tank areas to avoid mud and manure buildup.

Install a Firm Footing: Create a Heavy Use Area

A heavy use area made of geo-textile fabric, gravel, and sand will provide an all-weather surface for you and your animals. To reduce muddy areas and increase forage production, move animals into the heavy use area when pastures are wet in the winter or when grass is less than 4 inches high. Install heavy use areas on high ground and at least 100 feet away from wells and open water. Design of a heavy use area is specific to your site. We can help you save time and money by getting it right the first time.

Contact Us

We have broad experience with the strengths and shortcomings of the various approaches to mud, manure, and pasture issues. Together we can custom-tailor a cost-effective solution for your operation. Request a site visit or give us a call.

West of the Willamette River contact the West Multnomah Soil and Water Conservation District: 503-238-4775, <http://www.wmswcd.org>, info@wmswcd.org

East of the Willamette River, contact the East Multnomah Soil and Water Conservation District: 503-222-7645, <http://www.emswcd.org>, info@emswcd.org

NUTRIENT MANAGEMENT

Want more production from your crops, pastures, and hay fields; feed them! Want to save money on fertilizer; use nutrient management. Nutrient management uses the results of a soil test to determine how much manure and/or fertilizer should be applied for optimum growth. It also protects water quality by ensuring that excessive amounts of nutrients are not applied. Manure is high in phosphorus so if you have been applying a fertilizer that contains phosphorus in addition to applying manure, you are wasting money. Many soils in Multnomah County are somewhat acidic and may need additives like lime to increase the pH level. We commonly find that people are either not fertilizing at all or are applying excessive amounts.

Oregon State University has excellent publications to help you know how to take a soil sample, interpret soil test results, and apply the right amount of nutrients.

Soil Sampling for Small Acreages

This publication is a simple guide about how to take a soil sample. Remember, the results of the soil test will only be as good as the soil sample taken.

A List of Analytical Labs Serving Oregon

This list of labs is updated every few years. Before choosing a lab, call for current prices and procedures for mailing the sample. Labs will often have packages of several analyses for a lower cost than individual tests.

Soil Test Interpretation Guide

Soil tests results may look a little foreign! This guide will help sort out the key points.

How to - Fertilizer Calculator Intro.

Oregon State University Extension and Oregon Tilth have developed an Organic Fertilizer Calculator. This resource allows farmers to determine how much nutrient value is available in different sources of organic fertilizer

All of these and more are available under the 'Soils' section of their Small Farms web page at <http://smallfarms.oregonstate.edu/soils>.

SEPTIC SYSTEMS

Before buying undeveloped property, you should contact the local official for septic system permits. Don't overlook this essential step! The septic system site will determine the location of the house, well, and other installations. The City of Portland's Bureau of Development Services manages the commercial and residential on-site sewage disposal system certification program for Multnomah County. Please visit the City of Portland Bureau of Development Services website at <http://www.portlandonline.com/bds> or call the Portland Environmental Soils staff at 503-823-6892 or Multnomah County Land Use & Transportation Program at 503-988-3043 with any questions.

Septic Systems: Checking an Existing One

Ask when the septic tank was last pumped.

Tanks should be pumped every 1 to 5 years depending on the household and soils.

Check the age of the septic system.

Up to 50 percent of all septic systems fail within 25 years; however, some systems that were installed in the 1930's have been well maintained and are still working. Check how fast toilets and sinks drain. Toilets and sinks that drain slowly may indicate a waterlogged or clogged septic system. Such systems often need to be pumped or replaced.

Find the location of the septic tank and drainfield.

The areas should not be unusually lush, smelly, green, or wet with seeping sewage. These are signs of a failing septic system that may need to be replaced.

Septic Tanks: The Basics

Typical septic systems have three parts:

1. Septic Tank

Household wastewater is collected and stored in a concrete, metal, plastic, or fiberglass tank just outside the house. The tank stores solids that float to the top or settle to the bottom. The remaining liquid flows into the drainfield. If tanks are not pumped periodically, floating solids may overflow into the drainfield and clog pipes.

2. Drainfield

The drainfield is made up of a grid of pipes that spread the liquid over a wide area. Holes in the pipe allow liquid to leach into the soil.

3. Proper Soil

The soil is the single most important purifying step in a septic system. Soil microorganisms and plant roots need air and time to break down bacteria, viruses, and nutrients in liquid waste. Septic systems fail when soils are too wet, clogged, or compacted to absorb the liquids or too well-drained to have enough time to purify liquids.

Table 12.1: Tank Pumping Frequency in Years

Tank Size (gallons)	1	2	3	4	5	6
500	6	3	2	1	1	0.5
750	9	4	3	2	1	1
1,000	12	6	4	3	2	1.5
1,500	19	9	6	4	3	3
2,000	25	12	8	6	4	4

Note: More frequent pumping is needed if garbage disposal is used. These numbers assume full time residence.

Septic System Etiquette

Contrary to popular belief (or wishful thinking), septic systems are not maintenance-free. Half of all septic system failures are due to poor maintenance. Signs of neglect include backed-up plumbing, lush grass over the drainage field, and smelly seepage. Long before you see these signs, the system may discharge untreated sewage into the groundwater and into your well! To extend the life of your septic system. Inspect the solids in septic tank annually.

Insert a probe into the inspection port in the tank lid. If solids (usually black specks) cover the probe more than one third of the tank depth, it's time to pump. Pump the tank every 1 to 5 years. Decide the pumping frequency based on the solids inspection or use table 12.1 as a guide.

Septic System Dos and Don'ts¹

Dos

- Learn the location of your septic system. Keep a sketch of it with your maintenance records for service visits.
- Have your septic system inspected at least every 3 years and pumped periodically (generally every 3 to 5 years) by a licensed inspector/contractor.
- Keep records of repairs, pumpings, inspections, permits issued, and other system maintenance activities.
- Use water efficiently to avoid overloading the septic system and flooding the drainfield. Be sure to repair leaky faucets and toilets. Space out laundry washing. Install showerheads, faucets, and toilets that use less than 3 gallons of water per minute or per flush.
- Plant only grass over your septic system. Roots from trees or shrubs might clog and damage the drainfield.
- Check with the local regulatory agency or inspector/pumper if you have a garbage disposal unit to make sure that your septic system can handle this additional waste. A garbage disposal can add up to 25 percent to the solids in a tank.
- Use commercial bathroom cleaners and laundry detergents in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda. Normal amounts of bleach, detergent, drain cleaners, and toilet bowl deodorizers will not stop the natural breakdown of solids in the tank. Excessive amounts will.
- Avoid products that claim to clean septic systems. There's little evidence that these products work. What's more, some may be carcinogenic and move into your groundwater.

Don'ts

- Your septic system is not a trash can. Don't put dental floss, facial tissues, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, latex paint, fats, oils, pesticides, or other hazardous chemicals in your toilets or sinks.
- Don't use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.
- Don't drive or park vehicles or equipment on any part of your septic system. Doing so can compact the soil in your drain field or damage the pipes, tank or other septic system components.
- Don't allow roof water to drain on the drainfield.

Well Water

Many rural landowners in Multnomah County are on public water systems. If you have questions about your public water source, contact your provider directly or visit the Oregon Health Authority's website at <http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Pages/index.aspx>.

If you have a well and would like to know the details of it such as depth, design, yields, and construction check the well log. Well logs are available for wells drilled since 1955, but information is not available on every well. For access to the state water logs go to <http://www.wrd.state.or.us> The following State of Oregon Water Resources Department Web site will provide detailed information on the proper construction, maintenance and abandonment of water wells. <http://www.wrd.state.or.us/OWRD/PUBS/wellconguide.shtml>.

Oregon State University has an excellent web page devoted to private water sources, such as springs and wells. As they point out, you are responsible for ensuring that your well water is safe to drink. Learn how to protect your drinking water: <http://wellwater.oregonstate.edu/html/wells.htm>.

¹ Compiled from: *Tips for Small Acreage Landowners in Oregon*, Fact Sheet Number 19

Wells, Septic and a Healthy Homesite, OSU Extension Publication EC 1340

Why do septic systems fail? <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19008/ec1340.pdf>

Septic Tank Maintenance, OSU Extension Publication EC 1343 <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19009/ec1343.pdf>

A Homeowner's Guide to Septic Systems http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf

SUSTAINING YOUR FOREST

If you have recently purchased forest land, you may be challenged by the task of managing this resource. Forests represent a significant and complex component of our natural environment that constantly changes through natural and human made impacts.

Develop a Plan

A great first step for a woodland manager is to develop a stewardship plan. The best way to start is to walk your land and inventory what is there. Also begin to think about your objectives for your property. Eventually, you can complete a more formal inventory of the land and document it in your plan. You may wish to seek the help of a professional forester or the soil & water conservation district in developing your plan.

Some things to consider while developing a plan:

- The existing tree, shrub, and understory plant types
- Soil type and drainage
- Size and location of streams
- Tree health including insect or disease damage
- Existing wildlife habitat
- Wildfire risk
- Markets for lumber or other forest products

You may need to modify your goals and objectives to match your land's natural capabilities.



Manage for Your Objectives

Healthy trees, quality fish and wildlife habitat, and forest products are just a few of the objectives that woodland owners have in mind.

Woodland Health

- Invasive weeds often take up valuable space where healthy, native trees should be growing. See the 'Weeds' chapter in this booklet for more details on how to control invasive species.
- As trees grow, they may begin to crowd each other and their growth will slow down. This is a good time to remove a few trees to give the others more space.
- Insect and tree disease can damage the health of your woodland, but professionals are available to help you devise a plan to eradicate the problem.

Fish & Wildlife Habitat

- Wooded streamsidings improve water quality and cool water temperatures. They also add cover for animals that travel along stream corridors.
- Diverse forests with several different species can accommodate the needs of multiple species of wildlife.
- Dead trees, when they're not located in a dangerous area, can be wonderful habitat for woodpeckers, flying squirrels, and several other species of wildlife.

Forest Products

- A healthy forest offers more opportunity for economic return on timber and other forest products.
- Planting appropriate species on the best soils will help you grow large trees faster.
- Attend woodland owner meetings and learn more about harvesting and marketing special forest products like mushrooms, floral greens, and other goods.

The Oregon Forest Practices Act

In Oregon, there are some regulations that govern how we manage our forests and the process is administered by the Oregon Department of Forestry. These regulations are meant to protect Oregon's valuable forest re-

sources including water quality and fish and wildlife habitat. Much of the management in your forest will require you to submit a notification to ODF at least 15 days before beginning. Activities that trigger the need for notification include:

- Harvesting or salvaging trees
- Site preparation and reforestation
- Chemical application
- Clearing forest land for non-forest uses
- Road construction and improvements

You might find that you need to leave some trees near your stream or wetland after a harvest, or if you're building a road there are some best management practices that you need to follow. For all the details, see ODF's website for specific requirements and for the Notification of Operations form: <http://www.oregon.gov/ODF/privateforests/fpaNotifications.shtml>.



Sources of More Information¹

In West Multnomah County, we encourage you to work with our conservation forester to complete a stewardship plan for your woodland property. Such a plan helps you formulate your objectives and consider how you want your woodland to look in 5, 25, or 50 years.

West Multnomah SWCD, 503-238-4775, <http://www.wmswcd.org>

ODF's Forestry Assistance Program offers technical advice and administers cost-share for completing various noncommercial forest and resource management activities.

See: <http://egov.oregon.gov/ODF/privateforests>

Oregon State University Forestry Extension has useful fact sheets and online presentations. They offer many programs and training sessions, including the Master Woodland Manager program.

Go to <http://forest-owner.forestry.oregonstate.edu>

Oregon Small Woodland Association is a useful membership group.

See <http://www.oswa.org> or <http://www.portland-country-living.com/trees-woodlands.html>

¹ (Excerpted from the Oregon Department of Forestry web site, the West Multnomah SWCD web site, the Hood River County Rural Living Handbook, the Polk County Rural Living Handbook, and Fact Sheet No. 15 in the Tips for Small Acreages in Western Oregon series)

WEEDS

Invasive weeds are a problem for almost every landowner. As invasive weeds spread and dominate new areas, they displace desirable plants on our farms, in our forests, and in our yards. The negative effects of weeds can include increased erosion, reduced crop yields, increased maintenance costs, reduced plant diversity in natural areas, increased fire hazard, and less food for wildlife. In some cases, weeds can limit the use of property and reduce property values. Invasive weeds are estimated to cost billions of dollars in damage every year. Some weeds, like Himalayan blackberry, are already so out of control that it is difficult to imagine eradicating them. Others are still at levels where control is possible. Better yet, if we all keep our eyes open, we can stop new weeds from invading.

A **weed** is generally defined as a plant that is a nuisance, a hazard, or causes injury to people, animals, a desired ecosystem, or crops. **Invasive weeds** are those that spread into areas where they are not native. **Noxious weeds** have been legally designated as pests, for example by a county, state, or federal agency.

Containing the Spread

Weeds that have invaded a section of your property already can be very difficult to control. One thing to keep in mind is that you are not managing the invasive weeds. You are managing your land for your particular objectives; be it to produce crops, raise livestock, for recreation, or for timber. Since it is difficult if not impossible to control every weed, first identify and prioritize species and infestations that threaten what you want to do with your property.

For each weed, identify and map invaded and un-invaded areas. Then focus on keeping weeds out of any large blocks of un-invaded areas. Control small outlier populations first then begin to reverse the invasion by starting at the edges of the invaded area and controlling inward. In aquatic settings, begin control upstream and work your way down. Get to know the biology of the weed, the best control method, and the best timing of control. Use how it spreads to limit further spread; all roads, trails, and watercourses are potential invasive corridors. For bird-dispersed species, control large seed source populations first. Remember that you will need to survey the areas regularly to detect and control any re-growth.

- Utilize control methods that are known to work. Soil and Water Conservation District staff can help you identify the right method for your situation.
- The 'right' technique may be different for 1/10th of an acre of scattered weeds versus 5 acres dominated by weeds.
- The 'right' technique for one weed may help spread another weed.

Preventing the Next Invasion

The most efficient and inexpensive way to address weeds is to prevent new invasions. We have all learned the hard way that if we let a weed get a foot hold it will take more of our time and money to control it. A stand of healthy, desirable plants is the most effective weapon against weeds. Disturbing soil and removing or suppressing established vegetation creates opportunities for weeds. Foot traffic, wheel traffic, and cultivation

Weeds to Watch For



Pokeweed, Phytolacca americana



Spurge Laurel, Daphne laureola



Travelers Joy/Old Man's Beard, Clematis vitalba

disturb soil, while excessive mowing, grazing, or fire can suppress established vegetation. Land used for high-traffic activities requires extra efforts to manage weeds. Avoid purchasing potential weeds. If there is a particular non-native plant you are interested in, be wary if it:

- Produces large amounts of fruit and/or seeds.
- Spreads quickly by runners, underground roots, or plant fragments.
- Is part of a 'wildflower' seed mix; these often contain non-native weedy species.

REPORT IMMEDIATELY LIST

Please report any sightings of the following weeds. Most are eligible for some control assistance.

False Brome, *Brachypodium sylvaticum*

Giant Hogweed, *Heracleum mantegazzianum*

Gorse, *Ulex europaeus*

Garlic Mustard, *Alliaria petiolata**

Kudzu, *Pueraria lobata*

Orange Hawkweed, *Hieracium aurantiacum*

Pokeweed, *Phytolacca americana*

Purple Loosestrife, *Lythrum salicaria*

Spurge Laurel, *Daphne laureola*

Knotweed species, *Polygonum spp.**

Travelers Joy/Old Man's Beard, *Clematis vitalba**

*Control assistance only available in priority areas.

Be careful about introducing new weeds when you bring soil, compost, straw, or manure onto your property. Work with your neighbors to control weeds along the property lines. Take frequent walks around your property and note any plants that are spreading quickly or coming up where you've not planted them. Learn to identify weeds and desirable plants (even if you can't name them) so you will notice something unusual.

The East and West Multnomah Soil and Water Conservation Districts want to prevent new weed invasions by training people to identify and report weeds that have the greatest potential to invade this area.

Please report potential sightings of these weeds online at <http://www.oregoninvasiveshotline.org>. When a report is received in Multnomah County, the website emails us. We will contact the landowner and with their permission confirm the plant and offer control. See <http://www.emswcd.org> for descriptions and photos of these weeds.

SOIL AND WATER CONSERVATION DISTRICTS

Soil and Water Conservation Districts are units of local government that serve residents and landowners by providing conservation education, technical, and financial assistance. We are a non-regulatory conservation organization. We rely exclusively on a voluntary approach to conservation in which the landowner is always the decision-maker. We favor a collaborative, inclusive approach to problem-solving.

Oregon conservation districts are subdivisions of state government, much like school boards, but are not state agencies. A board of five to seven directors governs each district. Directors are local residents who serve voluntarily without pay and are elected by local citizens.

Opportunities for Rural Landowners in Multnomah County

Everything we do is designed to help you better manage your land, whether you own or manage a farm with livestock or horses, produce crops, need help protecting a nearby stream, or simply want to replace noxious weeds with native plants. We can offer you free technical assistance for almost any issue you have on your property that relates to soil or water. Solving these problems will improve the health of your land, forest, livestock and horses, wildlife, stream quality and landscape. Most often it also results in improved crop production and increased land value.

Rural landowners are eligible for free site visits.

Our staff specializes in agricultural conservation practices and invasive weed control. They help individual landowners, organizations, and communities assess their natural resource needs and potential impacts; provide guidance in planning and implementing solutions; and help coordinate available financial assistance. We are always ready to answer your questions.

Invasive Weeds

Invasive weeds, such as English ivy and garlic mustard, displace native plants and wildlife and can reduce land value, crop yield, and quality. SWCD staff can help you identify invasive weeds, find options for removing them, and give you advice on native plants to plant in their place.

Farms & Livestock

We can help survey your operation whether it be a small livestock operation, vegetable farm, full-size cattle operation, berry farm, or horse stable. We walk you through the process of determining your needs and provide technical advice for optimum animal health and farm productivity.

Forestry

We connect forest owners with technical and financial resources to develop either a forest stewardship plan or a harvest plan for a sustainable forest.

Outreach & Education

We sponsor educational programs on conservation issues. We hold free workshops for residents, provide speakers for a variety of community meetings, and table at events related to our mission and strategy.

Grant Opportunities

There are a variety of funding sources for conservation and watershed health projects, including district, local, state, federal, and non-profit sources. We can identify available financial sources and coordinate them to meet the needs of the local land owners and managers.

Give us a call today!

East Multnomah SWCD

Serving Multnomah County residents east of the Willamette River

503-222-SOIL (7645)

<http://www.emswcd.org>

info@emswcd.org

West Multnomah SWCD

Serving Multnomah County residents west of the Willamette River

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