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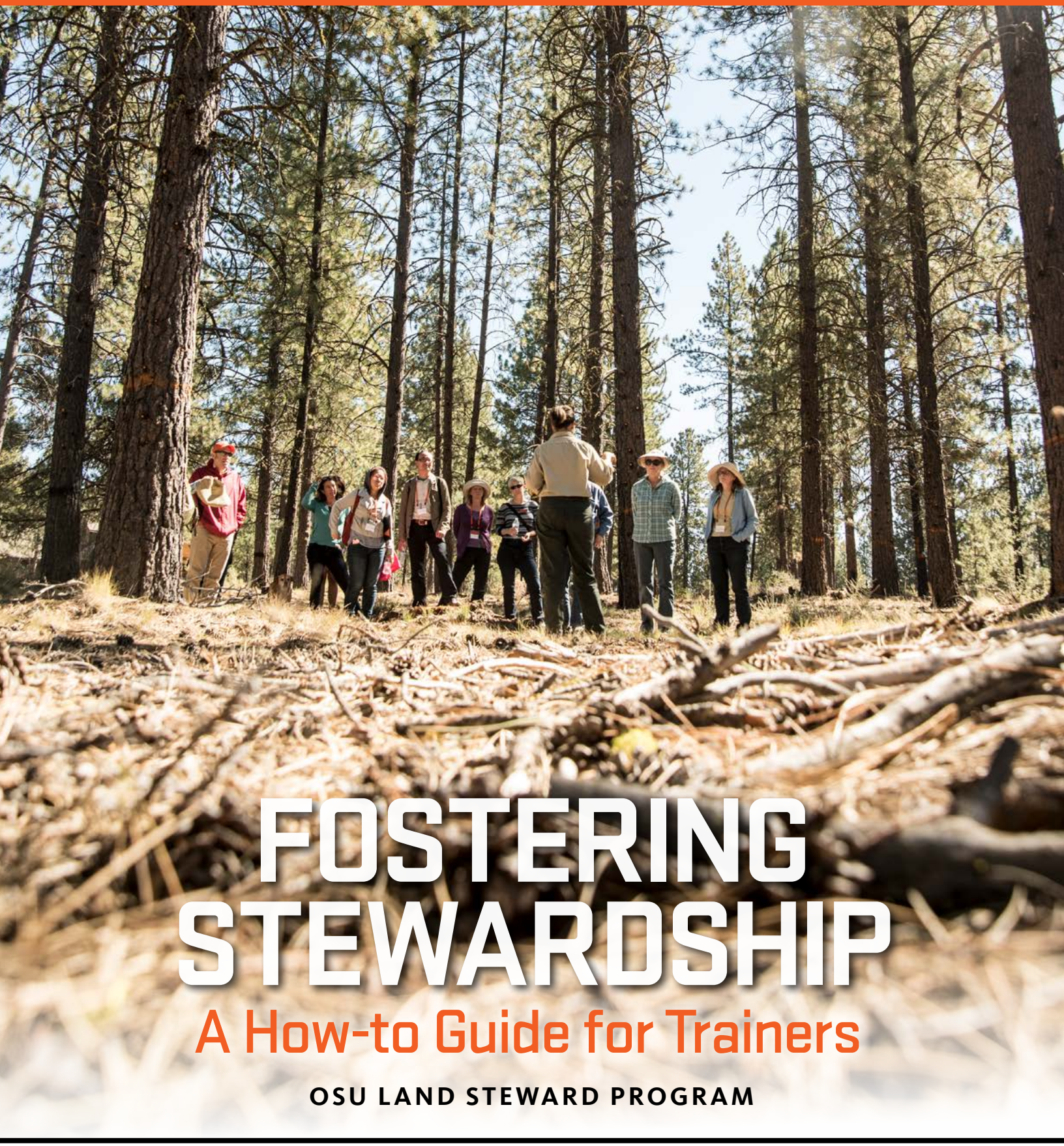

FOSTERING STEWARDSHIP

A How-to Guide for Trainers

OSU LAND STEWARD PROGRAM

Oregon State University

EM 9356
May 2021

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USDA United States Department of Agriculture National Institute of Food and Agriculture

Oregon Forest Resources Institute

WESTERN SARE Sustainable Agriculture Research & Education

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Contents

"With 20 acres and literally no experience, the Land Steward course was a lifesaver for me.
The various subject areas touched on every aspect of my farm and I learned immensely from each class and was able to apply it immediately to the farm. There is still much to be done, but I more fully understand how to go about it properly, and more importantly, where the resources are and how to contact them to assist me."

— Land Steward graduate

Part 1

Introduction

This curriculum is a tool to help natural-resource professionals provide an overview of best practices for managing rural properties. It will help educate people who own land in the wildland urban interface.

Land Steward training offers a multidisciplinary approach to land management that has great appeal to both new and experienced landowners. It combines wildland natural-resource topics (forest, fire, stream and wildlife) with more agriculturally oriented natural-resource topics (soil, pasture, water systems and rural economics). This diverse array of topics is a well-rounded introduction to many issues and concerns facing those living on rural land in many parts of the West. The training introduces basic best practices and guides participants in assessing their natural resources. It helps them create a management plan and connects them with resource experts to obtain the guidance and support they need to achieve their goals.

Audience: Who should participate in the training?

New landowners

This curriculum is well suited for those new to rural landownership. It offers a broad overview of the habitats, natural resources and issues commonly found on rural land in much of the West. It guides participants through assessing their resources, creating goals for their property and developing a management plan to achieve their goals. The program also helps them connect with local resource experts and institutional resources that can support their plans.

Experienced landowners

Experienced landowners also benefit from this systematic examination of their resources, the creation of a management plan, and a review of professional and technical resources available to landowners in their area.

Acreage size

There is no acreage specification for the program. Participants may own properties of less than an acre in size to over 1,000 acres. Some do not yet own land but are interested in rural living. Small-acreage owners and even urban residents benefit from understanding the natural-resource management practices affecting their region. Residents throughout the West are affected by issues such as wildfire, forest conditions, stream-water quality, flooding, erosion, wildlife habitat and invasive weeds.

Coordination and instruction: Who should use the curriculum?

Coordination

The Land Steward program is a versatile and effective tool for anyone who has an audience of rural landowners with a need to gain management and planning skills. It can be coordinated by anyone with a natural-resource background, such as a forester, range manager, wildlife biologist, botanist, environmental scientist, small-farms coordinator, Master Gardener coordinator, etc. The coordinator shares their own area of expertise and does not need to be an expert in every topic. Other natural–resource professionals partner in the program, providing technical assistance beyond the coordinator's personal field of experience.

Partner instructors

The coordinator can present content for each module when appropriate, but the program is designed to include partner organizations, agencies and specialists to teach appropriate modules. This serves a dual purpose: It provides content beyond the specialty of the coordinator, and it helps introduce landowners to natural-resource experts and technical or financial resources available to them through local agencies and organizations. Partner agencies and organizations may include

agencies such as state or federal forestry departments, fish and wildlife departments, the Bureau of Land Management, , the Natural Resource Conservation Service, the U.S. Department of Agriculture, local Soil and Water Conservation districts, watershed councils, the Department of Environmental Quality, county specialists, land trusts, university faculty, Extension agents, local independent professionals, consultants or experienced landowners. The partners selected will enhance the themes provided in the modules.

Experienced hosts

Experienced landowner hosts also provide education on field days. They showcase their management projects and lessons learned. Peer-to-peer learning is an effective component of adult education. To fill this role, look for landowners familiar with management planning and good land-management practices.

Sites don't need to be perfect models of management, but they should have examples of good management in the selected topic module to be shared with the class. Once you have run a Land Steward training a few times, consider including graduates of the program as site hosts.

Background

For decades, the university Extension system has been reaching out and educating rural audiences with best practices through programs such as forestry, rangeland science, small farms and others. These programs offer valuable education to landowners. However, landowners may not identify with a single category of land management, such as Master Woodland Managers. Some landowners are seasoned rural owners who view their land as a rural retreat, with little intention of deriving economic benefits from it. Many are new to rural life, fulfilling a dream of country living with little experience in land management. They have a general sense of responsibility to care for their land, and the concept of being a steward fits with their values and vision of themselves. However, many come to the program with a layperson's perspective of natural resources. Their conservation ethic may even lead to a hands-off approach with some negative consequences for the overall well-being of their natural resources.

The Land Steward Program often appeals to an audience that does not see themselves in single-topic "master" programs (Master Woodland Manager, Master Gardener, etc.). While we find that 70%–80% of the acres held by course participants are forestland or woodland, owners may not initially identify as forest or woodland "managers." Though their forest may be in need of management, they may not be drawn to a Master Woodland Manager course or identify that there is any need for action on their part. They may have horses but not realize that their pasture management may be having negative impacts on a nearby stream. Some rural owners are on land designated EFU (exclusive farm use) but may not want to actually be farmers. They may have pastures but no grazing animals or hay production, though they want to maintain the quality of the fields.

The Land Steward Program was developed to reach an audience with a desire to care for their land and give them the fundamentals of many of the resource-management issues common to rural living. The training hones their management skills, and it helps them develop goals and create a plan to achieve their vision for their land.

The program launched in 2008 in Jackson County, Oregon, as a field-based volunteer training. In 2018, an instructor-led online hybrid version of the program was launched to reach audiences in a wider geographic area and ease delivery. In 2020 the hybrid was refined to create an independent online self-paced option.

The program developed in southwest Oregon has now been delivered in many more counties throughout the state. With the online option, participants from other states across the country and even Canada have enrolled. Even for those who live in southwest Oregon, online delivery has been essential during the global pandemic.

Impacts

The volunteer field training is 11 weeks long. In the seven months following the training, participants are invited to receive an optional mentor visit based on the priority concerns they identified during the creation of their plan. They are encouraged to complete one project from their action plan and complete their volunteer hours by the graduation date, which is roughly 10 months after the training begins. In the month prior to graduation, they are invited to complete a survey on the impacts of the program.

The survey questions and results vary for each class but are consistent in trend from class to class.

Within 10 months of beginning the program, participants in the 2016–18 cohorts reported:

- They completed resource management improvement projects on 16%–31% of their acres.
- They planned resource management improvement projects on an additional 38%–55% of their acres.
- A combined beneficial impact on 62%–86% of their acres.

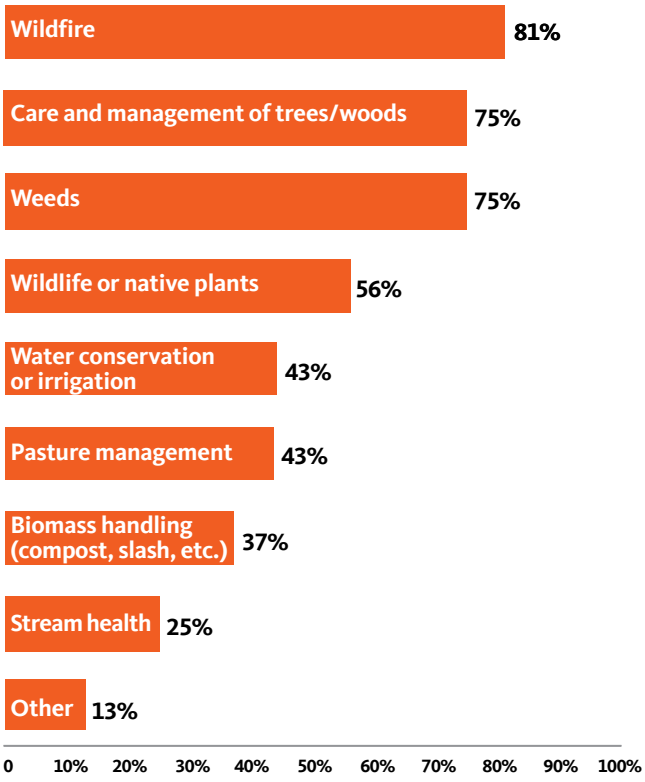
The 2018–19 cohort was the most recent class to fully complete the field program. Survey respondents represented 19 properties. Their results are shared below. (Subsequent cohorts were disrupted by the

COVID-19 pandemic or were online versions.)

100% agreed that "as a result of the Land Steward training, my ability to access the information and technical assistance I need had improved." They made 46 contacts with 16 different agencies and organizations.

They reported a total of 72 improved practices on 19 properties in response to the following question: Select the categories of any major stewardship projects you have undertaken or practices you have changed as a result of your participation in the Land Steward Program.

Stewardship projects undertaken after participating in Land Steward Program



What participants are saying

Participants describe their activities in each category:

Wildfire

- *Signed up for NRCS (Natural Resources Conservation Service), started fuels reduction, home fire safety zones including hardscaping around home, organized neighborhood emergency phone list, encouraged neighbors to sign up NRCS.*
- *Removed wall of cypress. Started Firewise community.*
- *Mowing large areas for fire protection.*

Woodland care and management

- *We have secured a $50K grant from NRCS for forest health care. Thinning and fuels reduction.*
- *Actively thinning designated areas for forest health. We also now notice a small band of white oaks that extends through part of the property, which now after the class can better determine productive sites vs. nonproductive tree sites, and areas to focus on habitat rather than forest.*
- *Ecological thinning to benefit successional growth and forest progression/thwart disease; localized site burning to mimic natural fire cycles.*

Weeds

- *Removed foxtails and blackberries and star thistle. Planted annual alfalfa and white and red clover to compete.*
- *Star thistle removal.*
- *Pulling blackberries, scotch broom.*

Wildlife

- *Removing invasives, removing barbed wire to enhance wildlife mobility, cultivation of native plants.*
- *Adding more habitat-friendly natives.*
- *Installed bee house, owl house, bat house and multiple birdhouses, planted 15 x 50-foot pollinator and native plants beds, grew native plants including native milkweeds from seed and shared starts with neighbors.*

Water conservation and irrigation management

- *Fixed runoff and created water storage areas in pasture.*
- *Reduction or gallons for irrigation*

- *We have catchment from the house and we are working on catchment from our 3,000-square-foot barn.*

Pasture management

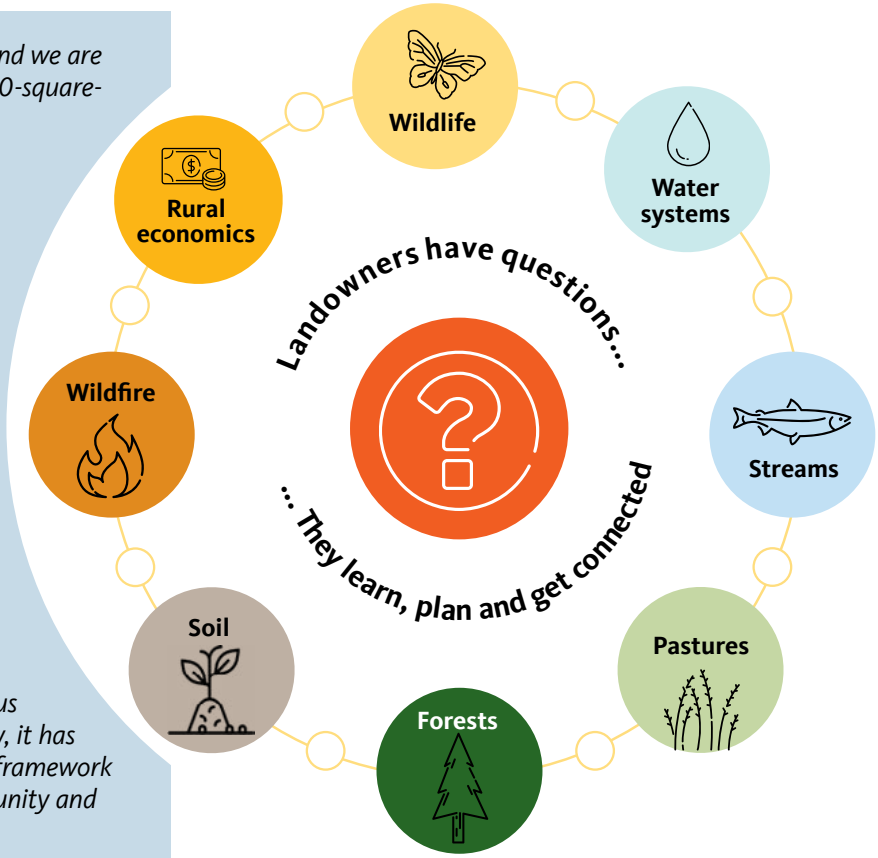
- *Seeding with appropriate forage mix, rotating grazing for llama and chickens. Reduction of gallons for irrigation.*
- *Reseeding with native grass.*
- *Improving our flood irrigation.*

Stream health

- *Tree cuttings planted; blackberry removed.*
- *Reduction or gallons for irrigation.*
- *Reforestation project.*

Personal impacts

- *The Land Steward has not only given us the tools to manage our own property, it has also given us the tools, language and framework for meeting and talking to our community and coming together to help one another.*
- *The Land Steward program was so amazing. I connected with so many resources as well as found awesome new friends and neighbors in the process. The very first meeting I felt so overwhelmed by gratitude that everyone in that room was there because we all cared about taking care of our land. We all came from different backgrounds/politics/beliefs, but we all shared the love of our land.*
- *I feel more empowered to make a sound decision for my property and being able to get resources for questions, guidance, help or services I will need. Overall I feel better equipped to manage our land responsibly for my family's future use and enjoyment.*
- *Expanded our sense of community with other landowners with stewardship goals. Made us aware of community programs and resources. Helped us build a short- and long-term plan and prioritize projects for our property; educated us on the complex aspects to consider when being a Land Steward versus "owning" property; increased our knowledge base and wet our appetite for additional learning opportunities; and promoted involvement in other community activities and volunteerism.*



Delivery options and program components

There are several options for delivering the components of the Land Steward program.

- **Nine-week instructor-led hybrid course:** The nine-week instructor-led online hybrid course can be used as a tool to help serve local landowners. This is the most accessible, and we recommend you try it first. This can be offered with three supplemental field days or live virtual classes held fully online.
- **Full Land Steward training and volunteer program:** A university Extension center could create an entire Land Steward volunteer training and program, which includes a requirement to invest a designated number of volunteer hours. This takes the most staff time and resources but is rated highest by participants. At this writing, the only such program is operated by Oregon State University Southern Oregon Research and Extension Center in Jackson County, Oregon.
- **Specific module field day:** A single module or select combination of modules could be used to develop a field day covering a few topics, such as forest health, riparian systems and wildlife habitat.
- **The resource guidelines:** These documents are the content guidance for each module of the training. They are designed as stand-alone resources on individual topics to be shared as needed with landowners.

Part 2

Program components

Nine-week instructor-led hybrid course

The hybrid was designed by natural-resource professionals and is the easiest to implement. See the "Hybrid instructor's guide," page 170, for the quick start worksheet.

Staff time estimate: 150 hours for hybrid with two seven-hour field days; 100 hours if field days are replaced with two-hour online classes.

The hybrid short course is delivered through OSU's Professional and Continuing Education system. It is composed of the following elements:

1. One in-person two-hour introductory session (or webinar).
2. Five self-paced online modules delivering best practices:
   - Management planning.
   - Woodland and forest care.
   - Wildfire preparation and the Home Ignition Zone.
   - Wildlife habitat and natural vegetation.
   - Stream and riparian management.
3. Field day or webinar: wildland natural resource focus
4. Four self-paced online modules delivering best practices:
   - Soil health.
   - Pasture management.
   - Water systems (rainwater harvest, irrigation, etc.).
   - Rural economics and enterprise.
   - Field day or webinar: agricultural resource focus.

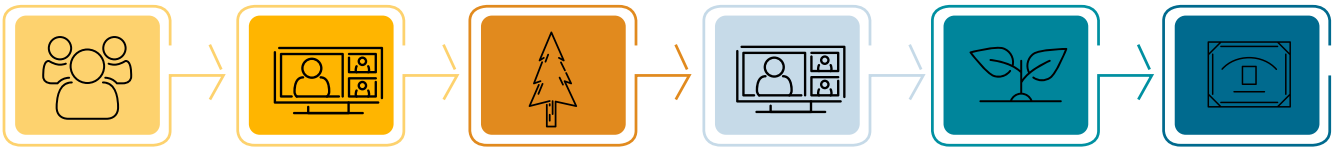
The instructor coordinates the introductory class and two field days (or webinars), which incorporate local sites, resource topic experts and experienced landowners.

Land Steward Property Management Plan

Course participants complete assessment activities for their property on each topic and use the results to create a management plan with a provided template.

There is no volunteer component to the hybrid course.

Nine-week instructor-led Land Steward hybrid course



Introductory class and stewardship planning

In person or remote

5 online modules and assessments

- Planning
- Forest
- Fire
- Wildlife
- Streams

Wildland resources field day or webinar

4 online modules and property assessments

- Soils
- Pasture
- Water systems
- Rural economics

Agricultural resources field day or webinar

Land Steward Property Management Plan **+ certificate of completion**

Full Land Steward training and volunteer program

The complete Land Steward Program is designed as a classic Extension volunteer program with training, volunteer and mentoring elements. Program participants attend a 55-hour, 11- module training program. The modules consist of five-hour field classes. Each class focuses on a different natural-resource or land-management topic. Participants complete natural assessments as a part of homework for each module and incorporate their results and goals from each lesson topic into a personal Land Steward Property Management Plan for their property. They present their plan during the last class session of the program.

When the 11-week training program is complete, participants are encouraged to schedule a mentor site visit from a team of experienced volunteer Land Steward mentors. This visit provides encouragement for progress they have made on their plan and guidance for finding solutions to management issues they may be facing.

Sometime between the start of the program and graduation approximately nine months later, participants complete their volunteer service hours, working on OSU Land Steward program activities or stewardship projects within the community.

The training, mentor and volunteer elements of the program can be structured to help build a community of Land Stewards, who help to support each other and the region with science-based natural-resource management practices. They also promote the maintenance and growth of the OSU Land Steward Program. Participants report that these relationships are among the most important and enduring benefits of the program. In Jackson County, we have developed volunteer committees that foster and sustain these relationships and support the program. The advisory council meets monthly to review the program's progress, develop policies and brainstorm new initiatives. The education committee recruits speakers to provide classes, once or twice a month, to Land Stewards and the community at large on topics related to land stewardship. The community committee creates opportunities to encourage camaraderie, including quarterly potluck dinners, monthly social hours and a monthly book club. All these groups continued to meet via Zoom during the Covid-19 pandemic.

The Land Steward Program can be implemented in its entirety as described here, or different elements could be selected according to the needs and resources of the region.

Graduation requirements

- Attendance in the 11-week, 55-hour field-based training.
- Completion of a *Land Steward Property Management Plan* for the property.
- Completion of volunteer service (20–50 hours, depending on program volunteer needs).
- Optional mentor visit to the property (see "Mentor program," page 12).
- Graduation occurs nine to 10 months after beginning the program, allowing for volunteer time and mentor visits. Graduates are awarded a Land Steward volunteer badge and certificate of completion.

Nine-month instructor-led volunteer training and program

ATTEND
11 weekly classes

COMPLETE
management plan

VISIT
from mentor (optional)

COMPLETE
volunteer service

RECEIVE
Land Steward badge and certificate

11-week field-based instructor-led training

The core training of the Land Steward program encompasses 55 hours, presented in 11 modules. The modules consist of five-hour classes that are strongly field-oriented. The modules could be used as presented here, modified to fit local conditions, rearranged to fit local timing issues or used as templates to create new locally relevant modules (see "Course administration," page xx). Field-based training modules include:

1. Program introduction, stewardship and management planning
2. Forests and woodlands
3. Wildfire preparedness
4. Wildlife habitat
5. Stream and riparian ecosystems
6. Building healthy soil
7. Dryland and irrigated pasture
8. Water systems and infrastructure
9. Economics and enterprise
10. Rules and regulations: agency open house
11. Stewardship plan presentations

Generalized field module format

Reading assignments: Before each class, participants complete reading assignments for each module topic contained in the Rural Resource Guideline series, to introduce best management practices. Additional readings and resources could be offered as desired. Often instructors have other handouts or resources to share with participants.

Resource assessment review: When the class gathers, there is a brief review of homework from the previous module (their assessment worksheets). In small groups, participants share with each other a brief summary of the results of their assessment from the previous topic.

Natural-resource expert introduction of the topic: After the homework review, a natural-resource expert briefly introduces best practices for the topic of the day, guided by the content outline and the Rural Resource Guidelines. This can be in the classroom or in the field.

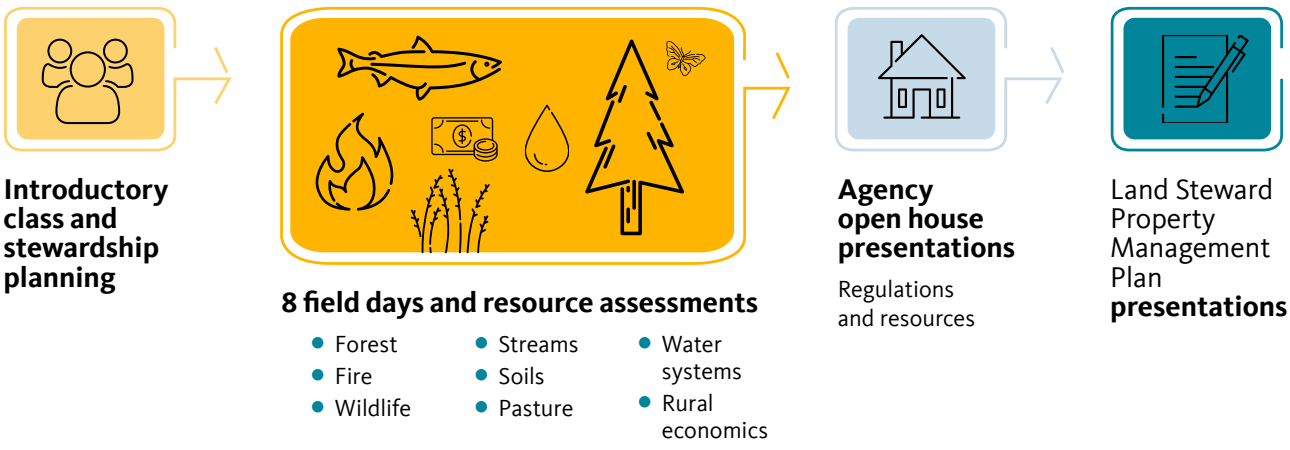
Field tour: Next, the class travels into the field and tours one or two properties that display good examples of the module theme. The landowners at the field sites share their management plans and lead the class on a tour, sharing relevant features of their property and their management challenges and successes relating to the day's theme. The natural-resource expert and coordinator help to guide the content of the tour.

Mix-and-match field days

Any module or combination of modules could be used as guidance for a stand-alone field day, rather than part of a fully implemented training.

The Land Steward Rural Resource Guidelines

The Land Steward Rural Resource Guidelines are a set of introductory documents developed by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center They are a first step to familiarize land stewards with general terminology and a guide to assess resource conditions and management techniques. The guidelines explain best management practices, techniques that help the owner to use and manage the land in a responsible manner, with consideration for their values and goals (which will vary among landowners). They provide the content outline for the natural-resource topics of the Land Steward Training and can also be used as stand-alone resources for landowner outreach and education. The series was developed for use in Jackson and



Land Steward Rural Resource Guidelines

Water Systems: Taking Care of a Precious Resource, EM 9243

Stream and Riparian Areas: Clean Water, Diverse Habitat, EM 9244

Forests and Woodlands: Protecting an Ecosystem, EM 9245

The Home Ignition Zone: Protecting Your Property from Wildfire, EM9247

Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna, EM 9250

Pastures: Stewarding a Working Landscape, EM 9303

Soil: The Dirty Secrets of a Living Landscape, EM 9304

Economics and Enterprise: Financial Considerations of Rural Life, EM 9315

From Vision to Reality: Creating a Land Steward Property Management Plan, EM 9335

Josephine counties in southern Oregon, but many of the practices will be applicable to other areas.

Structure of the Rural Resource Guidelines

Each guideline document consists of two or three components, a narrative and one or two worksheets.

- **Introduction:** This is an introductory narrative to best management practices for private landowners.
- **Worksheet 1:** Resource assessment: During the training, this worksheet is used as homework for the participants to assess the health of their resource. (Some topics only have one worksheet)
- **Worksheet 2:** Management activity assessment: During the training, this worksheet is used as homework for the participants to assess their current management practices and identify areas for improvement.

Results of the participant's assessments are entered into their Land Steward Property Management Plan each week.

Land Steward Property Management Plan

One of the most important aspects of the Land Steward training is the creation of a personalized Land Steward Property Management Plan. Creating a plan helps landowners articulate and accomplish their management goals. It familiarizes them with the language and process of planning, and it can be a resource for them in working with agency and organizational personnel. In some cases, having a plan in place can help them qualify for financial and technical resources, such as project cost-share funding or fuels-reduction programs. Over the 11-week training, participants assess their natural resources and current management, setting goals for each module topic to create their plan. During the final class meeting, participants present a brief synopsis of their plans to their fellow Land Stewards.

The Land Steward Property Management Plan (see Appendix for template) includes:

- A description of the owner's vision and property management objectives.
- A property map, typically divided into management zones.
- Results of resource assessments.
- Planned activities and a timeline.

Volunteer components of the field-based volunteer training

All versions of the course can be implemented without a volunteer component. The volunteer aspects are mentioned here in brief for context. However, this curriculum is focused on sharing the tools for the Land Steward education program and not in-depth volunteer coordination. With a full Land Steward volunteer program and dedicated faculty, there are many components that can be developed as volunteer opportunities that both serve the broader community and build a supportive peer learning community of landowners. Land Steward volunteers can help to coordinate and host monthly community education classes for the public. Volunteers can help to design and coordinate an annual conference of land-management education classes with resource experts. They can host community-building events, such as potlucks and land tours. Experienced Land Stewards can become mentors who perform mentor visits to help new Land Stewards find solutions to challenges they may be facing on their land. All of these activities have been implemented successfully in our southern Oregon Land Steward community.

Land Steward volunteer-supported program elements

Mentor program

A valuable component of the full training is the volunteer Land Steward mentor program. Program graduates and experienced landowners form a committee of volunteer Land Steward mentors. After the 11-week training, participants can schedule a mentor visit to help resolve any concerns or questions that they found as they completed their assessments. Other training participants can benefit from attending these visits, with permission of the owner. In a class of 30 participants, it is common to have 20–25 mentor visits. In the program evaluations, the mentor visits are consistently rated among the highlights of the training. This program requires considerable additional staff and volunteer time to manage. A separate mentor manual may be published in the future.

Part 3

The field-based course

Program design and module flexibility

The guide provided here for a Land Steward Program is based on the one developed and conducted through the Southern Oregon Research and Extension Center. It is intended to serve as an introduction to good management practices for most land-use types found in this region. Many of the modules will be directly applicable to other areas of the Northwestern United States. However, people in other regions may want to consider modifying modules to fit local conditions. They may use these modules as templates to create their own regionally appropriate modules for other land uses and ecological life zones, such as sagebrush steppe, high prairie or open range. The field visits also offer opportunities to localize the content.

Program structure and staffing

- The complete program is designed as a classic Extension volunteer program.
- Part-time staff members can coordinate the volunteer program. The time required will depend on the size of the volunteer community and the number and scope of volunteer components and committees. A coordinator's hours may add up to a 0.50–0.75 full-time equivalent position.
- It is possible to conduct the 11-module core training as a stand-alone nonvolunteer course, with participants concluding their involvement at the end of the 11-week course. This would require about 400–500 hours of coordination.

Photo: Stephen Ward, © Oregon State University

Instructors from partner agencies and other specialists deliver much of the content in the Land Steward Program.

Planning calendar

SIX MONTHS AHEAD; DATE:_____

☐ **Complete quick-start planning.**
- Select dates and reserve meeting room.
- Confirm needed information for registration (dates, costs).
- Communicate with PACE and Land Steward coordinator (Rachel.werling@oregonstate.edu).

☐ **Create marketing plan.**
- Adapt flyer template.
- Adapt brochure template.
- If scheduling a mailing, plan to have materials arrive in mailboxes two months to three weeks before the early-bird deadline.

☐ **Begin securing field sites and instructors.**

THREE TO FIVE MONTHS AHEAD; DATE:_____

☐ **Open registration**
☐ **Begin marketing campaign when registration is open.** Options include:
- Email lists.
- News releases.
- Post on websites.
- Share with partners.
- Distribute flyers and brochures.
- If mailing, send about two months before the class starts.

☐ **Continue securing sites and instructors.**

TWO MONTHS AHEAD; DATE:_____

☐ **Complete preliminary site visits and meetings with instructors.**
☐ **Create draft agendas and share with site hosts and instructors.**
☐ **Check Canvas updates.** PACE will help modify dates.
☐ **Review introductory PowerPoint and lesson plan,** adapting as needed.

TWO WEEKS BEFORE INTRODUCTORY CLASS

☐ **Send reminder welcome email** to registrants.

ONE TO TWO WEEKS BEFORE INTRODUCTORY CLASS

☐ **Finalize agenda and supplies** for introductory class; see agenda.

AFTER COURSE BEGINS

☐ **Each week, send a Monday reminder.** (Template in appendix.)
- Any announcements.
- What should be completed.
- What will be worked on that week.

☐ **One to two weeks before field days,** send reminder and finalized agenda to site hosts and instructors.
☐ **See "Field day lesson outline" for more on field days.**

AFTER COURSE ENDS

☐ **Distribute Qualtrics survey.** (This could be done by Rachel Werling, Land Steward coordinator. Contact her at *rachel.werling@oregonstate.edu*.)

Part 4

Topic modules and lesson plans

The lesson plans of the topic modules that follow are for delivery in the full field-based Land Steward training. The order of the modules can be changed according to local field conditions. For example, the wildfire module should be offered in outside of fire season. The modules can also be used to mix and match or deliver as a single-topic field day.

Note that the education content for each module is in the guideline documents at the end of each lesson plan. The lesson plan introduction is brief and not meant to be an exhaustive discussion of the content of the topic. Be sure to look at the Guideline document for the content. There is a suggested content guide for review by instructors in the lesson plan, but for the full content see the Guideline. The suggested content is also meant to be an outline open to alterations and additions by any presenter, not a definitive list of topics.

When delivering the online instructor-led hybrid course (with in-person classes or virtual delivery), participants will have access to the rural resource guidelines found in each module, or they will have encountered the content in the online lesson material.

See Appendix XX for the hybrid instructor's guide.

Coordinator preparation

- Recruit natural-resource expert (see natural-resource expert, page 17)
- Select landowners and field sites (see field sites, page 16)
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and structure of the session.
- Send reminder emails about three to seven days prior to site visits (see samples in appendices). Include class participants, the natural-resource expert and landowners.
- Print directions for carpooling to field sites.

General delivery guidelines for full field-based training

Module delivery overview

Each module follows a similar delivery pattern.

- The participants meet in the classroom for a brief review of homework (usually assessments) from the previous module.
- The natural-resource topic expert provides a brief review of best practices for management of the day's topic. This should be informed by their expertise and the content outline below (distilled from the management guidelines). This can happen in the classroom or at the field site.
- The group travels to the first field site (carpool, caravan, group transport). Encourage participants to carpool with different classmates each week; this is when they have uninterrupted time to get to know each other. In course evaluations, participants emphasize the value of these opportunities to make connections that become the foundations of enduring friendships.
- After introductions by the coordinator, the landowner gives an overview of their management plan and goals, focused on the module topic.

- The landowner then leads the group on a tour through their property, describing their management challenges and successes related to the module topic.
- During the landowner's tour, the natural-resource expert and coordinator can help respond to questions and highlight features they identify as important.
- A second site can be visited, following the same format as the first site.
- At one site, participants can use Worksheet 1 from the Rural Resource Guidelines to practice all or a portion of the assessment.
- Participants complete worksheets 1 and 2 for their own properties as homework before the next module.
- They will incorporate their assessment (worksheet) findings into their Land Steward Property Management Plan.
- Results of their assessments and questions will be discussed at the beginning of the next class.
- Before the next class, they will complete the reading for the following module, usually the Rural Resource Guidelines document for the next topic.

Field site logistics

- Prior to the class, discuss parking with the landowner. If you have a large class, anticipate as many as 15 vehicles. Encourage carpooling.
- Preview the location and work with the landowner to identify a good gathering spot for the introduction.
- If the natural-resource expert will deliver the best-practices review in the field, it is helpful if there is a sheltered place for the class to sit. Ask participants to bring field chairs. Arrange for a field mic.
- Consider the weather. Will sun, shade, wind, precipitation or temperature affect the presentation?
- Identify stopping places during the tour where the field class of 20–40 attendees can gather for discussion.
- Arrange the available bathroom and water facilities, if any, in advance.
- At one site, arrange for a place for a table to assemble snacks. The landowner host may provide some snacks, with additional contributions from members of the class.

Alternative delivery methods

When possible, it is appropriate for the natural-resource expert to deliver the content at the field site, where the group can gather and sit in a sheltered area. If a classroom setting works better, the coordinator will need to make appropriate arrangements. If PowerPoints are necessary, arrange a computer and projector and any other display materials.

Photo: Stephen Ward, © Oregon State University

Be prepared with a microphone your speakers can use in the field. You can ask participants to bring their own chairs.

Providing background resources

Provide any other locally specific references as assigned or optional reading, as desired.

Coordinator guidance

- Review coordinator preparation sidebar.
- Upon arrival at the field site, gather the group in a comfortable, sheltered place.
- Introduce the natural-resource specialist and landowner.
- Announce the available bathroom andwater facilities, if any.
- Review the agenda of the visit, including when there will be a snack break.
- Remind participants to remain together, stay on topic and avoid side conversations when presenters are speaking. Although adults should know those rules, failure to abide by them can be quite distracting to others and can limit the success of the field-based class.
- During the visit, help guide the content as necessary, by asking questions of the natural-resource expert and landowner.

Sample agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the biggest variable. Here is a suggested schedule.

12:00–12:30 p.m.	Welcome and announcements
	Discussion (20 minutes): Participants break into small groups to review the homework assignment from the prior module. (10 minutes for small-group discussion, 10 minutes to share with the larger group). Participants continue those conversations during the carpool to the field site.
	Organize carpools (distribute driving directions)
12:30–1:00 p.m.	Carpool to first field site
1:00–1:10 p.m.	Arrival, introductions and orientation
1:10–1:30 p.m.	Overview of best practices by natural-resource expert (see content guidance in modules)
1:30–2:30 p.m.	Tour of property led by landowner
2:30–2:45 p.m.	Snack break
2:45–3:00 p.m.	Drive to second field site
3:00–3:10 p.m.	Introductions
3:10–4:10 p.m.	Tour second property
4:10–4:30 p.m.	Worksheet 1: Natural resource assessment activity
4:30–5:00 p.m.	Return to classroom (30-minute drive)
5:00 p.m.	Adjourn

- Adhere to the event's time parameters.
- At one site, lead the group through a practice of Worksheet 1 or a portion of the worksheet. (see "Field exercise," page xx)
- At each field site, highlight local topics when appropriate: plant species present (weeds and natives), special tools, special systems and infrastructure.
- At the conclusion of the last visit, the coordinator should leave last to ensure that all participants leave together.

Natural-resource specialist guidance

Provide a brief (15–20 minute) overview of best practices. Ideally, this is delivered at the field site. But if appropriate, the overview can be done in the classroom prior to the field outing. The course is a "flipped-classroom" design. In this type of design, learners read (or watch) content before a class. Time in the class can then focus more on experience and questions than lecture. For this course, participants have read an introduction to the topic in the Rural Resource Guideline documents. This overview should be used to highlight or emphasize important issues rather than cover the entire topic.

- To help determine what to emphasize, use the content outline for the module, the Rural Resource Guidelines, your professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites.
- The field experience is where the content of the program can focus on local issues. If there are concepts that are important in your area that were not covered in the reading, the field day is the occasion to share them.
- This is not a lecture-based program. The content is delivered as a brief overview to start, with the field site helping to expand on the concepts.
- During the landowner's tour that follows your presentation, be ready to help respond to questions or highlight features you identify as important.

Landowner guidance

The landowner will lead the group on a property tour designed to highlight management topics (about 60–90 minutes). Elements should include:

- **Driveway sign:** Place a sign at the driveway entrance to help attendees find the property. It could be a simple piece of cardboard with "Land Stewards Here" written on it in thick marker.
- **Parking:** Have a plan for parking. You or a helper can direct vehicles to park where you wish.
- **Bathrooms:** Inform the coordinator whether you have bathroom facilities available for the group.
- **Introduction and plan:** When indicated by the coordinator, briefly introduce the history of the property. Describe your planning process and management goals related to the day's topic. Show maps and planning zones if applicable.
- **Land tour:** Lead a tour of the property. Highlight management practices underway, sharing challenges and successes.
  - Plan ahead for a few key stopping spots where the whole class can gather to discuss the issues you mention.
  - Walking conversations are fine, but when you stop, repeat the points that arise for the whole group, so everyone can benefit from those discussions.
  - Confirm that everyone is able to hear when you stop to share information.
- Be responsive to input from the coordinator and natural-resource expert when they help to clarify or guide the visit.

MODULE 1

Course introduction, planning and stewardship

Introduction

When offering a full field-based training, the first class is an introduction. The training can be fully implemented without any online component by using the *Rural Resource Guideline* series as the content. If instructors have access to the online modules, these can be used to deliver content. The *Rural Resource Guideline* series also provides the resource assessment worksheets (homework). Results of the assessments help landowners to create their individualized Land Steward Property Management Plan.

The goals of the introductory class are to:

- Begin to create community among the participants, who will support each other in their learning and land stewardship.
- Outline the course and expectations.
- Introduce the Land Steward Property Management Plan process so that participants understand how they will develop their plan throughout the course.

Logistics

TIME NEEDED

- Two hours (can be more in volunteer program).

SETTING

- Classroom venue needed, with projector and sufficient seating.

INSTRUCTORS

- **Training coordinator:** The professional who will be coordinating the whole course will lead this class.
- **Land Steward mentors or volunteers (optional):** If this is an established volunteer program with mentors, they may be included in the agenda and participate in activities to help build community. Even if they play a minor role in this introductory session, it is an appropriate time to introduce them to the new cohort.

Lesson plan: introductory class and management planning

LEARNING OBJECTIVES

After completing this module, participants should be able to:

- Identify how the course components support their visions for their land, including the Rural Resource Guidelines content and assessments, and the creation of an individual Land Steward Property Management Plan.
- Create a definition of land stewardship.

Coordinator preparation

- Prepare materials and handouts.
- Edit timed agenda of the class.
- Create or edit the introductory PowerPoint (see Appendix XX).
- Reserve a classroom.
- Send reminder emails three to seven days before class (see samples in Appendices).
- Provide stewardship reading to the class (optional).

Materials

- Snacks and beverages.
- Supplies for snacks.
- Large map of the region.
- Dots or pins and labels for map.
- Flip charts and markers for list of LS characteristics.
- Nametags.
- Projector.
- Sample management plans if available.
- Display on table.
- Other informative materials: upcoming workshop flyers, publications.
- Administrative paperwork at check in. collect information on emergency contacts, and obtain permission to share contacts with class participants.
- Handouts: one each
  - Course syllabus or schedule.
  - Planning Guideline and Land Steward Property Management Plan template.
  - Sample Rural Resource Guideline (choose one).
  - Agency contact sheet.
  - Class list (share if permitted).
  - Stewardship activity.

BEHAVIOR OBJECTIVES

- Meet fellow Land Stewards and identify on a map the location of each property represented by the participants.
- Review and rank personal stewardship values for your land.
- Describe background information on your property.
- Create a land map.

Agenda: Two-hour in-person class

5:30 p.m.	Set up the classroom
6:00 p.m.	Check-in. Provide name tags, handouts. Ask participants to mark their property location on the map and place a dot or pin a label with their initials and acreage.
6:10 p.m.	(Use the introductory PowerPoint found in Appendix XX.) Welcome. Introduce yourself. Outline the agenda for the evening. Quick housekeeping. Participants introduce themselves: Use the map that attendees have just marked. Each person: • Locates their property on the map. • Lists their name, property location, size, years owned. Ask: What is one thing you like about the property? (two minutes each)
6:30 p.m.	Course overview (PowerPoint) Participants should have a copy of the handouts shown on the materials list, to follow along with the PowerPoint.
7:00 p.m.	**Stewardship activity discussion:** Give a short introduction about land stewardship. Ask participants what land stewardship means to them. Use quotes provided in the PowerPoint or others for inspiration. There is not one correct answer to this question. Distribute the activity sheet included below. Display the instructions slide from the introductory PowerPoint. **Activity process:** Spend a few minutes jotting down your ideas for characteristics of a land steward. Then discuss this topic in groups of three to five people. In groups, write on flip charts or sticky notes. Create a group definition or list characteristics. What are characteristics of a land steward? What is land stewardship? (Five minutes for introduction, three minutes to write individually, two minutes to form groups, 10–15 minutes to discuss in small groups)
7:25–7:40 p.m.	Groups report back to the class on their definition of land stewardship, followed by class discussion.
7:45–7:55 p.m.	Wrap-up and reminders (use PowerPoint slide)
8:00 p.m.	Adjourn

CONTENT OUTLINE

Use PowerPoint in Appendix, page 187.

- Participants introduce themselves, describing their property by location, acreage, land types.
- Course goals.
- Course schedule.
- Weekly activity overview.
- Introduction to the Rural Resource Guidelines and assessments.
- Introduction to creating a plan. Share sample plan
- Stewardship activity (see worksheet below)
- Reminders.

READING ASSIGNMENT (TO COMPLETE BEFORE CLASS)

Optional: The instructor may provide thought-provoking reading for this activity, which participants may read before the class. Consider sharing Aldo Leopold's land ethic essay, which you can easily find online. You can also simply use a quote or two. We have provided examples, but you can use any inspirational reading you find relevant.

HOMEWORK (TO COMPLETE AFTER CLASS)

- Read the planning guideline: *From Vision to Reality: Creating a Land Steward Property Management Plan*, EM 9335.
- Using the planning guideline, complete the values worksheet on page 8. Bring it to class next week.
- Begin the first three pages of introductory material in your Land Steward Property Management Plan, including the map. Use the links to tutorials and resources to help you create a map. Give yourself about three weeks to complete these introductory pages.
- Preview the *Rural Resource Guideline* for next week's field class to prepare you for what we will see in the field. Bring your worksheets to practice the assessments during class.

CLASSROOM SETUP

- Sign-in table.
  - Handouts (see materials needed) available at check-in.
  - Nametags.
  - Administrative paperwork.
- Refreshments on a table.

- Hang up a wall map of the region you are serving. Provide dots, pins or labels for participants to mark the location of their on the map.
- Consider seating participants in small groups around tables by regions, or seating in a U-shape.
- Flip charts and markers for stewardship activity.
- PowerPoint and projector.
- Display table with sample management plans, if available, flyers advertising upcoming workshops, other publications.

STEWARDSHIP ACTIVITY (PRINT AND DISTRIBUTE TO CLASS)

Question: What are the characteristics of a **land steward** in the context of ownership of a woodland, farm or other rural acreage in your area? Develop a definition of land stewardship.

Present some quotes for inspiration.

You may have read the Aldo Leopold land ethic essay; if so, that may be a source of inspiration. This quote from the essay may prompt your thinking.

"The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.

"It of course goes without saying that economic feasibility limits the tether of what can or cannot be done for land. It always has and it always will. The fallacy the economic determinists have tied around our collective neck, and which we now need to cast off, is the belief that economics determines all land use. This is simply not true. An innumerable host of actions and attitudes, comprising perhaps the bulk of all land relations, is determined by the land-users' tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. As a land-user thinketh, so is he."

— The Land Ethic, by Aldo Leopold (1949)

Stewardship: The careful and responsible management of something entrusted to one's care

— Merriam-Webster, 2018

Instructions for stewardship activity

1. Individually: Write down characteristics of a land steward as applied to a landowner where you live. (five minutes)
2. Small groups (10–15 min):
   - Share your list of characteristics with each other.
   - Discuss within the group.
   - Develop a consensus definition or listing of the characteristics for a land steward.
   - Designate a notetaker to capture your definition on a sticky note.
3. Share group definitions with the larger group and discuss (15 minutes).

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

FROM VISION TO REALITY:

Creating a Land Steward Property Management Plan

Rachel Werling and Max Bennett

One of the most effective tools for caring for your land is a management plan for your property. Using this rural resource guideline, our plan template and the assessments from the other rural resource guidelines in this series, you can create a plan that will help you achieve your land stewardship goals. Learn why land management planning is important, what makes up a land management plan and how to put one together.

What's in a management plan?

In a nutshell, a plan is a written document that describes your property, identifies what you want to do with it, and outlines a strategy for accomplishing your property management objectives.

There are many different plan formats. We have created a template that is relatively simple but comprehensive. The Land Steward plan template includes:

- A cover page.
- Property specifics (location, zoning, acreage, etc.).
- A property map and description.
- Resource assessment summaries that describe the conditions on your land.
- A description of your values and vision for the property.
- Clearly defined and attainable management objectives.
- Planned activities or projects and timeline.
- Project record and monitoring guidelines.

Why make a plan?

Surveys of participants in the OSU Extension Land Steward program tell us that making a plan for their land is one of the most effective aspects of the program. Stewards care about their land, and a plan empowers them to make informed and strategic decisions. It helps them follow through to achieve their goals for their land.

Benefits of creating a plan

- **Learn more about your property.** As you go through the process of creating a land management plan, you

Photo: Natural Resources Conservation Service

Eric and Emma Keys craft a management plan for their property. Use resource assessment worksheets in the Rural Resource Guideline Series to measure how things are going on your land.

Rachel Werling, Extension faculty and Land Steward Program coordinator, Jackson County; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor, Southern Oregon Research and Extension Center; both of Oregon State University.

Oregon State University

EM 9335
October 2021

Photo: Rachel Werling, © Oregon State University

Your plan can change. Review it once a year to schedule activities and chart your progress. Consider updating the plan every five years as your goals shift.

will collect information that will give you insight into past and current conditions and potential future outcomes for your property.

- **Clarify your property management goals.** Creating a plan will force you to hone in on what's truly important to you. What do you really want to do with your property? What do you want it to look like in five or 10 years? How do you hope to use it?
- **Focus and prioritize.** There are always many possible projects that require time and money. A plan helps you prioritize the most essential actions.
- **Communicate your intentions and plans to others.** A plan is a great tool to use with advisers, contractors and even heirs or other family members who help care for the property now or will do so in the future.
- **Demonstrate your commitment to stewardship.** Completing a plan shows that you're organized, serious and that you have a concrete vision for the future of the property. Management plans are often prerequisites for cost share assistance and various types of forest and farm certification programs. While the plan you create here might not completely meet the requirements of these programs, it will give you a great starting place.

About the Rural Resource Guidelines

This is one of a series developed for private landowners by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties but is applicable to other areas.

Vision, goals, objectives — separate but critical parts of your overall plan

As you work through your plan, you will clarify your vision for your property.

You will create goals that need to be accomplished to achieve your vision.

Finally, you'll identify specific priority actions or objectives with a timeline that will help you attain your goals and create your vision.

You may have many goals to achieve your vision, and many objectives to achieve each goal.

EXAMPLE

Vision: A landscape with diverse native habitat that supports wildlife

Goal: Maintain control of invasive plants.

Priority actions/objectives: Begin work on Scotch broom weed priority area. Winter 2021 pull all plants. Revisit site every spring and pull new seedlings. Do not let any plants bloom. (This is a specific action on a timeline that will bring about your goal.)

A plan is a living document

- Your plan is not cast in stone. Life happens, and circumstances may change. The plan is meant to be used and updated as needed, not sit on a shelf gathering dust.
- Review your plan once a year to schedule activities and update your progress. Consider updating the plan at least every five years to reflect new goals or objectives.
- The plan is also a great tool for organizing business records and keeping track of activities on your property. We recommend you put it in a three-ring binder.

Creating your plan

Examine the attached Land Steward Property Management Plan template. Page through it and look at the organization and components. Reference the plan template as you continue reading below. Each content box has some guidance. You can fill in this template or use the categories as an outline to create a plan document from scratch.

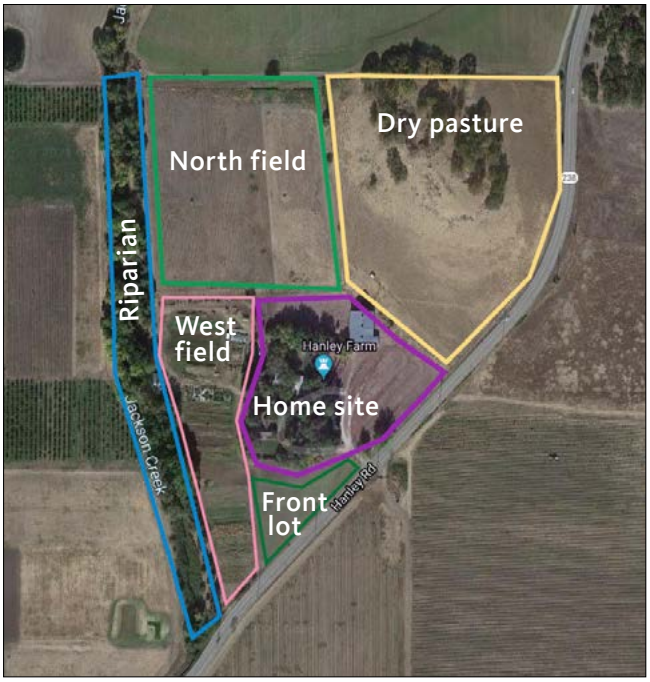


Photo: Google

Use a recent aerial image such as this from Google maps that shows your property lines to create a base map. See how this property is divided into zones.

Cover page and property information

The first three pages cover basic information and are straightforward to complete. Much of the information will be available on your deed or your county website.

There are boxes to list your zoning and any special assessments. Note that these are not necessarily the same! Review *Economics and Enterprise: Financial Considerations of Rural Life,* EM 9315, *https://catalog.extension.oregonstate.edu/em9315,* for more information on zoning and special assessments for farm and forest land.

Property map

Creating a property map (page 3 on the template) is a helpful exercise. It will show you the relationships between the main features on the property such as the home site, outbuildings, woodlots, pastures, streams and so forth. To create a property map you'll need a base map, ideally a current or recent aerial image that shows your property lines. You can find or create a base map using various online mapping tools. Links to a few of the many online mapping resources can be found in the resources section. How to Create A Property Map with Google Maps, *https://www.youtube.com/watch?v=7XIw3fqOxWM,* shows you basic steps to use Google Maps for creating a map. Land Mapper is a quick way to get a variety of maps for your property. Additionally, your county assessor's office may be a resource for a map of your property. You could even draw a map by hand if you have a small property.

Divide your property into zones

We recommend subdividing the property into different management zones or units and delineating these on the aerial photo. Google Maps and other online mapping tools mentioned can help you do this, but all have a learning curve.

Management zones are based on things like:

- Land use or objectives (such as farm, forest, residential, wildlife reserve, etc.).
- Major vegetation zones (including pasture, oak woodland, mixed conifer forest, etc.).
- Soil types and topography.
- Access (including roads, fences and gates).

Management zones are often separated by features like roads, streams, fences, vegetation type and terrain (distinctive features of the landscape).

The benefit of identifying and mapping subzones is that you can hone in on the specific management needs of each subzone, which are likely to be different from those of adjacent zones.

Property description

Page 4 of your template provides a place to briefly summarize the property history, terrain, current uses and landscape context. This section of the plan is optional — but it's great background information.

Your vision for the property

What's your vision for your property five to 10 years or more down the road? What would you like to do with

Sample Land Steward vision statements

- *"We want to develop and maintain a healthy, fire-resilient, diverse forest that is aesthetically pleasing, provides desirable wildlife habitat and contains large trees of species adapted to the site. "*
- *"Live on the property and make responsible, ecologically sensitive use of firewood, garden products and other goods and amenities generated on the site."*
- *"Develop an organic, sustainable farm that will generate a profitable income from various small (manageable and efficient) enterprises."*

Land Steward Rural Resource Guidelines

Find the full collection online at the OSU Extension Catalog, *https://catalog.extension.oregonstate.edu.*

Forests and Woodlands: Protecting an Ecosystem, EM 9245

The Home Ignition Zone: Protecting Your Property from Wildfire, EM9247

Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna, EM 9250

Stream and Riparian Areas: Clean Water, Diverse Habitat, EM 9244

Soil: The Dirty Secrets of a Living Landscape, EM 9304

Pastures: Stewarding a Working Landscape, EM 9303

Water Systems: Taking Care of a Precious Resource, EM 9243

Economics and Enterprise: Financial Considerations of Rural Life, EM 9315

it? What do you want it to look like? This is one of the most fun parts of the planning process, but also among the most challenging. You have to decide what you really want and what's feasible given limitations of time, funding, energy and competing commitments. It may help to draft your vision at the start of working on your plan, and then come back and refine your vision after you have completed your resource assessments and learned what is possible for your land.

Your vision will depend partly on your personal values and overall goals. To jump start your thinking, complete "Worksheet 1: My Land Stewardship Values," page 8.

On page 5 of your plan, briefly describe your five-to-10-year-property-management vision.

Natural resource assessment summaries

Using the land steward rural resource guideline series to help build your plan

The next section of your plan is a list of natural resource assessment summaries for a variety of resources you may find on your land (forest, stream, pasture, etc.). Use the Land Steward Rural Resource Guideline series to evaluate your natural resources and create these summaries. Each guideline provides introductory information on how to care for natural resources. Each document includes assessment worksheets that will help you evaluate the condition of that resource and identify some actions you may want to take. Summarize your assessment findings in the natural resource assessment section of your plan.

Sample goals

- *Develop a trail system so I can access the property for enjoyment and maintenance (Categories 1 and 2).*
- *Create a defensible space around my home for fire safety (Category 2).*
- *Establish crop production zones (blueberry, vegetable garden and small fruits) (Category 3).*
- *Maintain control of invasive plants (Category 2).*
- *Have fun! (Category 1).*

Reading the guidelines and completing the assessments will help you:

- Understand the current condition of your resources.
- Identify possible needed actions or projects.
- Identify questions you may have.
- Suggest resources to find assistance.

Use any of the guideline topics that are relevant to your land and include your assessment findings in your plan.

Completing the resource assessments in the Rural Resource Guidelines

Each resource assessment consists of one or two worksheets. The first worksheet helps you assess the condition of the resource. The second helps you evaluate your management activities as they relate to that resource.

To complete the assessment, print out the worksheets and get a clipboard and a pencil. Then go outside to look at what you see on your land. For each assessment, plan to spend about 30 minutes to an hour making observations.

When you're done, summarize your findings in the boxes on pages 6–10 of your management plan.

In the first box, summarize your goals for the resource. Examples of goals might be: maintain a healthy riparian zone and good water quality, or support a forest with diverse wildlife habitat and low fire hazard.

In the second box, you'll summarize the main findings of the assessment. These include resource concerns and good conditions. Examples of resource concerns are soil erosion on a steep slope and noxious weeds in a pasture. Examples of good conditions are clear, sediment-free water in a stream and beneficial, weed-free forage in a pasture.

In the third box, list potential follow-up actions. Using the examples from above, these might include re-vegetating a bare area to reduce erosion or eliminating a patch of noxious weeds. The idea is to summarize the important findings of the assessment and the important follow-up actions.

As you work through the assessment, you may have questions. You may not be certain whether something you're seeing is a resource concern or not. One of your follow-up actions might be to research key questions you have as a result of the assessments.

Major goals

Once you have completed all of your resource assessments, it is time to identify major goals for your property that will help you create the vision you have for your land. Take a moment to revisit the vision statement you created earlier. Some of your thinking may have changed due to what you have learned about your land. Review the goals you listed for each resource in your resource assessment summaries (pages 6–10 of the plan).

Next, identify three to five major goals that support your vision. These may contain goals from your assessments or they be more general goals. You also may want to subdivide your major goals into three categories:

1. Quality of life.
2. Natural resources.
3. Production/economic goals.

The choice is yours. They are your goals.

Reality check

OK, it's time for a quick reality check:

- Do your goals match the time you have available and your financial resources?
- Do you have the knowledge and equipment needed? If not, can you acquire them?
- Are there any significant regulatory, legal or technical constraints?
- Do you manage your land in partnership with others? Are all managers in agreement? How about kids or other family members?
- Do your vision and goals fit with the potential and capabilities of your land?

In many cases Land Stewards have found that they have needed to modify their initial vision for the property due to one or more of these real life

Sample action plan

Priority action/ objective	Project description (specifically, what will be done?)	Start date	Completion target date	Who will do it	Resources needed (funds, equipment or technical assistance)
Establish streamside buffer of trees and shrubs along creek	Plant trees and shrubs along 400 feet of creek, on south and west sides. **Goal:** 30-foot buffer, ¼ acre to plant in total. **Steps** 1. Get advice from watershed council, Soil and Water Conservation District or Extension, about what species will do well and desired spacing. Also, can I get cost share assistance? 2. Order trees from nursery. 3. Pick up trees. 4. Plant. 5. Install weed and deer protection during planning. 6. Monitor with before and after photos.	Fall 2016	Spring 2017	Me, assisted by family	• 100 trees • 50 shrubs • Planting shovels • Weed barrier (cardboard and chips) • 50 tree protection tubes Total budget $750

constraints — and that's OK. For example, one couple decided they wanted to find a smaller piece of land with less to manage after completing their assessments and plan. Another couple decided they wanted to buy another 120 acres to be able to steward more of the landscape. Yet another landowner was hoping to clear a stream-side area for agriculture, but found riparian regulations did not allow for his goal. To paraphrase the saying: "Well informed is well planned."

Priority actions (objectives)

Now it's time to list your priority actions. These are concrete steps that will help you achieve your goals. Consider your vision, major goals and the results of your resource assessments. What are the most important actions needed to meet your goals and address resource concerns? List one to five priority actions in your plan.

Goals versus priority actions: Goals are broad statements of purpose and intent. Priority actions are similar to objectives — they should be specific, measurable, time-bound and realistic. Completing these actions will help you meet your broader goals and achieve your long-term vision. Review the example in the box on page 2.

Develop an action plan and timeline

Now that you've established your vision, goals and priority actions, it's time to develop your priority action plan (see page 10 of plan). This is a straightforward process. For each of your priority actions, describe specifically what will be done. Add a start and completion date.

List who will do the work. Identify needed resources, such as equipment, technical assistance or additional funding.

Monitoring: Show change and impact

Photo point monitoring

We strongly encourage you to document your projects with repeat photos. On an everyday basis, change in vegetation is usually slow and subtle. But over time, the impacts can be dramatic.

Repeat photo monitoring is pretty simple: Take a photo at the start of your project, at the end, and repeat photos from the same location over time. This will show change and impact. You will be happy you did it!

Photo: Rachel Werling, © Oregon State University

Take a look at these examples of photo monitoring of a fuels reduction project — before, and two years later. As you can see, repeat photography is a powerful tool for documenting the results of your project and capturing change over time.

Photo monitoring tips

- Put a stake (capped rebar is better) in the ground where you take the photo, so you can re-locate your photopoint.
- Include an object, such as a recognizable tree, in the frame of your photo so that you'll be able to duplicate the original photo.
- Take repeat photos at the same time of the year, so seasonal differences such as vegetation changes in winter versus summer don't mask the impact of your work.
- File the photos with descriptive name and date.
- Just do it! You will be glad you did!

For details, see the link in "Resources," below.

Other monitoring methods

If taking photos isn't an option for you, you can simply keep notes in a dedicated journal, or walk the land with a with a clipboard and a copy of the project monitoring sheet provided in the plan template on page 15. Be sure to include your monitoring notes in your plan later.

Resources

Creating a map of your land

- How to Create a Property Map with Google Maps, a tutorial by Amy Grotta, *https://www.youtube.com/watch?v=7XIw3fqOxWM*
- Landmapper, *https://landmapper.ecotrust.org*
- Digital mapping tools: part one, the basics, *https://extension.oregonstate.edu/forests/health-managment/digital-mapping-tools-part-1-basics*
- *Land Survey and Mapping: An Introduction for Woodland Owners*, *https://catalog.extension.oregonstate.edu/pnw581*
- Quick Guide to Photo Point Monitoring, *https://efotg.sc.egov.usda.gov/references/public/NM/bio61a6_PhotoDocumentation_Protocol.pdf*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, rural planner, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

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Worksheet: My land stewardship values

Complete this worksheet to help clarify your vision for your land. Consider your property and how you use it. How important is each of the following to you?

Topic	Very important	Somewhat important	Not important	Undecided
Real estate investment				
Long-term financial security				
Income from natural resources (timber, etc.)				
Income from agriculture or other enterprises				
Use as a vacation property				
Personal residence (my home)				
A legacy for my heirs				
Aesthetics/beauty				
Keeping it “natural”				
Personal or sentimental attachment to land				
Recreation (walking, camping, etc.)				
Fishing or hunting				
Providing benefits to society such as clean water or clean air				
Reducing wildfire risk				
A place for wildlife to exist				
Satisfaction from owning land				
Providing an ecological legacy (conservation)				
Other:				
Other:				
Other:				
Other:				

Adapted from *Mentored Management Planning*, OSU Forestry and Natural Resources Extension Program

Oregon State University
Extension Service

LAND STEWARD
PROPERTY MANAGEMENT PLAN

NAME

ADDRESS

EMAIL

DATE

Property information

Property name _____

Address

Physical location of the property

Legal description

Township, range, section, tax lot. Get this from your deed or property tax statement.

Location

General location. Include watershed, neighborhood or community, if known. (Example: Butler Creek Watershed)

Acreage

_____ Home site

_____ Irrigated (pasture, crops, orchard, etc.)

_____ Non-irrigated (pasture, other)

_____ Forest or woodland

_____ Oak habitats (oak woodland, oak savannah)

_____ Other (stream, wetland, other nonagricultural areas, etc.)

_____ **Total acreage**

Zoning

Zoning may limit what you can build on your property or what you can do with it.

Special assessment

You may qualify for or wish to qualify for one of the forest or farm deferral programs, which provide for a reduced assessment value and lower taxes.

Fire Protection District

Who provides structural fire protection? Are you in a fire district? Not everyone is!

Property map *Insert aerial photo or map.*

Management zone or unit	Acres (#)	Description, main uses, notes

Property description *Optional*

The format and language for this section comes from the *Oregon Forest Management Planning System Guidelines.*

Background and history

Answer the question: "This is what I know about the history of my property."

Terrain and topography

Describe how you are currently using your property. Do you live on the property? If not, how often do you visit or work on it?

Current uses

Describe how your property fits in the context of the surrounding landscape. For example, are you in a rapidly urbanizing area? Adjacent to public land? Are there any regional assessments or initiatives that recognize the importance of where your land is located, whether it be for watershed health, species conservation or other factors? For example, are you located within a Conservation Opportunity Area?

Landscape context

You may qualify for or wish to qualify for one of the forest or farm deferral programs, which provide for a reduced assessment value and a lower tax rate.

Long-term vision

It may be helpful to draft your vision as you start working on your plan, and then come back and refine your vision after you have completed your resource assessments and learned more about what is possible for your land.

Briefly describe your five-to-10-year-property-management vision. (What's your vision for your property five to 10 years or more down the road? What would you like to do with it? What do you want it to look like?)

Natural resource assessment summaries

Use the results of the worksheets for each Rural Resource Guideline Assessment to complete the following. Include the completed assessments with your plan for your records.

FOREST AND WOODLAND ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

HOME IGNITION ZONE/WILDFIRE PREPAREDNESS ASSESSMENT

List your goals for this topic:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

WILDLIFE HABITAT ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

STREAM AND RIPARIAN AREA ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

SOILS ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

Major soil map units from the USGS Web Soil Survey. Include soil name, main uses, key limitations and productivity.

List potential follow-up actions:

PASTURE ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

WATER SYSTEMS AND INFRASTRUCTURE ASSESSMENT

List your goals for this resource:

Summarize the main findings of the assessment (resource concerns, healthy conditions, other results):

List potential follow-up actions:

ECONOMICS AND ENTERPRISE ASSESSMENT

List your goals:

Summarize the main findings:

List potential follow-up actions:

Major goals

Now that you have completed your assessments, it is time to prioritize. Revisit your vision statement on page 5. Consider what you have learned about your property and the goals you have for each resource. Complete the following.

List three to five major goals that support your vision. Revisit the goals you listed for each resource on pages 6–9. Which of these are most important to you? You may want to categorize your major goals into three groups: quality of life, natural resources, and production or economic goals. The choice is yours. They are your goals.

Reality check: Do your goals match the time you have available and your financial resources? Do you have the knowledge and equipment needed? If not, can you acquire it? Are there any significant regulatory/legal or technical constraints? Do you manage your property in partnership with others? Are all managers in agreement? How about kids or other family members?

Priority actions/objectives

List one to five priority actions. Ideally, these should be specific, measurable, time-bound and realistic. Consider your vision and major goals, and the results of your resource assessments. What are the most important actions needed to meet your goals and address any resource concerns? Use the Priority Action Plan template that follows to help make your plan into reality.

1.

2.

3.

4.

5.

Priority action plan

Consider SMART objectives — Specific, Measurable, Attainable, Relevant and Time-bound

Priority action/objective	**Project description.** *Specifiy what will be done.*	**Start date**	**Target end date**	**Who will do it**	**Resources needed** *Funds, equipment or technical assistance*

Project record

Keep track of your completed projects with this form.

Project	Start/end date	Cost	Notes

Project photo monitoring

Action or project to be monitored

Date "before" photo taken _____ *Date of "after" photo*_____

Notes _____

BEFORE

AFTER

Project monitoring information sheet

Action or project to be monitored _____

Date completed _____

Notes _____

Date monitored	**Notes** *How are things looking? Record the progress.*	**Follow-up actions** *Any maintenance needed?*

Forests and woodlands

Introduction

Program participants will have read the Rural Resource Guideline for this module. Please review that content. A bulleted content outline based on the guideline aids resource instructors (see "Content outline" below). This module can be delivered as a part of a complete Land Steward Training or used as a guide for a stand-alone field day. It helps to remind participants to connect the concepts from this module with other related module topics in the training. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

The private property held by Land Steward participants can be classified as types of land by acreage. In southwest Oregon most participants manage forest and woodland acreage (50%–80% in any given class). This would be true for many areas of the Northwest that support forest cover. Improving management of private forestland is critical for reducing landscape-level risks to the region's forests, such as wildfire, weeds and tree disease. Participation in the forest module often results in landowners' first recognition that they are, in fact, woodland managers. After completing the program, many graduates pursue additional classes in forest management and seek technical and financial resources to improve the condition of their woodlands. Goals for their forested lands can vary widely from conservation to commercial profit. Using best practices will improve outcome, regardless of these goals. Note that this module does not cover the specific conditions of oak woodlands. We use the term "woodland" synonymously with "forest," as it is used regionally in Oregon. It does not denote percentage of cover, as the term is used in ecology.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field, including travel time.

MODULE DELIVERY

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITE SUGGESTIONS

Select one or two field sites where people can observe a variety of forest conditions. Physical features, such as soil conditions, aspect, topography and past management, can provide a wide variety of forest conditions within a single site. Use both well-managed stands and those in need of management to demonstrate the contrast in conditions. Possible forest features and conditions to consider when choosing a site include:

- Stand density and variation in tree spacing.
- Canopy gaps.
- Live and dead surface fuels.
- Ladder fuels.
- Tree and shrub health and vigor.
- Species diversity.
- Noxious weeds.
- Wildlife habitat resources.

Review "Field site logistics," in "Module delivery guidance," page xx.

NATURAL-RESOURCE EXPERTS

Appropriate experts for the forests and woodlands module may include university forestry Extension agents, personnel from the Oregon Department of Forestry or the U.S. Forest Service, and experienced professional foresters. Choose someone who can be available as a resource in the future for landowners' questions and technical needs.

Coordinator preparation

- Recruit natural-resource expert (see natural-resource expert above).
- Select landowners and field sites (see field sites above).
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and structure of the session.
- Send reminder emails to participants, landowners and the natural-resource expert three to seven days prior to site visits. See samples in Appendices.
- Print directions for carpooling to field sites.

Lesson plan: forests and woodlands

LEARNING OBJECTIVES

After completing this module, participants should be able to:

- Describe basic woodland stewardship practices.
- Recognize how forest management can affect water quality, soil health, tree health, wildfire risk and wildlife.
- Conduct a simple woodland resource assessment to identify resource concerns, healthy conditions and potential follow-up actions.
- Incorporate this information into your management plan.

BEHAVIOR OBJECTIVES

- Assess forest and woodland conditions.
- Assess management activities for forests and woodlands.
- Identify practices to improve forest conditions and create goals.
- Incorporate the results of the forest and woodland assessments and landowner goals into your Land Steward management plan.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Forests and Woodlands: Protecting an Ecosystem* and review Worksheets 1 and 2.
  - Print and bring entire document to forest and woodland field class.
- Read additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

1. Using *Forests and Woodlands: Protecting an Ecosystem*:

a. Use Worksheet 1 to complete an assessment of the forest and woodland present on your property.

b. Use Worksheet 2 to assess your current forest-management practices.

2. In the Land Steward Property Management Plan under "Natural resource assessment summaries," summarize the results of your assessments and list your forest management goals and priority actions for your property.

3. Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1 FROM FOREST AND WOODLANDS: PROTECTING AN ECOSYSTEM (SEE BELOW)

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of the forest or woodland using Worksheet 1. Goals are to reinforce observing the characteristics of tree and forest health, and to familiarize participants with the assessment that they will perform at home on their own land as homework. If you only have 25 minutes, select a portion of the assessment to complete, such as tree health. If you have more time, complete additional portions.

- Ask participants to work in small groups with one notetaker. Assign each small group one or two sections of the assessment worksheet, depending on your class size. They will share results of their sections at the end.

Materials list

- Copies of the reading assignment for the next class, usually the Rural Resource Guidelines. Some participants prefer to access these online, so you may not need a full class set.)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from the wildlife management guidelines.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Jug of water and cups.

- Distribute clipboards, pencils and copies of Worksheet 1.
- Give them 10–15 minutes to explore the forest stands to assess the habitat. Instruct them to start with their assigned section and proceed with the rest of the worksheet as time allows.
- Reconvene the participants and invite each group to share the results of their assessments. Discuss briefly as a group.

ALTERNATIVE ACTIVITIES

You can include many alternative activities in this module, such as tree identification or assessing trees for thinning to promote forest health.

Providing background resources

In "Module delivery guidance," review "Background resources," page 9.

Instructor guidance for the field day

In "Module delivery guidance," review "Background resources," page 9.

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page 9. Share the suggestions with the natural-resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. See the suggested schedule for a field module in "Sample agenda," page 12.

Content outline

Program participants will have read *Forests and Woodlands: Protecting an Ecosystem*, EM 9245. This document serves as guidance for the content provided by the natural-resource expert as well as concepts to highlight during the property tour. It is not necessary to cover all the topics in this list. Focus on issues based on your own professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites, while keeping introductory presentation time to 15–25 minutes. Suggested content topics include:

- Acknowledge the variety of management priorities that can exist for forested land: wildlife habitat, timber production, recreation, restoration, etc. Informed management practices will sustain and enhance the forest resource, regardless of the landowner's specific priorities.
- Describe the condition of the forest property within the surrounding landscape, reminding landowners that fires, disease, wildlife and weeds do not respect property boundaries. Landowners can respond to the conditions created, in part through informed management practices.
- Forests and water quality (review Stream and Riparian Ecosystem module)
  - Forested watersheds provide a high-quality water resource, but water flow is inherently connected to the amount of trees taking up water.
  - Sediment from management activities in forested watersheds can threaten water quality, both as a human and fisheries and wildlife resource.
  - To protect water quality:
    - » Maintain adequate riparian buffers.
    - » Keep heavy equipment away from riparian areas.
    - » Locate road and skid trails outside of buffer areas.
    - » Prevent road and trail erosion with water bars, etc.
    - » Maintain an adequate shrub and herbaceous layer to prevent overland flow and erosion.
    - » Restore eroded areas using appropriate native plant species.
- Forest soil health
  - Healthy forest soil supports a robust forest plant community, including trees.
  - Healthy, uncompacted soil retains moisture and facilitates water infiltration and gas exchange.
  - To promote healthy soils:
    - » Restrict heavy equipment to roads, skid trails and landings to reduce damage to soil health.
    - » Revegetate bare soil with native understory species to preserve soil health and prevent erosion.
    - » Preserve adequate duff, litter and woody debris that are part of the nutrient cycle of forest soil.
    - » Reduce the risk of soil-damaging wildfire by preventing excessive buildup of surface fuels.
- Weeds
  - Prevention is the best way to minimize weed problems.
  - Keep weed seed from entering the forest on equipment, vehicles, fill dirt or road gravel.
  - Monitor forestlands for weed establishment.
  - Eradicate weed populations early by using Integrated Pest Management.
- Reducing wildfire risk
  - Design and maintain access roads to allow for access and suppression of fires.
  - Maintain forest stands that are fire-resistant and resilient by reducing all classes of forest fuel loads, maintaining fire-adapted species and retaining large, fire-resistant individual trees.
  - Balance wildlife habitat features with fuels reduction.
  - Prioritize expensive fuel treatments according to topography, knowledge of fire behavior and land use.
  - Review wildfire preparedness module.
- Tree health
  - Learn to assess tree health and conduct a forest inventory.
  - Match tree species to site conditions for optimal health.
  - Thin excessively dense stands.
  - Retain desirable species and individuals, including wildlife habitat specimens such as snags.
  - Provide space and resources around shade-intolerant species.
- Reforestation
  - Match species to site conditions or site potential.
  - Use seedlings from the appropriate seed zones. Keep seedlings cool and moist until planted.
  - Plant in appropriate season for establishment (late fall through early spring in southern Oregon).
  - Protect seedlings from being overtopped by weeds or shrubs.
- Forests as wildlife habitat (see wildlife habitat module)
  - Inventory of wildlife species and habitat resources of the forest.
  - Recognize that habitat is species specific, and that a single property or forest stand may not provide all resources necessary to benefit wildlife populations.
  - Understand how the property fits into the greater landscape in regards to wildlife needs.
  - When thinning, promote vegetation structure and diversity.
  - Retain some snags, dead down wood and brush piles, while reducing fuel continuity.
  - Retain some dense patches (balanced with fuels considerations) and create openings for early successional species.
- Understand how the Oregon Forest Practices Act applies to the property.

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

FORESTS AND WOODLANDS:
Protecting an Ecosystem

Max Bennett, Don Goheen and Jack Duggan

New and inexperienced landowners often wonder what they should do with their woodland, and the possibilities are numerous. There is no one right way to manage a forest, no single recipe to follow. Much depends on your particular interests, goals and objectives. For example, you could emphasize wildlife, timber production or recreation — or you could work to restore the forest to a previous condition. You could manage for all of these goals.

Regardless of your objectives, your choice to follow these management guidelines protects water quality, reduces weed infestations, maintains soil productivity, reduces the threat of fire and promotes forest health. In a nutshell, you are protecting the forest ecosystem and preserving options for future generations.

When we talk about forests and woodlands, we are referring to an area of trees and associated vegetation of any size — from a backyard woodlot to a tract of several hundred acres or more. Though specifics vary, these concepts apply to a wide range of forests and woodlands, from oak woodlands to mixed conifer forests.

Protect water quality

Forests produce high-quality water due to the outstanding filtering provided by woodland vegetation and soils. Many communities, such as those in Ashland and Medford, rely on water quality from forest watersheds. Protecting water quality is one of the most important public benefits that private forests can provide.

Max Bennett, Extension Forestry and Natural Resources faculty and associate professor, Southern Oregon Research and Extension Center, Oregon State University; Don Goheen, forest entomologist, U.S. Forest Service (retired); Jack Duggan, OSU Land Steward program.

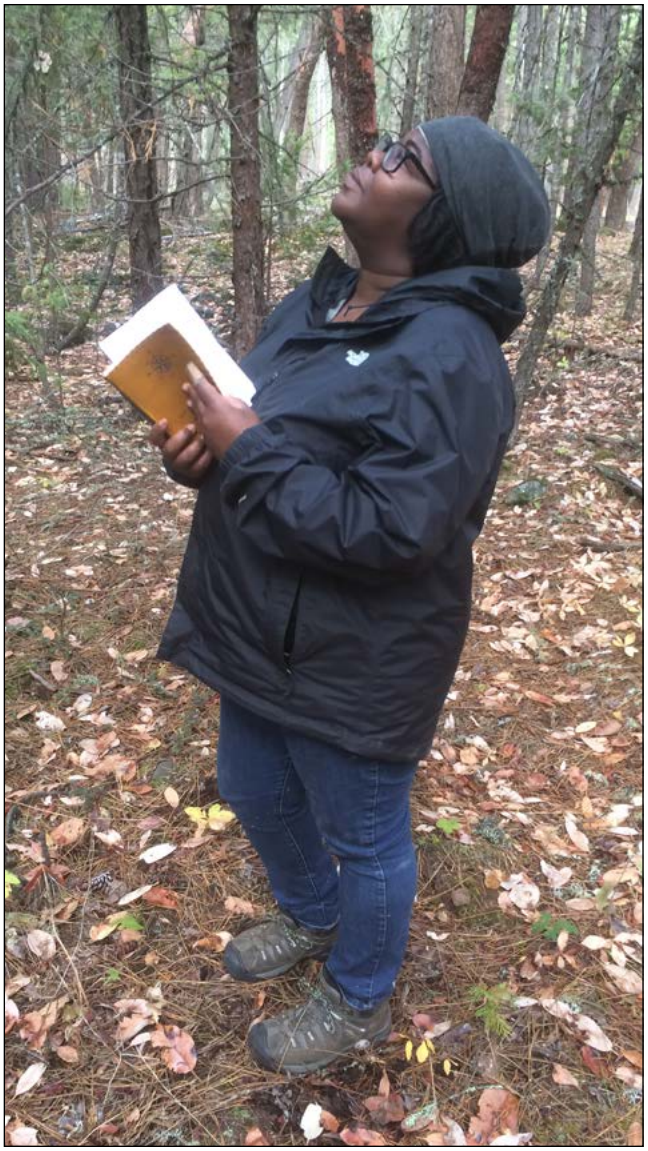

Photo: Rachel Werling, © Oregon State University

Land Steward Erica Hooper Lee uses what she has learned about assessing tree health to select trees for thinning.

Oregon State University

EM 9245
December 2019

3 EASY STEPS

Use this document to evaluate and improve your own forest or woodland

1. Read *Forests and Woodlands: Protecting an Ecosystem.*
2. Use Worksheet 1: Resource assessment for forests and woodlands, page 9, to assess the condition of your resource.
3. Use Worksheet 2: Management activity assessment for forests and woodlands, page 12, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local Extension office, Soil and Water Conservation District, watershed council, Oregon Department of Fish and Wildlife office, the Oregon Department of Forestry or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners with little or no technical background by the Land Steward program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties, but many of the practices are applicable to other areas.

Photo: Michelle Bowman, Bugwood.org

Stream culverts should be adequately sized for peak flows. Culverts are often partially buried to provide a more natural stream bottom.

One of the main ways to protect water is to control the amount of sediment entering the watershed. While a little bit of sediment in streams is natural, excessive and chronic sediment harms fish, their spawning beds, and domestic water supplies.

Sediment is probably the biggest water pollutant on forest lands.

These best practices can help keep sediment to a minimum:

- **Maintain a forested buffer** along streams to filter out sediment and other pollutants that might otherwise enter waterways. See *Streams and Riparian Areas: Clean Water, Healthy Habitat,* EM 9244, *catalog.extension.oregonstate.edu/em9244,* for more specifics on riparian buffers.
- **Avoid using heavy equipment** in streambeds or near streams. When roads and skid trails are located within riparian zones or along streams, it is easy for runoff from the road to enter the stream itself, resulting in water pollution.
- **Locate roads and skid trails away from the riparian zone** and minimize the number of stream crossings to reduce the risk of water pollution.
- **Install and maintain water bars,** drainage dips, and other water control structures to reduce runoff on roads, diverting sediment before it enters the stream.
- **Adequately size culverts for storm flows.** The Oregon Forest Practices Act requires all culverts in newly constructed forest roads to be able to pass a 50-year storm flow (flow expected in a major, once-in-50-years storm). This can be surprisingly large. Where feasible, favor bridges over culverts.
- **Maintain adequate tree cover** to reduce runoff and erosion. Harvesting and other disturbances aren't bad, but disturbed areas should be quickly replanted. This vegetation — along with uncompacted, porous forest soil — helps facilitate the safe capture, storage and release of precipitation in the form of streamflow.
- **Monitor roads, skid trails and disturbed areas** periodically for runoff and erosion. It is easiest to spot problems during rainy periods.
- **Restore any eroding areas** by planting, seeding, installing check dams, etc.
- **Follow the label** on herbicides and fertilizers. Avoid applying these products on windy or rainy days or near bodies of water. The product could drift or run off into surface water.

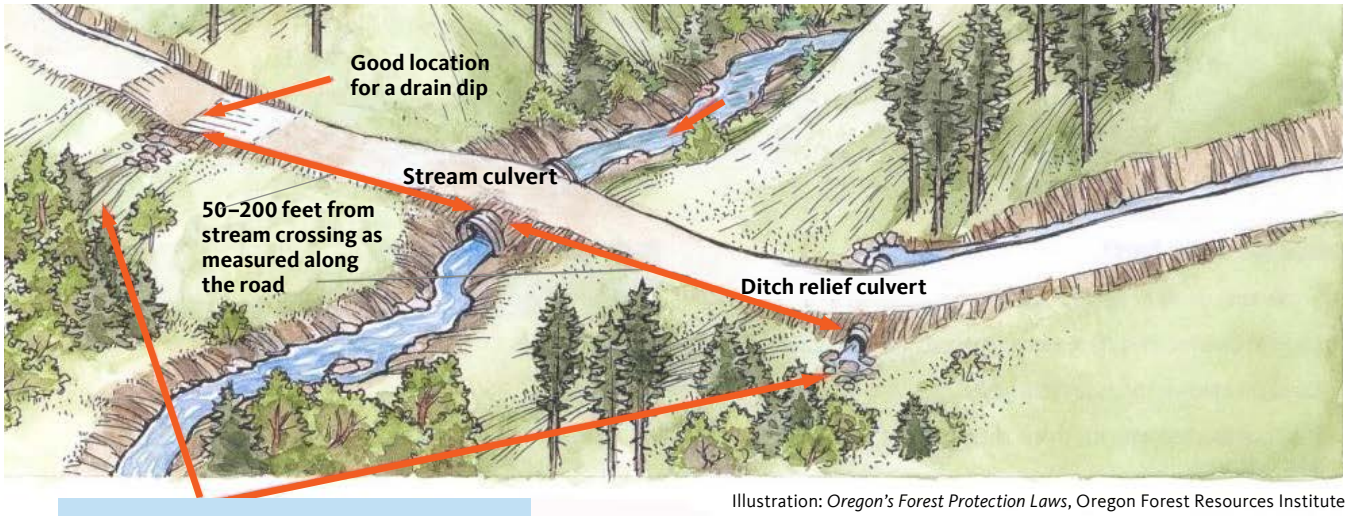

Illustration: *Oregon's Forest Protection Laws*, Oregon Forest Resources Institute

Ditch draininage should be directed into a vegetation filter, and not allowed to continue flowing down the ditch and into the stream.

Forest roads can be a source of sediment in streams. Use drainage structures to divert water from the road surface or ditch before it enters the stream.

Keep soils healthy

- **Minimize soil disturbance, compaction and displacement.** Undisturbed forest soils consist of about 50% pore space. This space allows for gas exchange with the atmosphere and the infiltration and temporary storage of rainwater and snowmelt. Heavy equipment compacts soils, reducing infiltration and gas exchange. This can reduce plant growth and increase surface water runoff, causing erosion.
- **Confine heavy equipment to roads** and designated skid trails where feasible.
- **Quickly replant bare or disturbed areas** to minimize erosion.
- **Balance the retention of organic matter** with fire hazard concerns.

Trees and other vegetation take up nutrients from the soil and recycle them through the decomposition of needles, leaves and twigs that fall to the ground. Most of a site's nutrient "bank" is contained in the organic matter found in the topsoil itself, not the vegetation. Nutrients are added primarily through the breakdown of rock layers and inputs from nitrogen-fixing vegetation, such as alder trees.

Severe wildfire is one of the main ways nutrients can be lost from the site, so fuels and fire risk reduction promote soil conservation. When slash is added to the forest floor after thinning, allow it to decay and return nutrients to the soil.

But this organic material also represents a fire hazard. Decomposition could take years and even decades in a dry climate. Balance retention of some organic matter for long-term soil health with the elevated fire hazard it poses.

Photo: Gerald Holmes,California Polytechnic State University at San Luis Obispo, Bugwood.org

Minimize soil disturbance and compaction by confining heavy equipment to roads and skid trails when possible.

Seek advice specific to your site to strike this balance.

Manage invasive weeds

Invasive or noxious weeds compete with and displace native plants. Prevention is the best way to keep invasive weeds to a minimum.

- **Keep out dirty vehicles and equipment.** Alternatively, wash vehicles before entry and require contractors to do the same. Try not to import seed-contaminated fill dirt or road gravel. Clean the dirt off boots when they have been used off site.
- **Periodically monitor** your woodland for noxious weeds. Skid trails, roads (especially cut and fill slopes), burned areas, logged areas and other disturbed areas are more likely to harbor new weed populations than the undisturbed forest. Monitor at different times of year; some evergreen weeds are more visible in winter.

Photo: Max Bennett, © Oregon State University

This stand just below a home site was thinned by removing small-diameter trees to reduce the fire hazard and improve tree health. Some dense patches of trees, including smaller trees, were left to provide habitat and visual screening.

- **Practice integrated pest management.** Where weeds are detected, attempt to control or eradicate them using IPM. This strategy combines an array of pest control methods to achieve the best results with the least disruption to the environment. Use pesticides only under strict circumstances that minimize risk.
- **Consult the *Pacific Northwest Weed Management Handbook*,** *pnwhandbooks.org/weed,* for more information on weed management.

Reduce the threat of fire

- **Learn your local fire restrictions.** Contact your local Oregon Department of Forestry office for more information on fire season, restrictions and closures.
- **Make your forest resistant to fire.** A fire-resistant forest is one that can survive a wildfire with some scorched ground but with most of the overstory trees intact. Follow these steps to create a fire-resistant forest:
  - **Minimize and reduce the continuity** of high-risk surface fuels. For example, landowners should treat excess slash.
  - **Reduce ladder fuels** by thinning and pruning.
  - **Break up crown continuity** by creating openings in the trees.

Photos: Ed Reilly

The same site before, top, and after, bottom, a treatment to reduce the fire hazard and improve the health of the remaining oaks and pines. Most brush and small-diameter trees were removed; some patches of brush were retained for habitat.

- **Retain larger trees** and favor more fire-resistant species, such as ponderosa pine. On larger properties, it's difficult to treat every acre, so focus fuel-reduction treatments in strategic locations, such as ridgelines and above and below access roads. See other publications in this series in the OSU Extension Catalog, *catalog.extension.oregonstate.edu,* for additional information.
- **Maintain access roads.** Access roads facilitate quick detection and suppression of fire. Remove dense vegetation encroaching on or overhanging the road. Design and maintain access roads that meet fire suppression vehicle standards. Where possible, maintain two ways to exit your property.

Promote tree and stand health

- **Assess the condition of your forest or woodland.** Conduct a forest inventory. Get to know the character, topography and soil conditions of your property and the composition and structure of the trees and shrubs.
- **Match tree species to site conditions;** plant and thin to favor best-suited species. Feature drought-tolerant trees (pines, oaks, madrones) on dry ridgetops, areas of shallow soils, and south and west aspects. Include a bigger mix of less drought-tolerant species (Douglas-fir, true firs, incense cedar) on east, and especially, north aspects.
- **Thin excessively dense stands or patches.** Determine stand density. If the forest is overly dense, thin the stand or portions of it to desired levels. Treat thinning slash by burning, chipping or removing it.
- **When thinning, retain vigorous, high-quality trees of desired species.** When choosing "leave" trees in a thinning operation, select trees with healthy foliage that appears full.
- **Provide lots of growing space** around pines, oaks, and other shade-intolerant species. Provide especially wide spacing around pine leave trees. Where hardwoods are selected for retention, ensure that crowns are open to the sun and unlikely to be overtopped by other retained trees before the next thinning.

Timber harvesting

Though many woodland owners don't manage primarily for timber production, timber harvests can generate income from a property. They also can improve forest health, reduce fire risks and create new wildlife habitat.

In a commercial thinning, some trees in a stand are removed in order to favor the growth of the remaining trees.

In a patch cut or clearcut harvest, most or all trees in an area are cut. This approach creates favorable conditions for tree species that grow best in full sun.

There are many other harvest methods, and each has important implications for future tree regeneration and growth and development of habitat.

Photos from left to right: Bill Schaupp, U.S. Forest Service; Chris Schnepf, University of Idaho, Bugwood.org; Max Bennett, © Oregon State University

Indicators of tree health issues include dead and dying branches, left, or tree crowns that show sparse or off-color foliage, center. Compare the tree at left to the tree at right. Tree in right photo has healthy crown.

Photo: Stephen Fitzgerald, © Oregon State University

Timber harvests can generate income, or they can be used to improve forest health, create new habitat and reduce fire risk.

- **Match the harvest method to your objectives** and become familiar with the implications of the harvest for the future development of the forest.
- **Learn the Oregon Forest Practices Act requirements** on timber harvesting. Numerous rules govern notification, post-harvest reforestation, roads and stream crossings, slash abatement, wildlife tree retention, and riparian buffer zones.
- **File a notification of operations prior to harvest.** The Oregon Department of Forestry issues notifications. Depending on the type and location of the operation and proximity to streams and wildlife habitat, you may need a written plan.
- **Consider working with a consulting forester** to help prepare for and manage the timber sale and harvest. A consultant can help choose a harvest method to meet your objectives, determine timber volumes and values, mark boundaries and timber to be cut, find a buyer, locate a logger, and manage the harvesting operation, among other tasks.
- **Find a reputable logger and use a contract.** Check references and ask to view other jobs the logger has completed.

The practices described in these guidelines all relate to timber harvesting, especially those related to protecting water quality through the proper design, location and maintenance of roads, road drainage and stream crossings.

Reforestation

- **Choose species adapted to your site and match them to site conditions.** Make sure the seedlings are from the correct seed zone and elevation, so that they will be genetically adapted to the site. Consult seed zone maps; most nurseries can help you make the right match.
- **Keep seedlings cool** and make sure the roots stay moist. Many reforestation failures trace back to poor handling and planting techniques.
- **Plant in winter** when seedlings are dormant and soils are moist.
- **Remove competing vegetation.** Shrubs and grass can quickly overwhelm planted seedlings. Weed prior to planting and maintain a weed-free area within 3 to 5 feet of the seedling through at least the first summer.

Maintain and improve wildlife habitat

- **Inventory the property** for habitat characteristics and keep records of wildlife observations.
- **Develop desirable habitat for the species you want to foster.** If you want to support a variety of wildlife, promote a diverse forest composition and structure in part or all of your stand. This will maximize the number of habitat niches and make more food, water, and cover available. See other publications in this series in the OSU Extension Catalog, *catalog.extension.oregonstate.edu,* for more information.
- **Favor a variety of tree species** when thinning, including some of different sizes. Vary the spacing from place to place. Maintain some dense, unthinned clumps. Create openings and edges of varying sizes. Feature shrubs, herbs and grasses.
- **Retain hardwood where possible.** Consider favoring large oaks as "leave trees." Oak habitat is particularly rich in species.
- **Look at the big picture.** While habitat diversity is generally desirable, consider the surrounding area and whether your property may provide special habitats not found in the vicinity. On a landscape scale, your biggest contribution to overall habitat diversity might be favoring one particular type of forest or habitat (oak woodland or riparian hardwoods, for example), rather than trying to maximize habitat diversity on your individual parcel. Also, consider how your property might serve as a corridor between adjacent habitats and what could be done to maintain connectivity.
- **Leave some dead wood.** Dead wood is a critical source of food and shelter for many species, from woodpeckers to small mammals.
- **Maintain some snags** (especially those over 10 inches in diameter at chest height) in places where they will not interfere with other management objectives.
- **Maintain some live trees** (especially hardwoods) with evidence of decay.
- **Leave large down wood** (logs greater than 10 inches in diameter at the small end).
- **Leave a few slash piles** at strategic locations in the forest.

Follow the rules

The Oregon Forest Practices Act governs forestry operations such as commercial timber harvesting, road-building, reforestation, precommercial thinning, chemical applications and prescribed burning.

Photo: U.S. Fish and Wildlife Service

The American marten, or pine marten, is found in Oregon's high forests.

Photos: Rachel Werling, © Oregon State University

Western fence, or blue-belly, lizard found in a coniferous forest near Applegate, Oregon.

Coyote pup near Butte Falls, Oregon. The coyote den was located in a downed log.

Photo: Ken Bevis, Washington Department of Natural Resources

Dead wood is a critical source of shelter for many species. Leave a few slash piles at strategic locations.

If you are undertaking a forestry operation, follow the guidelines laid out in the Forest Practices Act. Submit a notification of operations to the Oregon Department of Forestry before you start. A notification is required when:

- Using power-driven machinery on your property.
- Harvesting a small patch of timber and selling the logs.
- Applying herbicide on forest lands.
- Completing a fuels-reduction project that generates slash.
- Building a road across a stream to access a timber stand on the other side.
- Converting a forested area to another land use.

Learn more about the forest practices act from the Oregon Department of Forestry or the Oregon Forest Resources Institute. Get to know your Oregon Department of Forestry stewardship forester, especially if you are contemplating a forestry operation.

References

What are Forestry Best Management Practices? SUNY College of Forestry and Environmental Science, *www.esf.edu/pubprog/forestmanage/*

Forestry Best Management Practices. American Forest Foundation, *mylandplan.org/content/forestry-best-management-practices-0*

Oregon Forest Practices Act. Oregon Department of Forestry, *www.oregon.gov/ODF/Working/Pages/FPA.aspx*

Oregon's Forest Protection Laws: An Illustrated Manual, Third Edition. Oregon Forest Resources Institute. oregonforests.org/pub/oregons-forest-protection-laws-illustrated-manual

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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Worksheet 1: Resource assessment for forests and woodlands

Use this checklist of characteristics to assess the current condition of your forest or woodland. Use extra paper if necessary.	Yes	No	Not sure	N/A
Species mix				
Conifer forest (conifers >70% of trees)				
Mix of conifers and hardwoods				
Hardwood forest (hardwoods >70% of trees)				
Oak woodland				
Mix of trees and brush				
Other				
List the main tree species	1.			
	2.			
	3.			
	4.			
	5.			
	6.			
Aspect				
Slopes face SE to W				
Slopes face NW to E				
Aspect is flat				
Terrain				
Terrain is mostly steep (35% slopes or greater)				
Terrain is mostly flat or with moderate slopes				
Terrain is varied				
Access				
I can access most of the property via roads, skid trails or trails				
I can't currently access some parts of my property				
Are any of the following potential CONCERNS present?				
Soils				
Bare areas of soil on more than 10% of ground				
Evidence of recent soil erosion (surface, rills, gullies, etc.)				
Excessive soil compaction (more than 10% of area compacted)				
Roads/water quality				
Roads or skid trails are steep and eroding				
Culverts undersized and prone to plugging up				
Roads cross streams in many places				
Roads or ditches drain directly to streams				
Streams				
Streams have no tree buffer, are directly exposed to the sun				

Worksheet 1: Resource assessment for forests and woodlands

Use this checklist of characteristics to assess the current condition of your forest or woodland. Use extra paper if necessary.	Yes	No	Not sure	N/A
Invasive weeds				
Numerous noxious or invasive weeds present				
Wildfire risk				
Excessive slash or ground fuels present				
Excessive ladder fuels present				
Tree density is high; tree crowns overlap				
Tree health				
Tree density is very high; tree crowns overlap				
A lot of trees have died recently				
Trees show evidence of recent branch or top dieback				
Many trees have low vigor (poor crown ratios)				
Forest diversity/wildlife				
Forest lacks undergrowth				
There are few large dead trees, or snags, or downed logs				
Are any of the following HEALTHY CONDITIONS present?				
Soils				
Soils are deep, uncompacted, have cover of duff and litter				
Roads/water quality				
Roads/skid trails have good drainage, are not eroded				
Roads do not drain sediment directly to creeks				
Streams				
Streams run clear except during storms				
Streams have adequate buffers of trees and other vegetation				
Invasive weeds				
Property is largely free of invasive weeds				
Wildfire risk				
Large, fire-resistant trees are present				
Surface and ladder fuels are light or discontinuous				
Tree health				
Larger, dominant trees have adequate (>1/3) live crown ratios				
The forest is diverse: there is a mix of tree species, sizes and ages				
The forest is not overly dense				
Recent mortality is scattered or confined to a few small areas				
Forest diversity/wildlife				
Dead wood (snags and downed logs) is abundant				
Brush patches and other habitat features present				
Signs of current wildlife use				

Review your responses to Worksheet 1: Resource Assessment for Forest and Woodlands. Use extra paper as necessary. **Are there areas of CONCERN or that require improvement? List the most important ones below.**	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Review HEALTHY conditions present. List the most significant ones below.	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Review the items marked "not sure" on Worksheet 1. List topics to investigate further.	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Worksheet 2: Management activity assessment for forests and woodlands

Use the checklist of management practices below to identify activities you incorporate in your forest and woodlands management. Use extra paper as necessary.	Already present	Completed	Need to do	Consider	Not applicable
Protect water quality					
Maintain a forested buffer around streams, including seasonal streams					
Avoid using heavy equipment in streambeds and riparian zones					
As much as possible, keep roads and skid trails away from streamside areas					
Design, construct and maintain roads/trails to minimize runoff and sedimentation					
Minimize stream crossings and size culverts for peak flows					
If using herbicides, follow the label; avoid drift into water					
Maintain adequate tree, shrub, herbaceous cover					
Periodically monitor roads, skid trails and disturbed areas for runoff and erosion					
Restore eroding areas by planting, seeding, installing check dams, etc.					
Keep soils healthy					
Minimize soil disturbance, compaction and displacement in management activities					
Keep heavy equipment on roads and predesignated skid trails					
Reforest/revegetate disturbed areas as quickly as possible					
Balance retention of litterfall and slash for nutrition with fire concerns					
Prevent and manage invasive weeds					
Monitor occurrence of noxious weeds; focus on roadsides and disturbed areas					
Manage/eradicate noxious weeds using appropriate integrated pest management methods					
Prevent new weed introductions via vehicles, equipment and contaminated material					
Reduce the threat of fire					
Design/maintain access roads to meet fire suppression vehicle					
Minimize and reduce continuity of high-risk surface fuels; treat excess slash					
Reduce ladder fuels by thinning and pruning					
Break up crown continuity by creating openings in stand					
Where possible, retain larger trees of the most fire-resistant species					
Focus fuels reduction in strategic locations					

Worksheet 2: Management activity assessment for forests and woodlands

Use the checklist of management practices below to identify activities you incorporate in your forest and woodlands management. Use extra paper as necessary.	**Already present**	**Completed**	**Need to do**	**Consider**	**Not applicable**
Maintain healthy trees and forest					
Assess condition of forest/woodland regularly					
Match tree species to site conditions; plant and thin to favor best-suited species					
Thin overly dense stands or patches to appropriate levels					
In thinning, retain vigorous, high-quality trees of desired species					
Provide wider spacing around pines, oaks and other shade-intolerant species					
Reforestation					
Choose site-adapted species of correct seed zone and elevation					
Use proper seedling handling and planting techniques					
Provide adequate site prep and follow-up care to ensure survival and growth					
Maintain and improve wildlife habitat					
Inventory for habitat features; monitor wildlife presence					
Maintain/promote habitat for desired species					
Promote diverse composition and structure. Remember “variety is the spice of life”					
Retain some snags, down logs and decayed trees					
Follow the rules					
Follow Oregon Forest Practices Act regulations regarding forestry operations					
Submit a Notification of Operations prior to forestry operations					

Results

Review the results of Worksheets 1 & 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these below.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Photo: Stephen Fitzgerald, © Oregon State University

Home ignition zone maintenance practices include use of a rock terrace as a fuel break, pruning the conifer trees on the right, and thinning between trees and clumps of shrubs. The basic idea is to break up the continuity of the fuel.

Wildfire preparedness

Introduction

Program participants will have read the Rural Resource Guideline for this module. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline" below). This module can be delivered as a part of a complete Land Steward training or used as a guide for a stand-alone field day. When implementing a training it helps to remind participants to connect the concepts from this module with other related module topics in the training as appropriate. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

Wildfire is one of the chief concerns of most landowners who participate in the Land Steward Program. Changes in climate patterns and historical forest-management practices have created an environment resulting in summers with increasingly severe wildfires fires across the West, usually with great loss of property and often lives. However, fire is a part of the ecosystem in the West, and even with the best management, wildfire will be part of living here. Under the right conditions, fire can also be a generative part of the ecosystem with positive benefits. This module will help landowners to understand characteristics of home and land management that reduce the risk of loss of property and life when wildfire comes to their property.

Coordinator preparation

- Recruit natural-resource expert (see natural-resource expert above).
- Select landowners and field sites (see field sites above).
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and structure of the session.
- Send reminder emails to class participants, landowners and the natural-resource expert three to seven days prior to site visits (see samples in Appendices):
- Print directions for carpooling to field sites.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field, including travel time

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITES

Choose sites that showcase the elements of the Home Ignition Zone. Choose a rural property that demonstrates most of the best practices pertaining to wildfire risk reduction in the HIZ. Review home construction, landscaping, surrounding topography and landscape conditions, as well as the landowner's personal preparedness. Many landowners have taken special precautions to prepare for fire, which they will be able to share with the participants.

Review "Field site logistics" in "Module delivery guidance," page 9.

NATURAL-RESOURCE EXPERT NEEDED

Possible natural-resource experts include Oregon Department of Forestry personnel (stewardship forester, Firewise coordinators, fire specialists). ODF focuses on community education and may have technical or financial resources to help landowners make their properties more fire-safe. Other possible resource experts include university Extension agents or personnel from local Soil and Water Conservation Districts. Choose someone who can be available as a resource in the future for landowners' questions and technical needs.

Lesson plan: The home ignition zone

LEARNING OBJECTIVES

- Recognize the ecological role that fire plays in the landscape.
- Identify how land, property and infrastructure-management practices affect the risk and level of damage during wildfire.
- Identify building and landscape features that reduce risk from wildfire.

BEHAVIOR OBJECTIVES

- Conduct a home and property wildfire preparedness assessment.
- Identify areas of concern and select actions to decrease the risk of property loss from wildfire.
- Create a management plan that will minimize the risk of wildfire damage while supporting healthy natural resources.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *The Home Ignition Zone: Protecting your Property from Wildfire*, EM 9247, and review Worksheet 1.
  - Print and bring entire document to wildfire preparedness field class.
- Read additional resources provided (optional).

Materials list

- Copies of reading assignment for the next class, usually the Land Steward Program Resource Guidelines (Some participants prefer to access these online, so a full class set may not be needed)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from *The Home Ignition Zone: Protecting your Property from Wildfire*, EM 9247.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

- In *The Home Ignition Zone: Protecting your Property from Wildfire*, EM 9247, use Worksheet 1 to complete a wildfire preparedness assessment of your property.
- In the Land Steward Property Management Plan under "Natural resource assessment summaries," summarize the results of your assessments and list your management goals and priority actions for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

From *The Home Ignition Zone: Protecting Your Property from Wildfire*, EM 9247. (See below)

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of the HIZ area using Worksheet 1. The purpose of this is to practice assessing fire risk in the HIZ and familiarize them with the assessment that they will perform as homework.

- Ask participants to work in small groups with one notetaker. Assign each small group one or two sections of the assessment worksheet, depending on your class size. They will share the results of their sections at the end of the class.
- Distribute clipboards, pencils and copies of Worksheet 1 as needed.
- Allocate 10–15 minutes for the participants to explore the property to assess the habitat. Instruct them to start with their assigned section and then proceed with the rest of the worksheet as time allows.

Content outline

Participants will have read *The Home Ignition Zone: Protecting your Property from Wildfire,* EM 9247. This document serves as guidance for the content provided by the natural-resource expert, as well as concepts to highlight during the property tour. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the sites. Suggested topics include:

- Remember the six P's:
  - People and pets.
  - Papers.
  - Prescriptions.
  - Pictures (memorabilia).
  - Personal computers and devices.
  - Plastic (credit cards, etc.).
- Personal wildfire preparedness.
  - 123 Ready Set Go.
  - Emergency kit and evacuation plan.
  - Know your neighbors.
- The wildland-urban interface: what is it and why it matters.
- Home Ignition Zone.
  - 0–100 feet (200 feet on sloped land)
- Causes of fire in the HIZ.
  - Embers fall on combustible materials.
    - » Embers cause the most loss of homes.
  - Sufficient radiant heat from nearby burning vegetation.
  - Contact from flames reaching the structure.
- Reduce risk in the HIZ.
  - Immediate zone considerations (0–5 feet)
    - » Install noncombustible roof.
    - » Clean gutters.
    - » Screen opening should be 1/8 inch.
    - » Use noncombustible siding.
    - » Employ 5 feet of noncombustible material around foundation.
    - » Remove dead vegetation and debris.
  - Intermediate zone (5–30 feet).
    - » Prune tall trees up to 6–10 feet from the ground.
    - » Prue individual tree canopies to 10 feet from each other.
    - » Remove dead plant material.
    - » Remove highly flammable plantings with fire-resistant species.
    - » Keep grass watered.
    - » Create fuel breaks.
    - » Avoid large areas of mulch.
    - » Park vehicles away from vegetation.
  - Extended zone (30–100+ feet).
    - » Remove dead vegetation.
    - » Mow grass to 4 inches.
    - » Remove invasive weeds.
    - » Remove ladder fuels.
    - » Thin dense vegetation.
- Create fire-resistant woodlands beyond the HIZ.
  - Reduce surface fuels.
  - Reduce ladder fuel.
  - Create space between fuels.
  - Retain larger fire-resistant tree species.
- Access.
  - Post home address to be easily visible to fire department.
  - Make sure that driveway has clearance for fire trucks.
- Follow the rules.
  - Know burning regulations.
  - Know when power equipment use is restricted.

- Reconvene the participants and invite each group to share the results of their assessment section. Discuss briefly as a group.

Alternative activities

There are many alternative activities that could be done for this module. Examples include: proper building of a burn pile, proper pruning and selecting trees for fuel reduction.

Background resources

In "Module delivery guidance," review "Background resources," page 9

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page 9. The coordinator should share the suggestions with the natural-resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page 12.

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

Photo: John O'Connor, Oregon Department of Forestry

Wildfire encroaches upon a home. In Oregon, living with wildfire means creating a fire-resistant landscape.

THE HOME IGNITION ZONE:
Protecting Your Property from Wildfire

Max Bennett and Clint Nichols

Oregon is fire country. With our hot, dry summers and abundant fuels, it is not a matter of if a wildfire will occur, but when. Wildfire can threaten homes, property and lives. But it also plays important ecological roles, such as reducing fuels and recycling nutrients.

Historically, not all wildfires in Oregon were the same. Some burned much hotter than others. Some forests burned more frequently, but the fires were less intense. Generally, the state's wetter regions tended to experience intense but infrequent fires, while drier locations experienced much more frequent low- and moderate-intensity fire. In recent decades, hotter, drier summers and a buildup of flammable vegetation have led to an increase in fire size and severity in these drier areas of the state.

For landowners, living with wildfire means protecting your home and property from damaging fires while creating a forest or woodland that is fire-resistant — meaning one that can experience a wildfire and survive, more or less intact. For communities, living with wildfire means suppressing wildfires when necessary, but also encouraging the use of prescribed fire at times and in locations where appropriate. This approach is summed up in the vision statement of the National Cohesive Wildland Fire Management Strategy: "To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire."

Max Bennett, Extension Forestry and Natural Resources faculty and associate professor, Southern Oregon Research and Extension Center, Oregon State University. Clint Nichols, forest and riparian resource conservationist, Jackson Soil and Water Conservation District.

Oregon State University

EM 9247
June 2020

2 EASY STEPS

Use this document to evaluate and improve your home and property

1. Read *The Home Ignition Zone: Protecting Your Property from Wildfire*
2. Use the worksheet on page 7 to assess your current management practices and identify areas for improvement.

If you have questions, contact your county Extension office, state or federal officials, or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners with little or no technical background by the Land Steward program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties, but many of the practices apply to other areas.

REMEMBER THE 6 P'S

Keep these items ready in the event you need to evacuate:

- **People** and pets
- **Papers,** phone numbers and documents
- **Prescriptions,** vitamins and eyeglasses
- **Pictures** and irreplaceable memorabilia
- **Personal computers,** hard drives, cellphones, chargers, batteries, etc.
- **Plastic** (credit cards, ATM cards) and cash

Personal wildfire preparedness

- **Get ready.** If a wildfire occurs, you may be evacuated. Become familiar with the three levels of evacuation preparedness (Be Ready, Be Set, Go!). You should always be at level 1 (Be Ready). At level 2 (Be Set), you should be ready to evacuate at a moment's notice. At level 3 (Go!), leave immediately.
- **Create an emergency kit and an evacuation plan** that lists what you need to take with you, where it is, and how you are going to get it away from your property (the six Ps).
- **Know your neighbor.** In rural areas, your neighbor can be at your home faster than any emergency response. Establish lines of communication to notify each other in the event of a wildfire.

The Home Ignition Zone

Homes built in the wildland-urban interface, where urban and suburban areas intermingle with the surrounding forest or other wildland vegetation, are at high risk from wildfire.

Home ignition in a wildfire typically occurs when:

- Radiant heat from nearby burning vegetation or structure fires rises to a level that induces combustion.
- Surface fires reach the walls or roof of the home.
- Embers, also known as firebrands, fall on combustible materials on or around the home.

Most commonly, homes are lost in wildfires when

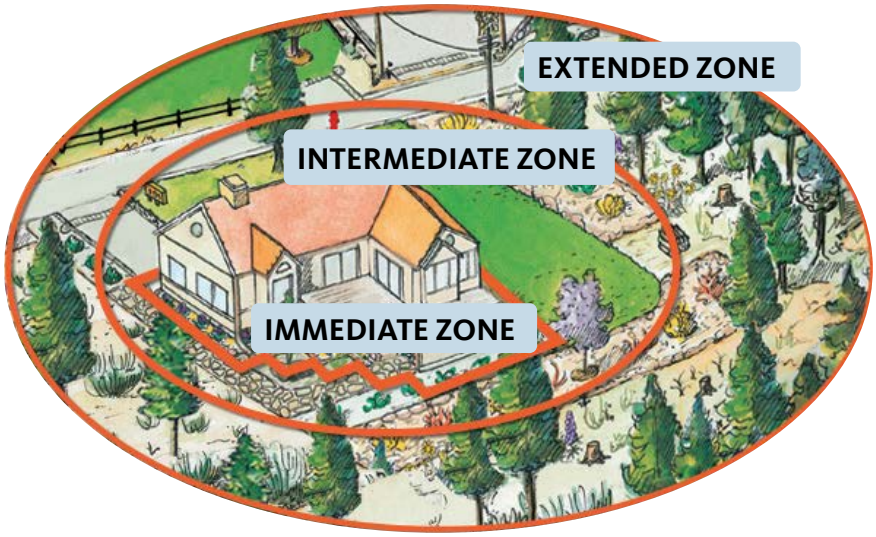

Illustration: © Univeristy of Nevada, Reno

The Home Ignition Zone is defined as the home and everything around it out to 100 feet (more on steeper slopes).

Photo: John O'Conner, © Oregon Department of Forestry

Clean the roof to keep embers from igniting tree litter.

Photo: Stephen Fitzgerald, © Oregon State University

Maintain a noncombustible area around the base of your home.

they come into contact with embers or low-intensity surface fires — not from a giant wall of flames from an advancing wildfire.

The Home Ignition Zone is defined as the home itself and everything around it out to 100 feet (out to 200 feet on steeper slopes). The condition of your HIZ is the primary factor that determines whether your home will survive a wildfire. The good news is that there is much you can do to reduce your risk!

The HIZ is divided into three zones:

- **The immediate zone,** which includes the home and extends outward for 5 feet.
- **The intermediate zone,** which extends from 5 to 30 feet.
- **The extended zone,** which extends from 30 to 100 feet (more on steeper slopes).

The actions you take vary by zone.

Immediate zone (0–5 feet)

This zone includes the home itself and everything out to 5 feet from the foundation.

CHIMNEY TO EAVES

- **Consider the composition and condition of your roof.** The roof is the most vulnerable component of a home when it comes to wildfire. The roof should be made of a combustion-resistant material, such as those in Class A (clay tiles, metal, slate, composition shingles).
- **Keep the roof and gutters free of debris** and tree litter. This is one easy and effective way to prevent embers from igniting there. Combustible gutters, such as those made of vinyl, can fail under radiant heat, exposing the underlying surface to direct flame contact.

EAVES TO FOUNDATION

Windows and siding that fail due to radiant heat exposure can expose the interior of the home or the underlying structure, both of which are more susceptible to direct flame contact and ember showers. Install metal mesh screening with 1/8-inch openings, which has been shown to reduce the chances of embers entering the home.

FOUNDATION TO 5 FEET

- **Maintain a noncombustible area** at least 5 feet wide around the base of your home. Use gravel, rock mulches or hard surfaces such as brick and pavers.
- **Remove dead vegetation and debris under decks.** Never store lumber, firewood or other flammable materials underneath. Install screen under low-profile decks to prevent ember entry.
- **Assess your storage practices.** Keep accessories such as patio furniture, gas grills and even welcome mats in an enclosed storage area or away from the home when the wildfire threat is high. These can be a source of ignition under an ember shower.

Intermediate zone (5–30 feet)

This zone should be "lean, clean and green." Discourage fire-prone, flammable vegetation within 30 feet of the house to keep it "lean." Maintain a low density of vegetation in general. Keep it "clean" by preventing the accumulation of dead vegetation or flammable debris within this area. Keep plants healthy and "green" by watering sufficiently during fire season. For most homeowners, the lean, clean and green area is the residential landscape. This zone often has irrigation, contains ornamental plants and should be maintained annually.

- **Prune tall trees up to 6–10 feet.** When pruning shorter trees, maintain at least a 50% crown. Proper pruning reduces the chance that a surface fire will use low hanging limbs to move into the upper canopy. Lower limbs as well as small trees and shrubs are known as ladder fuels because fire can "climb" into the upper canopy where fires can become more intense and spread faster.

Photo: Stephen Fitzgerald, © Oregon State University

Home ignition zone maintenance practices include use of a rock terrace as a fuel break, pruning the conifer trees on the right, and thinning between trees and clumps of shrubs. The basic idea is to break up the continuity of the fuel.

- **Prune individual tree canopies** at least 10 feet away from the home or attached structures. Individual trees and clumps of trees should be spaced at least 15–20 feet apart between tree tops, with a greater distance on steeper slopes.
- **Remove dead plant material** such as leaves, needles and twigs.
- **Replace flammable plants** such as juniper or Leyland cypress with fire-resistant plants.
- **Keep grass watered** (green) and mowed to 4 inches.
- **Create fuel breaks** with driveways, walkways, paths and other hardscapes.
- **Avoid large, contiguous areas of bark mulch,** which is flammable, especially when dry. Keep bark moist and break it up with hardscapes, lawn or other, non-flammable materials.
- **Park vehicles in areas clear of vegetation** and maintain fuel breaks around secondary structures. Vehicles and other nearby structures such as gazebos and sheds can be a source of ignition and fuel.

Extended zone (30–100+ feet)

This area extends from the 30-foot lean, clean and green area out to at least 100 feet, and up to 200 feet or more on steeper slopes with thick vegetation. It typically lies beyond the residential landscape and often consists of naturally occurring plants such as conifer and hardwood trees, brush, weeds and grass.

You may find that your Home Ignition Zone overlaps onto adjacent properties. Work closely with neighbors to reduce your shared risk.

- **Remove dead vegetation,** including dead shrubs, fallen branches, thick accumulations of needles and leaves, etc.
- **Mow grass to 4 inches high or less**.
- **Remove invasive weeds** such as blackberries, cheatgrass and Scotch broom.
- **Remove ladder fuels** such as low tree branches, shrubs growing underneath larger trees and small trees growing between mature trees.

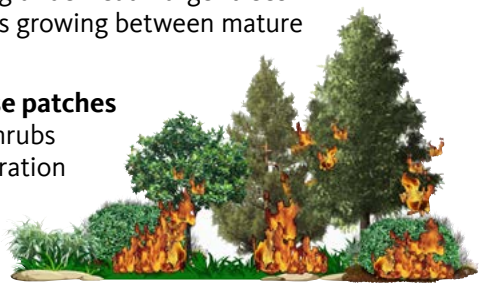

Illustration: Cat Kizer, © Oregon State University

Ladder fuels allow flames to climb nearby trees. Prune branches of live trees up to 10 feet.

- **Thin out dense patches** of trees and shrubs to create separation between them in order to slow the spread of fire. Breaking up the canopy, or reducing the connection between tree crowns, reduces the chance that high-intensity crown fires will approach your home. Such fires can create a major source of radiant heat as well as embers. In some cases, however, mature stands of healthy, fire-resistant trees, such as ponderosa pine and bigleaf maple, catch and filter embers that would otherwise land on the home.
- **Continue pruning and removing ladder fuels** out to the farthest extent of the Home Ignition Zone, from 100 feet to 200 feet.

Photo: John O'Conner, © Oregon Department of Forestry

A well-maintained Home Ignition Zone.

Photo: Ed Reilly

Fuel reduction in Zone 3 and beyond: before (left) and after (right). Keep larger trees of fire-resistant species.

Beyond the Home Ignition Zone: creating a fire-resistant woodland

The Home Ignition Zone extends out to approximately 100 feet from the home (up to 200 feet or more depending on slope, aspect, vegetation type and density). But your fuels management activities shouldn't stop there. You can create a forest or woodland that is more fire-resistant — that is, one that is able to experience a wildfire and survive more or less intact. Research and experience in forests throughout the American West show four basic principles for creating fire-resistant forests:

1. **Reduce the amount of surface fuels,** such as small branches and other debris lying on the forest floor. This does not mean removing all woody material or litter; just reduce the heavier concentrations. However, it is important not to leave bare ground, which may encourage invasive plants that are often highly flammable.
2. **Reduce ladder fuels,** such as lower tree limbs, small trees, and brush growing under larger trees. Reducing surface and ladder fuels reduces fire intensity and heat production and makes it harder for a fire to ignite tree crowns.
3. **Create space between individual trees** or clumps of trees to reduce the potential for tree-to-tree fire spread.
4. **Keep larger trees** of fire-resistant species, which are the trees best able to survive a fire.

Access

- **Clearly post your home address** at the foot of the driveway and at every junction on a shared road. Firefighters cannot defend what they cannot find or access.

Illustration: Cat Kizer, © Oregon State University

- **Make sure your driveway has the proper clearance** for large fire equipment. Firefighters will not defend a structure that has inadequate ingress and egress routes or one that lacks defensible space.

Follow the rules

Several state and county regulations require landowners in areas designated as high-risk to follow guidelines regarding fuels reduction, setbacks, access to the property and more. See References, below.

Certain activities, such as using chain saws and other power-driven equipment, open burning, and

forestry operations, may be restricted or prohibited during fire season. Be sure you know where to access this information for a complete list of restrictions in your area. See *Forests and Woodlands: Protecting an Ecosystem*, EM 9245, *catalog.extension.oregonstate.edu/em9245*.

References

Reducing Wildfire Risks in the Home Ignition Zone, National Fire Protection Association. *www.nfpa.org/-/media/Files/Training/certification/CWMS/ReducingWildfireRisksHIZ.ashx?la=en*

Standard for Reducing Structure Ignition Hazards from Wildland Fire, National Fire Protection Association 1144, *www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1144*

Keeping Your Home and Property Safe from Wildfire: A Defensible Space and Fuel Reduction Guide for Homeowners and Landowners, EM 9184, *catalog.extension.oregonstate.edu/em9184*

Reducing Fire Risk on Your Forest Property, PNW 618, *catalog.extension.oregonstate.edu/pnw618*

Citizen Fire Academy, *extension.oregonstate.edu/citizen-fire-academy*

Oregon Forestland-Urban Interface Fire Protection Act, or Oregon's Defensible Space Law, *www.oregon.gov/ODF/Fire/Pages/UrbanInterface.aspx*

Oregon Department of Forestry public use restrictions: *www.oregon.gov/odf/fire/pages/restrictions.aspx*

Firewise USA, *www.firewise.org*

Fire Adapted Communities, *www.fireadapted.org*

Ready Set Go, *www.oregonrsg.org*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, forest and riparian resource conservationist, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

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Worksheet: Wildfire preparedness and home ignition zone assessment

Use this checklist to assess the current condition of your home ignition zone. Use extra paper as necessary.	Yes	No	Not sure	N/A
Personal wildfire preparedness				
Evacuation plan in place that you practice and update regularly				
Neighborhood emergency phone tree in place and shared with local agencies				
72-hour kits for your family and pets or livestock created and periodically checked				
Important personal documents and list of valuables protected in case the home is lost				
Zone 1: chimney to eaves				
Home constructed of materials resistant to combustion				
Roof is of a composition that resists combustion, such as Class A roofing material				
Roof is in good repair, with no gaps or missing shingles				
Roof is free from tree litter and debris				
Skylights are constructed with multilayer glazed panels or tempered glass				
Gutters are constructed from combustion-resistant material				
Gutters and downspouts are free from litter and debris				
Eaves are boxed				
Home has wildfire protection system installed (roof sprinklers or fire retardant applicators)				
Zone 1: eaves to foundation				
Siding is of a combustion-resistant material				
Home construction is free of gaps and openings beneath siding				
Eave, soffit and roof vents are screened with 1/8-inch metal mesh or smaller				
Windows are multi-paned or tempered glass				
Window screens are combustion-resistant with mesh openings no larger than 1/8 inch				
Area around the foundation is free from litter and debris				
Zone 1: foundation to 5 feet				
Adjacent structures (carports, gazebos, garages) are combustion-resistant				
Deck, patio furniture, propane grills stored or combustion-resistant				
Attached fixtures (fences, decks, etc.) cannot carry fire to the home				
Attached fixtures cannot collect embers beneath or on the surface				
Noncombustible area 5 feet wide maintained around base of home				

Zone 2: 5–30 feet	**Yes**	**No**	**Not sure**	**N/A**
Firewood or flammable liquids (paint, fuels, etc.) stored at least 30 feet away from the home				
Vehicle parking areas are not vegetated and are separated from the home				
Highly flammable vegetation removed				
Grass within 30 feet of the home irrigated and mowed; cuttings removed				
Shrubs within 30 feet of the home pruned to less than 18 inches tall and free from litter and dead material				
Trees within 30 feet of the home pruned or limbed up 6 feet to 10 feet above ground				
There is adequate separation between crowns of individual and clumps of trees				
Zone 3 and beyond				
Surface fuels have been reduced, and are at a low level				
Ladder fuels are minimized				
There is adequate separation between crowns of individual and clumps of trees				
Large fire-resistant trees retained				
Access, water storage, signage				
Address clearly marked on the house and at the entrance to the driveway				
Minimum clearance of the driveway is 12 feet wide; vertical clearance of 15 feet				
Driveway accommodates emergency vehicles turning around, and has a secondary exit from property				
Trees along driveway adequately thinned to allow visibility into surrounding forest				
Bridges rated to hold a minimum of 50,000 pounds and wide enough for fire trucks to pass				
Water storage structures for firefighting use				
If applicable, property has submitted Oregon's Defensible Space Act, SB 360 certification card to Oregon Department of Forestry (see References, page 6)				
Home setbacks, addressing and access conform to county requirements.				

Review the results of the worksheet. Consider any practices you checked in the “No” and “Not sure” columns. What are the most important potential follow-up actions? List and briefly describe these below.	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Photo: Lynn Ketchum, © Oregon State University

The wildlife module focuses on management practices that enhance habitat value. Concepts learned here may also be applied to lessons on pastures, forests and streams.

Wildlife habitat

Introduction

Program participants will have read *Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna*, EM 9250. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline," below). This module can be delivered as a part of a complete Land Steward Training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

Most Oregonians value the natural landscape of their state. The underlying function of landscape is habitat for wildlife and natural vegetation. Whether humans are using their land for commercial purposes or simply as a rural retreat, or some combination of those, it is likely that wildlife will also be using the land. For many, this is a source of enjoyment. This module focuses on management practices and landscape characteristics that enhance usefulness for wildlife. It also touches on nuisance wildlife and noxious plants. You can revisit the concepts in this module during other modules, such as those on pastures, streams and forests. This way, participants recognize how they can manage for wildlife within those landscapes, such as by creating hedgerows at pasture edges, or leaving dead tree snags as wildlife trees.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines, and structure of the session.
- Send reminder emails to class participants, the natural-resource expert and landowners three to seven days before site visits.
- Print directions for carpooling to field sites.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field including travel time.

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

Content outline

Program participants will have read *Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna*, EM 9250. This document serves as guidance for the content provided by the natural-resource expert as well as concepts to highlight during the property tour. Suggested content topics follow. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites.

- Review the benefits of wildlife.
  - Pest control (insects, rodents, etc.).
  - Pollination.
  - Other roles in the ecosystem (population control, trophic cascade).
  - Enjoyment, recreation, hunting.
- Describe how and why it is beneficial to know the animal and plant species in your region and on your land
  - Keep an inventory of species.
  - Learn about wildlife species requirements of both desirable and undesirable wildlife.
  - Create goals to enhance or deter desirable or undesirable wildlife.
- Introduce the elements and sources of wildlife habitat: food, water, shelter and space.
  - Food
    - Planting and retaining healthy native plant populations helps support native wildlife species and helps deter noxious invasive species.
    - Management practices such as planting cover crops, shelter belts and hedgerows can enhance food and shelter resources.
  - Water
    - If natural water sources are present, it is essential to protect water quality, as well as stream and wetland habitat.
    - Cautions on providing artificial water for wildlife.
  - Shelter
    - Retain natural elements such as snags, logs, some thickets and brush piles.
    - Plant hedgerows, fencerows and shelter belts.
    - Balance habitat elements with good forest management and fire risk.
  - Space
    - Understand the requirements of local species and how your property fits into that, considering migration, breeding and resident territory needs.
- Explain the importance of structure, diversity and connectivity of habitat.
- Describe and illustrate examples of what habitat means for some relevant local species.
- Introduce the concept of noxious species (animal and plant), and highlight examples and control options.
- Briefly highlight regulatory concerns and resources relevant to landowners.

FIELD SITES

Site characteristics: Select field sites where elements of wildlife habitat can be observed or where land managers have taken steps to enhance and retain wildlife habitat. This could be a small or large acreage, or a home site with well-developed wildlife habitat elements. The site could have forest with wildlife trees and brush piles, oak habitats, meadows, pastures with hedgerows, streams, ponds, wetlands, etc. It helps if the property showcases landscape connectivity, diverseof vegetation types and structure. Overly manicured landscapes are less desirable, unless they are combined with more wild and diverse areas. Consider visiting two sites to compare possible management situations and strategies.

Site logistics: Review “Field site logistics” in “Module delivery guidance, page 9.

NATURAL-RESOURCE EXPERT NEEDED

Examples of appropriate experts include personnel from the U.S. Fish and Wildlife Service or Oregon Department of Fish and Wildlife, or anyone with a strong background in wildlife biology or management, such as university faculty or local naturalists. Choose someone who is available as a resource in the future for landowners who seek to introduce best practices for wildlife management.

Lesson plan: wildlife habitat

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Identify elements of wildlife habitat in the landscape.
- Recognize beneficial roles of wildlife.
- Recognize management activities that enhance wildlife habitat or deter nuisance wildlife.

BEHAVIOR OBJECTIVES

- Assess the habitat resources available to wildlife on your property.
- Select actions to improve habitat for beneficial wildlife or deter noxious wildlife.

- Identify wildlife habitat goals and create a management plan for your property that supports beneficial wildlife and deters noxious wildlife.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna*. Review worksheets 1 and 2.
  - Print and bring entire document to wildlife field class.
- Read additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

Using *Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna:*

- Use Worksheet 1 to complete an assessment of the wildlife habitat present on your property.
- Use Worksheet 2 to assess your current wildlife management practices.

In the Land Steward Property Management Plan under "Natural resource assessment summaries," summarize the results of your assessments and list your wildlife habitat management goals and priority actions for your property.

Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

From *Wildlife Habitat: Nurturing A Diverse Mix Of Flora And Fauna* (see below).

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of the natural resources of the site related to wildlife habitat using Worksheet 1. The purpose of this is to reinforce observing the characteristics of wildlife habitat and to familiarize them with the assessment that they will perform at home on their own land as homework.

- Ask participants to work in small groups with one notetaker. Assign each small group one or two sections of the assessment, depending on your class size. They will share results of their sections at the end of the class.
- Distribute clipboards, pencils and copies of Worksheet 1, as needed.
- Allocate 10–15 minutes for the participants to explore the property to assess the habitat. Instruct them to start with their assigned section and then proceed with the rest of the worksheet as time allows.
- Reconvene the participants and invite each group to share the results of their assessment section. Discuss briefly as a group.

Background resources

In "Module delivery guidance," review "Background resources," page xx.

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page xx. The coordinator should share the suggestions with the natural-resource specialist and landowner, as appropriate.

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page xx.

OREGON STATE UNIVERSITY EXTENSION SERVICE

Photo: Jimmy Emerson, CC BY-NC-ND 2.0

Rural properties can be managed to support many different kinds of wildlife. Habitat should include food, water, shelter and space.

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

WILDLIFE HABITAT:
Nurturing a Diverse Mix of Flora and Fauna

Rachel Werling and Cat Kizer

Observing wildlife in nature is part of the joy of rural living. Private property can play a key role in wildlife habitat. However, wildlife is a large category, and each species has specific requirements.

If you manage your land to promote a diverse native habitat and support natural ecological processes and systems, many species will benefit. On the other hand, sometimes our actions can provoke nuisance behavior in wildlife, or invasive species can become problematic.

Rachel Werling, Extension faculty and Land Steward Program coordinator, Jackson County, Oregon State University; Cat Kizer, OSU Land Steward Program.

Understanding the animals and plants that live in your area will improve your neighborhood wildlife relations.

The term "wildlife," as used here, refers to more than just undomesticated animals. It also refers to plants and other organisms native to an area. Wildlife habitat consists of four components: water, food, shelter and space.

Many elements of habitat serve multiple purposes for wildlife. For example, a food source such as a fruiting shrub may also provide shelter and nesting habitat.

Identify what you have, what you want

The first step to improving your property for wildlife is to clarify your own goals. Get to know what species live in your area and assess habitat areas as they are now. This will help you focus your efforts.

Oregon State University

EM 9250
July 2020

3 EASY STEPS

Use this document to evaluate wildlife habitat on your land

1. Read *Wildlife Habitat: Nurturing a Diverse Mix of Flora and Fauna*.
2. Use Worksheet 1: Resource assessment for wildlife habitat, page 6, to assess the habitat conditions on your land.
3. Use Worksheet 2: Management activity assessment for wildlife habitat, page 8, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local Extension office, state Department of Fish and Wildlife, state Department of Forestry or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties but is applicable to other areas.

Photo: Cat Kizer, © Oregon State University

A "cobble pond" provides bathing and drinking opportunities for birds and other wildlife.

- **Identify your goals.** Try to keep your expectations as realistic as possible. List wildlife that you would like to attract that are native to your region. What wildlife should be present, but are absent for some reason? If you are a gardener, you may not want to encourage animals that could damage plants. How will you discourage them, while encouraging others? Your local Extension office or state department of fish and wildlife are good resources that can help you identify the species you might like to encourage and the habitat resources they need to thrive.
- **Get to know your species.** List the animals, plants and other organisms currently found on your property, including native and non-native species. This list is a great way to identify needed improvements.
- **Inventory your resources.** What are your current habitat resources? These can include streams, ponds, oak habitats, native grasses, a mixture of hardwoods and conifers. Notice the diversity of wildlife species using these resources. Do you have a wide variety of birds and pollinators? Or only a few species? Do you think you should see more of certain species like monarch butterflies or Pacific treefrogs, for example? If possible, compare how wildlife use your neighbor's property. Do you see more wildlife there? Try to identify the habitat features that the wildlife are using, such as fruiting shrubs or standing snags with nesting cavities for birds. This exploration can help you identify elements to enhance on your own property.

Participate in citizen science

Citizen science is the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists. Participating in citizen science can be a great way to learn more about your local environment while contributing to scientific understanding.

Many online platforms capture the observations of amateur naturalists. Here are just a few to check out: eBird, iNaturalist, Project BudBurst and eMammal.

Provide water, food, shelter and space

WATER

Most wildlife species need access to water for drinking, bathing or reproduction. If you have a freshwater ecosystem such as a stream, spring or wetland, it is vital to maintain or improve water quality for wildlife.

Uncontrolled grazing by livestock in or around riparian areas reduces the water's value to fish and other wildlife, and to the landowners. Fencing out

livestock, stabilizing banks and planting native plants all help to improve this ecosystem. For more details on managing riparian areas, see *Streams and Riparian Areas: Clean Water, Diverse Habitat*, EM 9244, *https://catalog.extension.oregonstate.edu/em9244*.

You can also build water features for wildlife, such as birdbaths, ponds, rain gardens and puddling areas for butterflies. These features attract wildlife of all kinds.

Use caution: Providing artificial sources of water can sometimes cause problems. Permanent ponds can become breeding areas for invasive bullfrogs or mosquitoes. Predators may be attracted to water sources, causing issues with domestic animals. If not cleaned, watering sources and birdbaths can spread disease among birds and deer. Contact your local fish and wildlife office for recommendations for your region.

FOOD

The best way to provide wildlife food is to plant native forbs, shrubs and trees. Native plants provide foliage, nectar, pollen, berries, seeds and nuts. In agricultural systems, consider incorporating cover crops and hedgerows.

Cover crops are planted primarily in agricultural ecosystems to maintain soil fertility and water quality, to control weeds, plant disease and pests, to create biodiversity and to encourage wildlife.

Hedgerows, fencerows or shelterbelts can provide diverse "edge" habitats at the interface of two or more plant communities, such as a woodland, crop field border or pasture.

Avoid invasive plants when choosing plants from nurseries. Verify with your nursery that plants you purchase are not invasive. Purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Fallopia japonica*), heavenly bamboo (*Nandina domestica*) and Scotch broom (*Cytisus scoparius*) are examples of ornamentals that have become serious management problems. Such aggressive aliens can decrease available habitat for native species and contribute to their decline. Consult your local native plant society or state agricultural office for lists of noxious species.

Photo: Evelyn Simak, CC BY-SA 2.0

Hedgerows provide diverse habitat where two or more plant communities meet.

Photo: Jeffrey Thieret

Brush piles provide shelter from wind, rain and other environmental stressors. Brush piles should be at least 15 feet wide, 15 feet long and 8 feet high.

SHELTER

Wildlife need places to escape from humans, predators and inclement weather. They also need safe places for raising young. Examples include patches of native trees, such as oaks and Ponderosa pines, and and dense areas of native shrubs, such as buckbrush (*Ceanothus cuneatus*). Brush piles are easy to build. Place them near feeding areas in yards, field edges or scattered in a large wooded or open lot.

A hedgerow or fencerow about 30 feet wide with a variety of native plants of differing heights provides wonderful cover habitat. Build nesting and roosting boxes for birds, bats and pollinators. Plant host plants for insects: milkweed for monarch butterflies, camas for bees.

Leave snags, logs and limbs to support wildlife and ecological processes. Some birds drill cavities in trees, which are then used in later years by bird and mammal species that cannot build their own cavities. Snags and downed wood play an important role in nutrient cycling.

Many of the features that provide shelter for wildlife are also potential fuels for wildfire. Work to balance habitat requirements with the potential for wildfire. See *Forests and Woodlands: Protecting an Ecosystem*, EM 9245, *https://catalog.extension.oregonstate.edu/em9245*, and *The Home Ignition Zone: Protecting Your Property from Wildfire*, EM 9247, *https://catalog.extension.oregonstate.edu/em9247*.

SPACE

Wildlife require space to find food and water, to establish and defend territories, to court and attract a mate, and to raise young. Space requirements vary by species and are generally determined by the quantity and quality of water, food, shelter and cover.

This concept is also important in continuity of habitat across the landscape. Your property may encompass the entire seasonal home range of some smaller species, such as snakes or rodents. It may also serve as part of the home range of wider-ranging species such as deer or

Wildlife-friendly fence

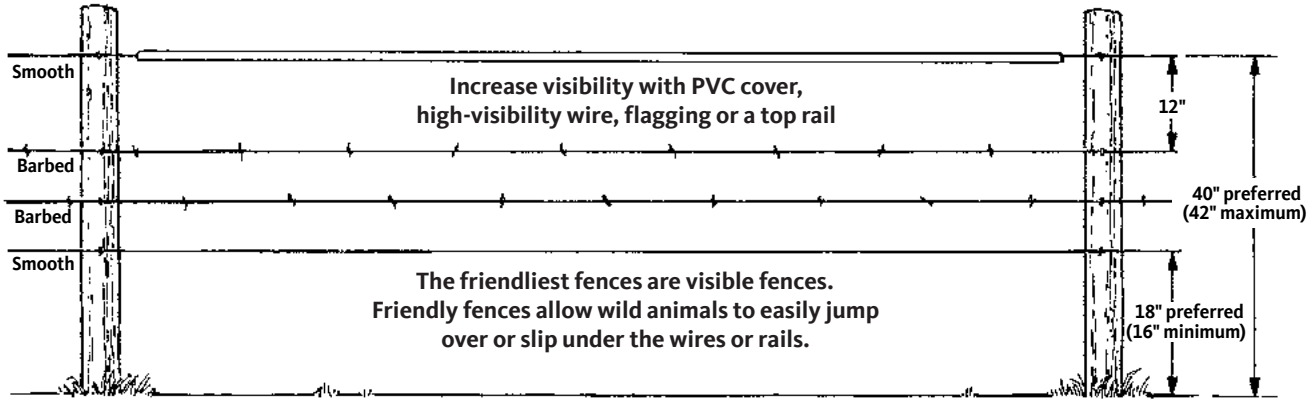

Illustration: Wyoming Game and Fish Department

foxes. Understand how your land fits into the big picture. A good way to get a sense of this is to consult a satellite view of your property within the larger landscape. What important habitats is your property connected to?

Wildlife-friendly fencing is specially designed to manage domestic livestock, while allowing wildlife to move across the landscape. When using deer-proof fencing, consider fencing only the vegetation you need to protect, rather than assuming your whole property needs to be fenced. Fences can dramatically restrict wildlife's ability to move across the landscape as needed. Consider fence design and placement to prevent injury to wild animals and reduce wildlife damage to your fencing.

Discourage invasive species

Providing habitat resources for the wildlife you want can create opportunities for wildlife you don't want, such as invasive species. Know the needs of wildlife native to your area.

Develop treatment protocols for invasive, noxious or pest wildlife. Some of Oregon's invasive plant species include medusahead grass, puncturevine, yellow starthistle, garlic mustard and scotch broom. Examples of invasive animal species include the bullfrog, nutria, feral swine, European starling, European paper wasp and house sparrow. Discourage and eliminate these species when possible.

Monitoring can play a vital role in invasive species management and prevention. Treating invasive species costs more as an infestation grows, which is why natural resource experts recommend vigilance to detect and remove infestations early.

Managing invasive species requires an ability to identify invasives, the development of a management plan and an understanding of treatment and control practices.

Some native species can become pests on our properties, depending on wildlife habitat practices. Agencies such as your state fish and wildlife department and your local Soil and Water Conservation District can help you with treatment protocols. For management advice for invasive plants, contact your local Extension office or your state department of agriculture.

Bird boxes can become habitat for invasive species, too. European starlings, house sparrows and European paperwasps can take over boxes placed with good intentions. Carefully place and monitor your boxes so you know which species are using them. If an invader takes up residence, remove it! Or, remove the box.

Native species vs. invasive species

Western pond turtle | **Red-eared slider**

Pacific treefrog | **Bullfrog**

Oregon sunshine | **Yellow starthistle**

Photos: © Oregon State University

Follow the rules

Understand the regulations that apply to the management of wildlife species.

- The Oregon Department of Fish and Wildlife has management rules for native and non-native species.
- The U.S. Fish and Wildlife Service administers the Migratory Bird Treaty Act, the Endangered Species Act and other laws managing species in peril or which regularly cross international boundaries.
- The Oregon Forest Practices Act regulates timber harvests to retain some wildlife habitat. Harvesters are required to leave a certain number of standing "wildlife" trees or downed logs per acre, depending on the type of harvest. Know the rules before you cut.

Wildlife habitat video resources

This selection of videos can help you become familiar with snags, brush piles and other ways to build wildlife habitat.

- *Enhancing Wildlife Habitat on Your Forestland*, Oregon State University Extension, *www.youtube.com/watch?v=8aP2o1in5j0*
- *Improving Wildlife Habitats*, Nick Fuhrman, professor, University of Georgia, *www.youtube.com/watch?v=gDkUoBc4lrU*
- *Wildlife habitat series: Brush pile*, Tom Venesky, *www.youtube.com/watch?v=ZN2OGIOD8c8*
- *Dead Trees and Logs*, Nick Fuhrman, *www.youtube.com/watch?v=itik-sQ2dIl*

References

National Wildlife Federation, *Garden for Wildlife*, *www.nwf.org/garden-for-wildlife*

National Wildlife Federation, Trees and Snags, *https://www.nwf.org/Garden-for-Wildlife/Cover/Trees-and-Snags*

Natural Resources Conservation Service, *Creating Brush Piles for Upland Wildlife*, *www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1081685.pdf*

Natural Resources Conservation Service, Wildlife Habitat, *www.nrcs.usda.gov/wps/portal/nrcs/detail/national/home/?cid=nrcs143_023553*

Oregon Department of Forestry, *Native Plants and Trees of Oregon*, *www.oregon.gov/ODF/Documents/AboutODF/NativeTreesPlants.pdf*

Oregon Forest Resources Institute, Oregon Forest Laws, *oregonforestlaws.org/wildlife-habitat/*

Oregon State University Extension Service, T*he Wildlife Garden: Create a Garden Pond for Wildlife*, EC 1548, https://*catalog.extension.oregonstate.edu/ec1548*

Oregon State University Extension Service, *A Guide to Hedgerows: Plantings That Enhance Biodiversity, Sustainability and Functionality*, EM 8721, *https://catalog.extension.oregonstate.edu/em8721*

The Xerces Society, Pollinator Conservation Resources – Pacific NW Region, *www.xerces.org/pollinators-pacific-northwest-region/*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, rural planner, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

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Worksheet 1: Resource assessment for wildlife habitat

Use this checklist of characteristics to assess habitat conditions. Use extra paper if necessary.	Yes	No	Not sure	N/A
Inventory of species				
Evidence of wildlife presence (nests, dens, ground holes, scat, paths, tree cavities, sapsucker holes in bark, etc.)				
Native/beneficial species present				
Problem areas of invasive/noxious/pest animal or plant species				
Habitat types present				
Mixed conifer forest				
Oak woodland/savannah				
Meadows				
Grasslands				
Riparian areas				
Wetlands (marsh, fen, bog, swamp)				
Open water (ponds, lakes)				
Shrublands or chaparral				
Other				
Water sources				
Year-round natural, unpolluted water sources (streams, ponds, wetlands, springs, seeps, etc.)				
Human-made water features (ponds, pools, fountains, puddling areas, rain gardens)				
Streams with tree shade to keep water cooler				
Water source has protective vegetation cover nearby				
Excess disturbance or contamination of water sources (livestock access, erosion, stormwater or other contaminants entering water source)				
Food sources				
Berry-producing native plants, shrubs, trees present				
Seed-producing native plants, shrubs, trees present				
Beneficial horticultural flowering plant species cultivated				
Field borders or hedgerows with diverse species/food-producing species				
Cover crops planted to provide forage/seed sources				
Other				
Shelter or cover				
Variety of vegetation structure: diverse heights and density of plants, shrubs, trees				
Fencerows or hedgerows present				
Nesting and roosting boxes provided				
Wildlife trees with cavities				
Areas of native grass cover present				
Host plants for insects (know your species)				
Water habitat for amphibians and/or fish				
Snags, logs, limbs, brush piles present				
Neighboring properties provide quality habitat features				
Accessible connections to wildlife between my land's habitat and the habitat of neighboring properties				

Review the results of Worksheet 1 (page 6). Prioritize any areas of concern below.

1.

2.

3.

4.

5.

How would you characterize the overall condition of your wildlife habitat?

☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Not sure

Review any questions marked "not sure." List topics to investigate further.

1.

2.

3.

4.

5.

Worksheet 2: Management activity assessment for wildlife habitat

Use this checklist of management practices to identify activities you incorporate into your wildlife habitat. Use extra paper if necessary.	Ongoing	Completed	Need to do	Consider	N/A or not feasible
Log and identify wildlife					
List current native wildlife, including mammals, reptiles, amphibians, insects, plants, fungi.					
List current non-native, noxious, invasive wildlife, including plants.					
List current "pest" wildlife, whether native or non-native.					
Identify your goals					
List your realistic expectations.					
List wildlife that you would like to attract.					
Broadly list your "treatment" plans for wildlife that you intend to exclude.					
Contact agencies when necessary.					
Inventory your resources					
List your property's current habitat resources (food, water, shelter, space).					
List your wildlife species and their abundance (for example, monarch butterflies in decline).					
Compare your property with the neighboring properties.					
Check for use of habitat by for invasive species (feeders, water features, boxes, etc.).					
Water source management practices					
Improve the quality of freshwater ecosystems.					
• *Control grazing by fencing pastures at riparian zones.*					
• *Stabilize banks.*					
• *Plant riparian areas with native trees, shrubs and forbs.*					
Maintain human-made water features.					
• *Birdbaths refreshed and cleaned frequently*					
• *Ponds free of invasive species (bullfrogs, etc.)*					

	Ongoing	Completed	Need to do	Consider	N/A or not feasible
Consider creating more water features.					
• *Rain garden?*					
• *Puddling areas for butterflies?*					
Food source management practices					
Plant native forbs, shrubs and trees.					
Clean birdfeeders regularly.					
Plant cover crops.					
Create a field border on outside edge or turning pivot in pasture or crop row.					
Create shelter or cover					
Plant native trees, shrubs and thickets.					
Create brush piles (two piles per acre).					
Plant a fencerow or hedgerow with native plants.					
Build nest and roosting boxes for birds, bats and pollinators.					
Plant native grass areas.					
Plant host plants for insects.					
Create or improve habitat for amphibians and fish.					
Leave or create snags, logs and dead branches.					
Provide space					
Understand and support the role of your property in overall landscape habitat continuity.					
Use wildlife-friendly fencing practices.					
Develop treatment protocols for invasive, noxious or pest wildlife.					
Follow the rules		**Yes**	**No**	**Not sure**	**N/A**
Contact agencies for recommendations.					
Contact state agencies for wildlife management rules.					
Become familiar with Federal Migratory Bird Treaty Act.					
Follow Oregon forest laws, if applicable.					

Results

Review the results of Worksheets 1 and 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Photo: Erik Simmons, © Oregon State University

Streams and riparian areas connect with other land resource topics in a variety of ways. This module will help landowners recognize practices that improve riparian conditions.

Stream and riparian ecosystems

Introduction

Program participants will have read *Streams and Riparian Areas: Clean Water, Diverse Habitat*, EM 9244. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline," below). This module can be delivered as a part of a complete Land Steward Training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

Streams and riparian areas are one of the natural resource features that connect many aspects of the landscape and resource categories as they move from their headwaters to their mouths. Vegetation in riparian areas can provide many beneficial functions that protect water quality and habitat. Streamside vegetation can reduce erosion, filter pollutants, slow floodwaters, increase groundwater recharge, and provide cooling shade and wildlife habitat. Streams are a resource that can interact with the other land resource topics in a variety of ways that may affect other management decisions. This module will help landowners recognize how best practices in management can improve stream and streamside resource conditions.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field including travel time.

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

Content outline

Program participants will have read *Stream and Riparian Areas: Clean Water, Diverse Habitat,* EM 9244. This document serves as guidance for the content provided by the natural-resource expert, as well as concepts to highlight during the property tour. Suggested content topics from the guidelines follow. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites.

- A vegetated buffer strip is critical for stream health.
  - It functions to protect water quality by reducing erosion, filtering pollutants, creating shade, promoting cooler temperatures and creating wildlife habitat.
  - Avoid removing vegetation to the water's edge (like lawn mowing).
  - Recommended width of buffer strip varies with adjacent land use.
  - Remove invasive species but only after knowing regulations and acquiring any required permits.
  - Plant native plants to best support local wildlife.
  - Replant areas of bare ground quickly to avoid erosion and invasion of weed species.
- Keep it clean.
  - Keep vegetated debris out of water and the water's edge.
  - Keep manure and sediment sources away from stream.
  - Keep pesticides, herbicides and fertilizers out of the riparian area.
- Keep it natural.
  - Riparian areas are critical habitat for wildlife.
    - » Birds: Riparian areas are critical habitat for migration corridors and nesting sites. Birds thrive when native plant species and the insects they support are present.
    - » Fish: Trout and salmon need cool, clear water, stream beds with rock and gravel, and in-stream habitat structure of logs and branches. Trees provide shade to keep water cool.
    - » Beavers: They create deep cool pools and hiding habitat for fish.
  - Respect the meander belt.
    - » Streams meander in flat terrain.
    - » Keeping human activities out of the meander belt helps support habitat and avoid property loss and destruction when streams flood and banks move during storm events.
    - » Culverts and bridges should be designed to accommodate high water flows and allow for fish passage.
    - » Road design should avoid erosion and runoff problems.
- Manage livestock and grazing.
  - Poorly managed grazing near a stream can cause bank erosion, increase weeds and reduce water quality.
  - Consider fencing livestock away from riparian areas.
  - Grazing practices: Manage timing and numbers of livestock to minimize negative impacts.
- Familiarize yourself with riparian regulations that apply to your stream. These can include:
  - City, county and state riparian ordinances.
  - Oregon Forest Practices Act.
  - Oregon Agricultural Water Quality Management Act.

FIELD SITES

Site characteristics: Try to select one or two sites that can showcase a variety of conditions. One area should show a wild stream with well-functioning habitat and good water quality. Comparison sites could include a restoration site where efforts have been made to improve the stream resource, or a site where agricultural practices are supporting stream water quality such as good manure management, off-stream watering systems, or stock exclusion systems. There are many misconceptions about streams, and the field site can be an effective way to clarify them. Sites with abundant wood in the water and beaver habitat can allow the opportunity to discuss the benefits of these features for riparian habitat.

Site logistics: Review "Field site logistics" in "Module delivery guidance," page 9.

NATURAL-RESOURCE EXPERTS

Examples of appropriate experts include personnel from the local watershed council, university Extension agents, staff from the state or federal Fish and Wildlife Department, fish biologists, or natural-resource specialists from Natural Resource Conservation Service Choose someone who can be available as a resource in the future for landowners' questions and technical needs.

Lesson plan: stream and riparian ecosystems

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Identify positive and negative stream and riparian resource conditions.

- Recognize good stream and riparian-area management practices.
- Understand how management activities affect water quality and wildlife habitat.

BEHAVIOR OBJECTIVES

- Use stream characteristics to assess the condition of stream and riparian areas.
- Identify areas of concern and select management actions that support healthy streams and riparian areas.
- List goals for improving stream and riparian areas and create a management plan that supports natural resource health.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Streams and Riparian Areas: Clean Water, Diverse Habitat*, EM 9244 and review worksheets 1 and 2.
  - Print and bring entire document to forest and woodland field class.
- Read additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

Using *Stream and Riparian Areas: Clean Water, Diverse Habitat*, EM 9244 :

- Use Worksheet 1 to complete an assessment of the stream and riparian area on your property.
- Use Worksheet 2 to assess your current stream area management practices.
- In the Land Steward Property Management Plan under the Natural resource assessment summaries, summarize the results of your assessments and list your forest management goals and priority actions for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of the stream area using Worksheet 1. The purpose of this is to reinforce observation of the characteristics of stream and riparian area health. This exercise will familiarize participants with the assessment that they will perform at home on their own land as homework.

- Ask participants to work in small groups with one notetaker. Assign each small group one or two sections of the assessment worksheet, depending on your class size. They will share results of their sections at the end of the class.
- Distribute clipboards, pencils and copies of Worksheet 1, as needed.
- Allocate 10–15 minutes for the participants to explore the property to assess the habitat. Instruct them to start with their assigned section and then proceed with the rest of the worksheet as time allows.
- Reconvene the participants and invite each group to share the results of their assessment section. Discuss briefly as a group.

Materials list

- Copies of reading assignment for the next class, usually the Land Steward Program Rural Resource Guidelines. (Some participants prefer to access these online, so a full class set may not be needed.)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from Streams and Riparian Areas: Clean Water, Diverse Habitat.
- Clipboards and pencils
- Camera/phone to capture the day
- First-aid kit.
- Watercooler and cups.

Background resources

In “Module delivery guidance,” review “Background resources,” page 9.

Instructor guidance for the field day

In “Module delivery guidance,” review “Instructor and coordinator guidance for the field day,” page 9. The coordinator should share the suggestions with the natural-resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in “Sample agenda,” page xx.

OREGON STATE UNIVERSITY EXTENSION SERVICE

Photo: Rachel Werling, © Oregon State University

Trees, shrubs and other vegetation along the Rogue River help maintain water quality and habitat.

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

STREAMS AND RIPARIAN AREAS:
Clean Water, Diverse Habitat

Rachel Werling and Max Bennett

Streams provide many benefits to landowners. They can be a natural resource, providing water for livestock or crops, or they may simply provide the joy of a cool, shady area full of wildlife. But streamside areas are critical for many reasons.

The area alongside a stream or other body of water is called the riparian area — a place where moisture interacts with the surrounding soils and geology, creating a special habitat. This zone is easy to identify, since the plants and trees are often different from those in the upland areas away from the stream.

Diverse streamside, or riparian, areas are vital for supporting water quality and wildlife habitat in a multitude of ways. Good streamside stewardship will help ensure the many benefits a stream provides into the future.

Note: Most land activities in and near streams are regulated. Be sure to familiarize yourself with the rules and regulations in your area before undertaking any development, restoration, modification or other activity.

Rachel Werling, Land Steward coordinator and Natural Resources, and Max Bennett, Extension Forestry and Natural Resources faculty and associate professor, both of Southern Oregon Research and Extension Center, Oregon State University.

Oregon State University

EM 9244
December 2019

3 EASY STEPS

Use this document to evaluate and improve your own riparian areas

1. Read *Streams and Riparian Areas: Clean Water, Healthy Habitat.*
2. Use Worksheet 1: Resource assessment for streams and riparian areas, page 6, to assess the condition of your resource.
3. Use Worksheet 2: Management activity assessment for streams and riparian areas, page 8, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local county Extension office, county Soil and Water Conservation District, watershed council, state or federal Fish and Wildlife officials, watermaster, or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners with little or no technical background by the Land Steward program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties, but many of the practices are applicable to other areas.

Photo: Rachel Werling, © Oregon State University

This landowner could improve stream stewardship by creating a buffer of native vegetation along the water.

Photo: Rachel Werling, © Oregon State University

Before and after blackberry removal along Bear Creek. The area will be planted with native shrubs and trees.

Create a vegetated buffer strip

Plants in riparian areas protect water quality in many ways: by reducing erosion, filtering pollutants, slowing floodwaters, increasing groundwater recharge, providing cooling shade and serving as wildlife habitat. Here are some actions you can take to nurture plant life on your riparian property.

- **Promote a vegetated buffer strip** along the stream that emphasizes native trees, shrubs, grasses and plants suitable for the site. Vegetated buffers reduce erosion, filter sediment and other pollutants, create stream shade to maintain cooler water, and provide wildlife habitat.

  If you want to create or expand a streamside buffer, the width you plan for will depend on local regulations, the size of the stream, adjacent slope and land uses, and your personal objectives. Some riparian functions, such as reducing erosion along small streams, can be achieved with relatively narrow buffers. Other functions, such as providing shade and filtering pollutants, may require larger buffers.

- **Know your local regulations.** Oregon city and county governments, the Department of Agriculture and the Department of Forestry require careful management of trees, shrubs and other vegetation along streams and may dictate minimum buffer widths in many circumstances. These regulations vary widely, from 10 feet wide for many small seasonal streams to 50 feet and more for larger streams that flow year-round and have salmon or trout. (see "Follow the rules," page 4).

- **Limit mowing.** Don't mow within 10–25 feet, or more, of the stream bank. Although a lawn may look neat, more diverse native vegetation does a better job of protecting water quality and providing habitat.

- **Avoid the removal of trees, shrubs and native plants** in the riparian zone. In many cases, such removal is prohibited by law.

- **Plant native species.** These are adapted to local conditions and will help promote the many beneficial functions of riparian areas. Native bushes and trees found along streams in southwest Oregon include many willows, Ponderosa pine, black cottonwood, bigleaf maple, Oregon ash, white alder, blue elderberry and red-osier dogwood. Become familiar with the native riparian species of your region. Observe what grows well in your area. Work with a native plant nursery and choose the best plants for your site.
- **Remove invasive species** such as Armenian or Himalayan blackberry, Japanese knotweed, and purple loosestrife, where feasible. These plants limit the regeneration and growth of native species. Invasive species are often successful at colonizing disturbed areas, but are inferior to natives in terms of riparian function. Local regulators may require a permit and replanting plan to remove invasive species.
- **Replant areas of bare ground.** Soil can quickly erode from bare patches, sending sediment into streams. Plant a mixture of native shrubs, trees and grasses to establish a fully vegetated site and discourage invasive species. Never leave bare earth exposed to winter rains. While plants are getting established, place temporary silt fences, straw bales, or compost mounds on bare areas to stop overland runoff, and spread a heavy layer of loose straw 2 to 6 inches deep along bare spots.
- **Check regulations for forested areas.** If your stream is forested, review *Forest and Woodlands: Protecting an Ecosystem*, EM 9245, *catalog.extension.oregonstate.edu/em9245*. The Oregon Forest Practices Act governs activity around streams in forested areas.

Keep it clean

- **Don't throw debris over the stream bank** or pile leaves or manure in the riparian zone. These materials, when added to a stream, will lower oxygen levels as they decompose. This type of dumping is a form of water pollution, and violators could be cited.
- **Don't use pesticides, herbicides or fertilizers** within riparian zones. These substances can degrade water quality. In some instances, such as when managing invasive blackberry and knotweed, it may be OK to carefully apply herbicides that are approved for use in aquatic applications. Ensure that application rates in adjacent areas, such as pastures, follow label instructions and are not excessive. Note that in hot weather many herbicides can volatilize and spread far beyond the intended location. Always follow directions on the label.

Photo: Rachel Werling, © Oregon State University

Use a planting plan to restore native vegetation after removing invasive blackberries. At this restoration site, colored flags indicate different species of native plants.

Leave it natural

- **Protect wildlife habitat:** Wildlife love diversity. Encourage diverse native plant growth with multiple layers of vegetation, including low plants, shrubs and trees. The native plants that grow in riparian areas provide shelter and a wide variety of nuts, berries, nectar and insects for food.
  - **Birds.** Riparian areas provide critical migratory and breeding habitat for many bird species. With diverse plants and access to water and food, stream corridors are often especially rich in bird life. If you plan to improve your stream by removing invasive species such as blackberry, be sure to plan your work outside of the bird breeding season; even invasive blackberries can serve as nesting habitat.
  - **Fish.** Trout and salmon need cool, clear water, streambeds with rock and gravel, and in-stream habitat structure such as logs and overhung banks. Trees and shrubs along streams provide shade and help maintain cool water. Many areas are experiencing changes in temperature ranges, including warmer summers. Shade is an important resource for the future of our streams and fish.
  - **Beavers.** Beavers are considered a "keystone" species. That means their activities play a crucial role in supporting the functions of riparian ecosystems that help fish, wildlife habitat, stream flows, and water quality. Practically speaking, you may not want a beaver to harvest a prize tree or to cause a road to flood, but finding ways to tolerate or work around their activity is good for streams. Consider installing strong wire fencing around prized trees and plantings where beavers are active.

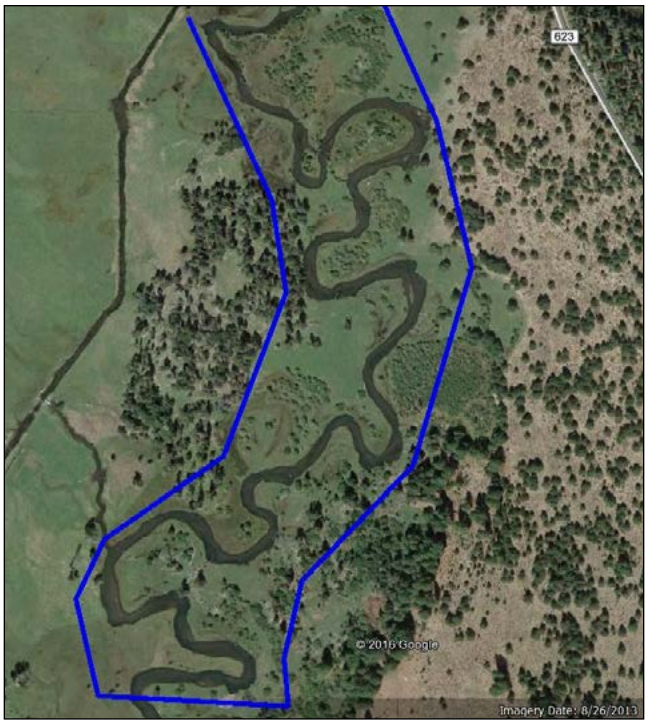

Image: Google Earth

The Wood River winds through Klamath County, Oregon. Protecting the meander belt from human use allows a stream to take its natural course. This protects water quality and reduces the chance of damage to property from flooding and erosion.

Photo: Rachel Werling, © Oregon State University

Logs, branches and other natural material in rivers, such as this scene in Neil Creek near Ashland, Oregon, provide critical in-stream habitat for fish and other wildlife.

In-stream habitat structure

A healthy stream for fish and wildlife contains leaves, branches, and logs. This organic material provides important food and habitat for aquatic organisms, from fish to mayflies. While too much material may cause a flooding hazard under certain circumstances, in most cases, it helps to dissipate the destructive erosive power of high water. When possible, let logs stay in streams.

- **Respect the meander belt.** Natural streams and rivers meander and change their courses over time, especially in flatter terrain. For many reasons, people often want to use or develop the areas next to streams. This frequently leads to problems with flooding, erosion, and decreased water quality. Where possible, respect your stream's historic meander belt to minimize conflicts. Limit building in riparian areas. Incision or downcutting of streams can occur when streams are straightened or if water runoff from the surrounding landscape is excessive.
- **Design culverts and bridges** to accommodate high water flows and allow for fish passage in fish-bearing streams.
- **Design roads with care.** Roads can be a major source of erosion, sediment, and pollution runoff into creeks. Is your road design mitigating possible negative impacts on nearby water bodies? See other publications in this series in the OSU Extension Catalog, *catalog.extension.oregonstate.edu,* for additional information.

Manage livestock and grazing

Grazing livestock in riparian areas can result in increased erosion, increase of noxious weeds, decreased streambank stability and decreased water quality from nutrients and pathogens in streams. These steps can help reduce problems:

- **Consider fencing livestock out of riparian zones.**
- **Develop off-channel water sources** in upland areas where adequate forage is available to draw livestock away from the stream area.
- **Manage grazing practices.** Maintain the growth of shrubs, trees, and other plants that help stabilize banks. Timing and rest are critical. Avoid riparian grazing during the rainy season. Allow adequate time for plants to rest and regrow. Avoid season-long grazing; move livestock frequently.
- **Study up.** If you use your creek for irrigation or have pasture in the riparian area, be sure to review pasture guidelines in the Rural Resource Series, available in the OSU Extension Catalog, and be familiar with the Agricultural Water Quality Management Act regulations that apply to your activities.

Follow the rules

Understand the regulations applying to your stream and its beneficial uses. Does it have fish? Is it a drinking water source? Is it used for irrigation?

Photo: Rachel Werling, © Oregon State University

Diverse riparian vegetation protects water quality and provides habitat.

Recreation? Navigation?

Many counties have riparian ordinances that prohibit removal of riparian vegetation within a certain distance of streams, rivers, and other waterways. You may need a permit to remove invasive species.

The Agricultural Water Quality Management Act regulates potential water pollution from farms and ranches under the Clean Water Act.

The Oregon Forest Practices Act regulates forest management activities and practices affecting water quality on forestland.

Individual municipalities may have their own riparian ordinances.

Resources

If you have more questions, contact your local county Extension office, Soil and Water Conservation District, watershed council, Oregon Department of Fish and Wildlife office, the Oregon Water Resources Department and their watermaster, or other local resources.

- U.S. Department of Agriculture Natural Resources Conservation Service Riparian Systems, *www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010137.pdf*
- *Riparian Health: Evaluating the Health of Riparian Areas, an Overview.* Extension Foundation. *www.extension.org/pages/55552/riparian-health-evaluating-the-health-of-riparian-areas-an-overview#.VdzNBUa1Z1A*
- *Polluted Runoff: Nonpoint Source Pollution.* Environmental Protection Agency. *water.epa.gov/polwaste/nps/wetlands.cfm*
- The National Pollutant Discharge Elimination System: An Oregon NPDES pesticide general permit is required for certain pesticide applications in, over, or near water. Contact the Oregon Department of Environmental Quality for information. *oregon.gov/oda/programs/Pesticides/Water/Pages/NPDES.aspx*
- *Guide to Oregon Permits in Riparian Areas.* Be sure to verify the most up to date regulations with the proper governing body. *oregon.gov/dsl/WW/Documents/water_related_permits_user_guide_2012.pdf*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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Worksheet 1: Resource assessment for streams and riparian areas

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Stream type: What is your stream like?				
Runs all year (perennial)				
Runs seasonally (intermittent)				
Has defined channel but only runs during a storm event (ephemeral)				
Beneficial uses: Is your stream used for/by these?				
Fish-bearing				
Other wildlife				
Irrigation				
Domestic use				
Recreation				
Livestock grazing in or near riparian zone				
Others (Navigation?)				
Riparian vegetation/buffer strip: Are these beneficial conditions present?				
Diverse, dense cover of trees, shrubs, and other plants along stream				
Width of buffer is adequate (meets regulations, provides functions critical for beneficial uses)				
Stream is shaded				
Woody material present (logs and sticks, debris jams)				
Wildlife or signs of wildlife present				
Water quality: Are any of these concerns present?				
Obvious signs of pollution (oil, odor, etc.) in water				
Water is muddy during or after storms				
Water is muddy even in the absence of storms				
Heavy algae growth				
Muddy/polluted runoff from adjacent land directly into stream				
Streamside area: Are any of these concerns present?				
Steep, eroding banks				
Problems with invasive species				
Bare areas of soil in floodplain				
Lawn mowed down to edge of bank or streamside				
Waste material (raked grass, manure, junk) present in floodplain				
Stream is incised (down-cut in the landscape, does not spread out in floodplain at high flows)				
Infrastructure: Check for these potential concerns				
Buildings in floodplain				
Buildings in meander zone				
Bridges not adequate for stream flow				
Culverts not adequate for stream flow				
Culverts not adequate for fish passage (fish barriers)				

Worksheet 1: Resource assessment for streams and riparian areas

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Follow the rules: Which apply to your stream or riparian area?				
County and/or city ordinance				
Agricultural use rules				
Forest ractices rules				
Other rules				

Review your responses above. Are there areas of concern or that require improvement? List below.

1.

2.

3.

4.

5.

Review which beneficial conditions are present.

1.

2.

3.

4.

5.

How would you characterize the overall condition of your stream and riparian area?

☐ Excellent ☐ Fair ☐ Poor ☐ Not sure

For the above questions, review the column "Not sure." List topics to investigate further.

1.

2.

3.

4.

5.

Worksheet 2: Management activity assessment for streams and riparian areas

Use the checklist of management practices below to identify activities you incorporate in your stream and riparian areas. This is a checklist of things to consider; be sure to know which specific regulations apply to your activity in your area. Use extra paper if necessary.	**Already present/ doing**	**Completed**	**Need to do**	**Consider**	**N/A or not feasible**
Create and maintain a vegetated buffer strip					
Leave native riparian vegetation intact					
Remove invasive species, such as blackberries					
Re-establish trees and shrubs if appropriate for site					
Leave no bare soil; plant native grasses, forbs, etc., in bare areas					
Don't maintain lawns or remove native vegetation within the buffer					
Allow native species to re-colonize riparian zone					
Keep yard waste and other contaminants out					
Don't pile or deposit leaves & other debris on bank or in stream					
Locate compost piles & other organic material away from riparian zone					
Avoid application of pesticides/fertilizer in riparian zones					
Keep animal waste/manure out of riparian/aquatic zone					
Leave it natural					
Respect the meander zone (infrastructure kept out of meander zone)					
Avoid building in the riparian zone/next to stream					
Size culverts and bridges to accommodate high flows and allow fish passage					
Maintain logs and other natural woody material in riparian/ aquatic zone					
Manage livestock and grazing to minimize impacts					
Carefully manage grazing to avoid damaging streambanks & riparian plants					
Consider fencing riparian zone					
Avoid direct runoff of muddy pastures or manure into stream					
Follow the rules: Do your practices comply?		**Yes**	**No**	**Not sure**	**N/A**
County and/or city riparian ordinance					
Agricultural water quality management rules					
Forest practices rules					
City rules					

Results

Review the results of Worksheets 1 and 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these below.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Building healthy soils

Introduction

Program participants will have read *Soil: The Dirty Secrets of a Living Landscape*, EM 9304. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline," below). This module can be delivered as a part of a complete Land Steward training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics.This Module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

We often think of soil as being an important resource for farming agriculture. However, soil underlies everything from fields and pastures to forests, stream banks and of course buildings and most other infrastructure. It is an important resource in every context. In this module, participants will learn to assess their soil characteristics and condition, create goals, and choose management actions that will support soil resources and the infrastructure that relies on it.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field, including travel time

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITES

Site characteristics: Choose a landowner with a farm or large garden who is passionate about the care and tending of soil. There are many techniques for building and maintaining soil. Site characteristics could include: a wide variety of composting strategies (worm composting, lasagna composting, etc.), erosion reduction examples and planting strategies (cover crops, rotation, etc). Choose a site where you can compare well-tended soil with abused or compacted soil.

Site logistics: Review "Field site logistics" in "Module delivery guidance," page xx.

NATURAL-RESOURCE EXPERT NEEDED

Choose an expert with a background in soil science as well as practical experience with managing soil. Examples include a university agricultural Extension agent or rural resources personnel from a Soil and Water Conservation Service or Natural Resources Conservation Service. For this module, the farmer or gardener will also be one of your experts, demonstrating their strategies for soil building.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

Lesson plan

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Describe the components and characteristics that comprise healthy soil.
- Identify current land and soil management practices and select actions that support healthy soil.
- Create a management plan incorporating activities that support soil health with techniques used for different ecosystems and land-use types (forest, pasture, garden, stream, etc.).

BEHAVIOR OBJECTIVES

- Use soil characteristics to assess the soil quality.
- Identify areas of concern and select management actions that support soil quality.
- Select goals for managing soil in different landscape contexts, and create a management plan that supports natural resource health.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Soil: The Dirty Secrets of a Living Landscape* and review worksheets 1 and 2.
  - Print and bring entire document to soils field class.
- Read additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

- Using *Soil: The Dirty Secrets of a Living Landscape:*
  - Use Worksheet 1 to complete an assessment of your soils.
  - Use Worksheet 2 to assess your current soil management practices.

- In your Land Steward Property Management Plan, under "Natural resource assessment summaries," summarize the results of your assessments and list your soil management goals for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of soil using Worksheet 1. The purpose of the exercise to familiarize them with the assessment that they will perform at home on their own land as homework. Ask them to complete the "Evaluate soil quality" section of the worksheet. Supplies: one shovel or trowel per group and one clipboard per group.

- Ask participants to work in small groups with one notetaker.
- Distribute clipboards, pencils and copies of Worksheet 1, as needed.
- Allocate 10–15 minutes to complete the exercise.
- Reconvene the participants and invite them to share questions and findings.

ALTERNATIVE ACTIVITIES

- Perform a slake test (see "Soil guidelines").
- Instruct participants to conduct a ribbon test to assess soil texture.
- Compare water infiltration of a compacted area with a garden bed.

Background resources

In "Module delivery guidance," review "Background resources," page 9.

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page 9. The coordinator should share the suggestions with the natural-resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page 12.

Content outline

Program participants will have read *Soil: The Dirty Secrets of a Living Landscape*. This document serves as guidance for the content provided by the natural-resource expert, as well as concepts to highlight during the property tour. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites. Suggested content topics:

- Importance of soil
  - Nutrients.
  - Micro-organisms.
  - Carbon reservoir.
- Understanding soil
  - Five soil-forming influences: parent material, climate, biota, topography and time.
  - Soil particle sizes.
  - Soil textural components: sand, silt and clay.
  - Soil structure.
  - Soil classifications.
  - Mapping soils.
  - At-home soil assessments.
  - Testing soil and fertility.
- Management practice guidelines.
  - Minimize disturbance.
  - Maximize soil cover.
  - Maximize continuous living roots.
  - Maximize biodiversity.

Materials needed

- Copies of reading assignment for the next class, usually the Rural Resource Guidelines. (Some participants prefer to access these online, so a full class set may not be needed.)
- Directions to field sites for participants
- Blank copies of Worksheet 1 from the soils guidelines.
- Supplies for your chosen activity.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

Photo: Rachel Werling, © Oregon State University

The Dirty Secrets of a Living Landscape

Gordon B. Jones and Scott Goode

Soil is a living ecosystem that includes minerals, air, water, habitat for creatures and the creatures themselves.

Why is soil important?

- Soil provides plants with nutrients, water, physical support and air for roots.
- Soil supplies 14 of 17 essential plant nutrients.
- Soil houses macro- and microorganisms, which are nature's prime recyclers.
- Soil serves as a reservoir for carbon and plays a vital role in the global carbon cycle.

A typical soil in good condition is composed of approximately 45% mineral matter, 25% air, 25% water and 5% organic matter.

Know your soil

Soils vary across the landscape. The development of a soil reflects the weathering process associated with the dynamic environment in which it has formed. Five soil-forming factors influence the development of a specific soil:

- Parent material.
- Climate.
- Living organisms, or biota.
- Topography.
- Time.

Gordon B. Jones, assistant professor of practice, Southern Oregon Research and Extension Center, and Scott Goode, Oregon State University Land Steward.

Oregon State University

EM 9250
December 2020

3 EASY STEPS

Use this document to evaluate the soil resources on your land

1. Read *Soil: The Dirty Secrets of a Living Landscape.*
2. Use Worksheet 1: Resource assessment for soil, page 8, to assess the condition of your resource.
3. Use Worksheet 2: Management activity assessment for soil, page 9, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local Extension office, Soil and Water Conservation District or other local resources.

About the Rural Resource Guidelines

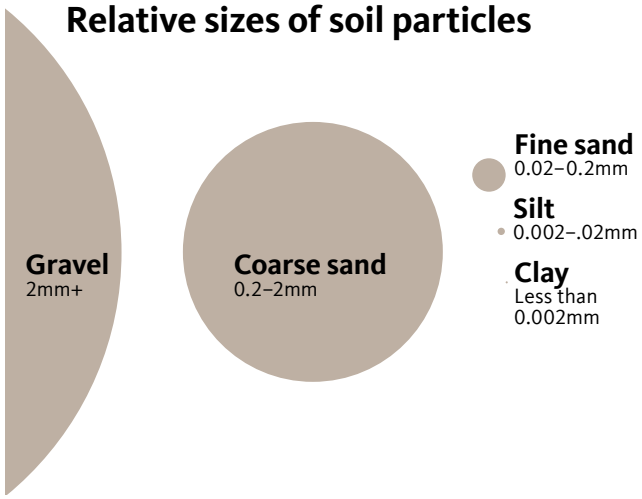
This is one of a series developed for private landowners by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties but is applicable to other areas.

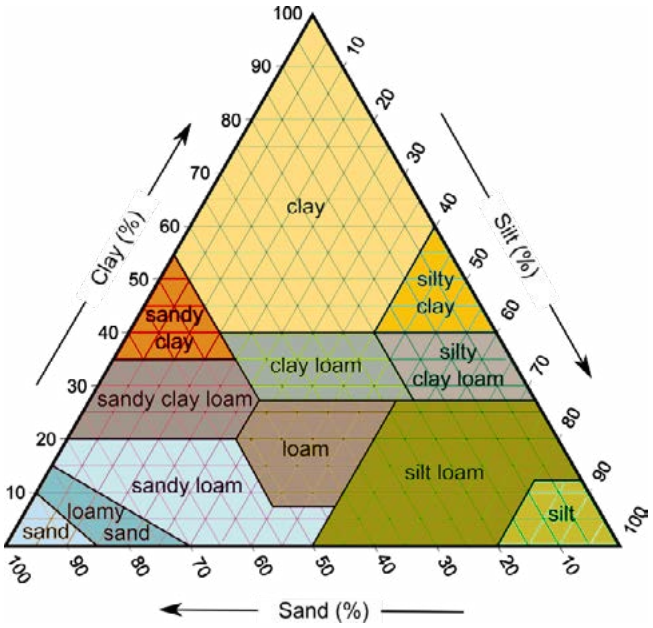
Whenever these five factors are the same on the landscape, the soil will be the same. However, if one or more of the factors varies, the soils differ as well.

Soil particles

Approximately 45% of soil is made up of mineral matter, or tiny rock fragments. The size of the mineral soil particles varies substantially, from large bits of gravel to microscopic clay fragments. Soil mineral particles are classified based on their size.

Clay particles are so small that you would need a powerful microscope to see them.





Graphic: Christopher Aragon, CC BY-SA 4.0

Plot the percentages of sand, silt and clay in a soil sample on a Soil Texture Triangle to establish the soil's texture.

Soil texture

Soil texture is determined by the ratio of sand, silt and clay particles, which gives soil its look and feel.

A simple test lets us measure the ratios of sand, silt and clay in a soil. Once these ratios are known, you can use the Soil Texture Triangle to identify the texture of the sample.

Soil structure

Soil structure describes the size, shape and friability (or crumbliness) of the aggregates that form a soil. The aggregates are formed from sand, silt, clay and organic material bound together with mineral and organic cements. The crevices and spaces in and between the soil aggregates are important habitat for soil biota. They also are critical for holding moisture. While soil texture cannot be easily changed, soil structure can be improved through good management practices.

Stable soil aggregates are the underpinnings of a healthy soil habitat. Here, fungal hyphae, organic matter and mineral and organic cements known as glomalin hold mineral particles together.

Soil aggregates that hold together, even when wet, are critical to good soil structure.

Classifying soils

The Natural Resources Conservation Service of the U.S. Department of Agriculture has identified and mapped soils for most of the U.S. Each of these soils is defined by the texture and horizons that compose the soil and is referred to as a soil series. Many of these soil series are named for a town or feature near where

the soil was first identified. Each state in the U.S. has a state soil series, just as states have official state birds and flowers.

Check out a soil map

Find maps and descriptions of local soil series in county soil surveys. The online tool Web Soil Survey is the most up-to-date place to find soil maps and soil survey information.

The soil survey includes valuable information about each soil series. This includes the potential uses of the soil (for agriculture, grazing, forestry, building foundations, septic drain fields); limitations, such as erosion potential or poor drainage; and productivity for agriculture or forestry uses. You can learn a lot about potential uses of your land by learning what soil types you have and their uses, limitations and productivity.

You can quickly generate a soil map of an area by entering the address or site coordinates on the Web Soil Survey page or on a mobile app. In addition to a map showing the names of the soils, you will see a description of soil textures and slope in a table. Clicking on the highlighted soil name in the table generates a more thorough description of each soil.

- Try mapping the soils on your property: *https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.*
- For a video demonstration, see *https://www.youtube.com/watch?v=tX_eRTIw1kY.*
- Here's a step-by-step guide to the Web Soil Survey (*https://websoilsurvey.sc.egov.usda.gov/app/gettingstarted.htm*).

Conduct at-home soil assessments

A soil texture jar test will tell you the proportions of sand, silt and clay in the soil on your property.

Follow these instructions from a University of California Agriculture and Natural Resources handout: *https://ucanr.edu/sites/UrbanAg/files/263165.pdf*

A slake test, where soil clods are saturated in water, will tell you about your soil's structure and aggregate stability. Stable aggregates, those which do not dissolve when wet, are key to healthy soil. Ray Archuleta, a conservation agronomist at the NRCS, describes this test in a USDA video available at *https://www.youtube.com/watch?v=5UfnbiBo-Ds.*

Test your soil fertility

While test kits can allow you to evaluate your soil's chemical properties at home, send a soil sample off to a commercial laboratory for the most accurate results. Routine soil tests will evaluate the soil's pH or acidity and measure the phosphorus, potassium, calcium, magnesium and organic matter content. These are key factors in growing healthy and productive plants in your garden, lawn or crop field.

Collect a representative soil sample from the areas of your property in which you're interested. See *A Guide to Collecting Soil Samples for Farms and Gardens,* in Resources, page 7.

Many commercial laboratories and universities perform routine soil fertility testing.

- In Oregon, see *Analytical Labs Serving Oregon,* EM 8677: *https://catalog.extension.oregonstate.edu/em8677*

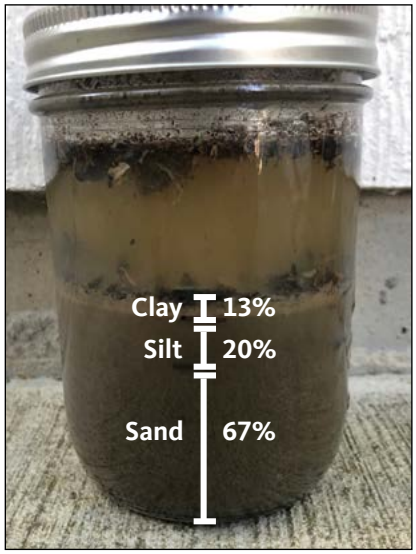


Photo: Gordon B. Jones, © Oregon State University

Soil separates into layers in a soil texture jar test. This test is one way to learn about the proportions of sand, silt and clay in your soil.

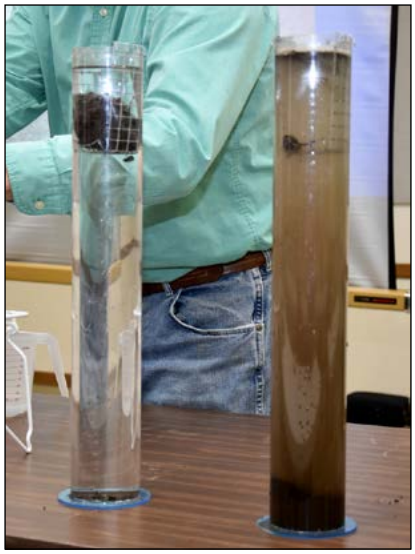


Photo: J. Johnson, Iowa NRCS

This slake test shows that the soil on the right has poor aggregate stability, which could lead to reduced water infiltration and root penetration.

Photo: Gordon B. Jones, © Oregon State University

Combine 15–20 soil cores from each management unit to make one composite sample to submit for analysis.

- Labs serving Washington: *http://analyticallabs.puyallup.wsu.edu*
- Labs serving California: *http://ccmg.ucanr.edu/files/51308.pdf*

Testing labs can provide recommendations of fertilizers and amendments needed to grow various plants or crops. Your local Extension agent can help interpret results. Or, consult the *Soil Test Interpretation Guide*, listed in Resources, page 7.

Many testing laboratories offer soil health assessments and tests for soil contaminants like pesticides and heavy metals. If you think you're a candidate for these tests, contact a testing laboratory or your local Extension office.

Management practices to build healthy soil

The Natural Resources Conservation Service defines soil health or soil quality "as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans." What soil health strategies you use depend on the soil type and your management goals.

Limiting physical disturbance and enhancing organic matter in the soil are key to soil health. NRCS has developed four principles of soil health to implement on your property:

- Maximize continuous living roots.
- Minimize disturbance.
- Maximize soil cover.
- Maximize biodiversity.

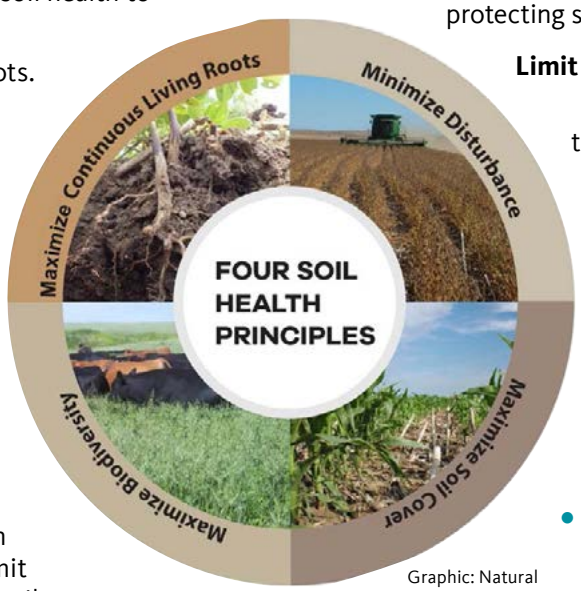
Minimize disturbance

Tillage, the mixing or cultivation of soil to control weeds or prepare a seedbed, is detrimental to healthy soils. The physical disturbance caused by tillage breaks up soil aggregates, which can reduce water infiltration, limit root penetration and cause the soil to crust. Tillage can kill soil macroinvertebrates and reduce the presence of beneficial fungi such as mycorrhizae. Tillage breaks open soil aggregates, exposing organic matter to oxygen and microorganisms, which hastens decomposition and loss of carbon from soil. While tillage improves the tilth or workability of soil in the short term, tillage degrades the soil structure over the long term. Protect the soil ecosystem by developing a management plan that minimizes soil disturbance.

The soil on the left is from a field managed without tilling for 11 years, while the soil on the right was managed conventionally. Notice the improved aggregation of the no-till soil.

Photo: USDA, CC BY 2.0

- Plant perennial crops and landscape plants that can grow for many years between tillage events.
- Sell your rototiller. Aggressive mixing by rototillers damages soil structure — more so than many other tillage implements.
- Control weeds prior to planting with techniques like solarization or occulation, which involve covering the ground with plastic for a period of time.
- Use "lasagna composting" to develop a vegetable or flower garden.
- Implement organic no-till practices, using cover crops and a roller or crimper.
- Consider low-risk herbicides rather than tillage to control weeds and unwanted vegetation while protecting soil structure.



Graphic: Natural Resources Conservation Service

Limit compaction

Limiting compaction is vital to maintaining soil pore space for gas exchange and water infiltration. Working soil while it is wet is a major cause of compaction because of the pressure exerted by tractor and truck tires. Livestock on wet soil also cause compaction, sometimes called "pugging."

Limit compaction by:

- Limiting tillage, especially when soil is wet.
- Avoiding driving over wet soil. Build lanes or roads if driving is required.
- Improving load distribution across the soils; vehicles with tracks or flotation tires limit compaction.
- Planting a perennial cover crop, such as turfgrass or white clover, in pathways that receive foot or tractor traffic.

Photo: Harry Rose, CC BY 2.0

Limit livestock access to wet pasture to avoid compaction. Consider building a hardened pad where livestock can congregate during wet conditions.

Photo: Natural Resources Conservation Service, CC BY-ND 2.0

Dense cover crop stands protect soils from erosion and soil crusting.

- Improving drainage to ensure soils are adequately dry when worked. Cover crops can help soils dry more quickly in spring.
- Planting deep-rooted cover crops such as daikon radish, and adding organic matter to alleviate compaction.

Remember that deep-ripping or tillage usually provides a short-term fix to compaction problems. Don't plan to rely on tillage to fix compaction caused by poor management practices.

Maximize soil cover

Prevent erosion and build soil health by maintaining a layer of physical protection, either as a living plant or mulch. Most erosion is initiated by the impact of raindrops onto bare soil. The splash caused by raindrops or irrigation detaches soil particles from aggregates and allows them to be moved by water.

Tips for soil cover

- Plant cover crops or grass sod to keep the soil covered year-round.
- Leave crop residues in place to armor the soil.
- Use mulch to prevent weeds and keep soil covered.

Some soils have the propensity to form crusts. When raindrops impact the soil and break down aggregates, the clay and silt particles wash into soil pores and create a crust upon drying. These crusts can prevent seedlings from emerging, decrease water infiltration, and increase erosion.

Prevent crust formation

- Limit tillage and amend the soil with organic matter to promote aggregation.
- Keep the soil covered with living plants or mulch to limit the breakdown of aggregates by the direct impact of raindrops.

Maximize continuous living roots

Living plants are the major food source for soil organisms. Many people don't appreciate how "leaky" roots are. Roots can exude 10%–40% of the sugars made during photosynthesis, providing an important source of food for soil microbes. This process is called "rhizodeposition." Roots also continually slough off cells, which microorganisms decompose.

There are also examples of direct partnership or symbiosis between plants and soil microbes. Two examples include the *Rhizobium* bacteria, which fix nitrogen symbiotically with legumes, and the mycorrhizal fungi, which help to transport phosphorus and water to plants. Maintain growing plants and roots for as much of the year as possible to ensure an active and functioning soil food web.

- Use perennial crops, cover crops and tight crop rotations to maximize the presence of living roots throughout the year.
- Consider living mulches for weed control.
- Pasture and perennial forages provide continuous cover and living roots for as much of the growing season as possible. Consider adding pasture or forage crops to your crop or garden rotation.

Maximize biodiversity

Biodiversity is the range of living organisms on your property and in your soil. It includes plants, animals (including livestock), insects and microorganisms. Increased diversity has been shown to make natural systems more resilient to change. Crop rotations reduce disease and insect pressure compared with monocropping. Diverse species mixtures in pastures and hayfields improve the stability of yield from year to year, and alfalfa, clover and other legumes contribute nitrogen to grass species. Studies have shown that increased plant diversity can increase the diversity and function of soil fauna and microbes.

Promote biodiversity in your soil

Diverse cover crops in farm fields and home gardens often include different species of grasses, legumes and brassicas.

- Implement a diverse crop rotation in your garden or farm fields
- Explore intercropping, silvopasture and agroforestry practices.
- Plant a "cocktail" of cover crop species in the off-season or between crops.
- Plant diverse hedgerows and buffer strips to support insect and wildlife diversity, limit erosion and protect water quality.
- Incorporate the use of livestock on your property to utilize "waste" products and improve nutrient cycling. Remember that those cover crops can make great forage for livestock.

Establish goals for your soil

The health and quality of your soil determine the potential of everything growing on your property. Your goals may vary. You may want to protect and improve soil health in your forest, pasture, farm and garden. You may want to prevent soil from eroding in all of these situations and keep it from contaminating your stream and waterways. Each of these situations calls for different strategies. You may have some soil goals under other categories. Keep soil goals in mind as you formulate overall goals for your property. Here are a few examples of agriculturally oriented soil goals to spark your thinking:

- Learn about the soil you have. Get your soil tested. Make a soil map.

Photo: E. Sagor, CC BY-NC 2.0

The planting together of corn, beans and squash — the three sisters — is a commonly known intercropping practice.

- Learn more about holistic approaches to soil stewardship that support healthy and fertile soil.
- Implement no-till agricultural practices, or minimize tillage frequency and severity where possible.
- Make a plan to rehabilitate an area where soil is compacted.
- Keep soil covered using cover crops and mulches.
- Measure your soil organic matter and work to increase it.
- Enjoy your soil! Get some dirt under your fingernails.

Resources

Agroforestry for Ecosystem Services and Environmental Benefits, The Center for Agroforestry, *http://www.centerforagroforestry.org/academy/2013/Jose-EcosystemServices.pdf*

Analytical Laboratories Serving Oregon, EM 8677, *https://catalog.extension.oregonstate.edu/em8677*

Building Soils for Better Crops: Sustainable Soil Management, Sustainable Agriculture Research and Education, *https://www.sare.org/Learning-Center/Books/Building-Soils-for-Better-Crops-3rd-Edition*

Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways, General Technical Report SRS-109 U.S. Department of Agriculture, U.S. Forest Service: *https://www.fs.usda.gov/nac/buffers/docs/conservation_buffers.pdf*

Cover Crop Innovators Video Series, Sustainable Agriculture Research and Education, *https://www.sare.org/Learning-Center/Multimedia/Cover-Crop-Innovators-Video-Series*

Cover Crops for Soil Health Workshop, SARE, *https://www.sare.org/Events/Cover-Crop-Conferences/Cover-Crops-for-Soil-Health-Workshop/Cover-Crop-Cocktails*.

Crop Rotation on Organic Farms, SARE, *https://www.sare.org/Learning-Center/Books/Crop-Rotation-on-Organic-Farms/Text-Version*

Does Glomulin Hold Your Farm Together?, USDA Agricultural Research Service, *https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1144429.pdf*

The Five Factors of Soil Formation, Virtual Soil Science Learning Resources, *https://www.youtube.com/watch?v=bTzsIvAD1Es*

A Guide to Collecting Soil Samples for Farms and Gardens, EC 628, *https://catalog.extension.oregonstate.edu/ec628*

Integrating Livestock and Crops: Improving Soil, Solving Problems, Increasing Income, ATTRA — Sustainable Agriculture Program, *https://attra.ncat.org/attra-pub-summaries/?pub=481*

Living Mulch Builds Profits, Soil, American Society of Agronomy, *https://www.agronomy.org/science-news/living-mulch-builds-profits-soil*

Managing Cover Crops Profitably, SARE, *https://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version*

No-Till Cover Crop Roller, Rodale Institute, *https://www.youtube.com/watch?v=PW4mwVJPS9A*

Rototill Sparingly, University of Maryland Extension, *http://extension.umd.edu/sites/extension.umd.edu/files/_docs/locations/frederick_county/MG%20Article-03-05-15%20Rototill%20Sparingly%20by%20Ron%20Dudley.pdf*

Sheet mulching — aka lasagna composting — builds soil, saves time, OSU Extension Service, *https://extension.oregonstate.edu/gardening/techniques/sheet-mulch-lasagna-composting*

Silvopasture: An Agroforestry Practice, EM 8989, *https://catalog.extension.oregonstate.edu/em8989*

Soil Food Web, Natural Resources Conservation Service, *https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/biology/?cid=nrcs142p2_053868*

Soil Health, NRCS, *https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/*

Soil Health Institute, *https://soilhealthinstitute.org.*

Soil Test Interpretation Guide, EC 1478, *https://catalog.extension.oregonstate.edu/ec1478*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, rural planner, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

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Published December 2020

Worksheet 1: Resource assessment for soils

Beneficial uses of my soil	Yes	No	Not sure	N/A
Growing food plants				
Growing landscape plants				
Growing pasture or forage for livestock				
Growing trees or forests				
Growing crops for sale				
Growing turf for recreation or aesthetics				
Support for structures				
Habitat for wildlife or beneficial creatures				
Water retention or water purification				
Carbon sequestration				

Soil type

NRCS Soil type determined by Web Soil Survey (see Know Your Soils in "Resources," page 7). You may have more than one soil type. List all. Use extra paper as needed.

1. NRCS soil name (Ruch, for example)	
1. NRCS soil texture (silty loam, for example)	
2. NRCS soil name	
2. NRCS soil texture	

"Ground truth" different soil types with the soil texture jar test. See "Resources," page 7.

Evaluate soil quality. Are any of these concerns present?	Yes	No	Not sure	N/A
Soil is bare (less than 30% groundcover of plants or mulch in a given area)				
Soil surface is crusted				
A spading fork will not penetrate the soil to full fork depth (as hard as a rock)				
No/few earthworm/macroinvertebrates present in a representative shovelful				
A shovelful of surface soil does not crumble easily				
Aggregates dissolve in water (See slake test, page 3)				
Puddles present for hours after a rain event				
Evidence of erosion (soil movement) present				
Was the site historically used for intensive crop production or orcharding?				
Landscape or garden plants look variable — some areas healthier than others				

Worksheet 2: Management activity assessment for soil

Use the checklist of management practices below to identify activities you incorporate in your soils management.	Ongoing	Completed	Need to do	Consider	N/A or not feasible
Know your soil					
Create a soil map of your property.					
Investigate soil types present. (Conduct a soil texture jar test, or evaluate soil by hand or by digging a hole.)					
Conduct a slake test. Compare a tilled area like a garden to an untilled area like a lawn.					
Perform a soil test to evaluate fertility.					
Consider a soil test for contaminants, heavy metals or legacy pesticides.					
Protect your soil					
Cover bare ground with mulch or living plants.					
Consider your soil through the seasons. Do you have a plan to keep the soil covered?					
Develop a plan to minimize tillage.					
Scrap or donate your rototiller.					
Plan to control weeds with minimal soil disturbance.					
Prevent soil compaction. Do you know where vehicles will drive when it's wet?					
Develop a hardened area for livestock during wintry, wet conditions.					
Feed your soil					
Plan to have living roots (plants) occupy your soil year-round.					
Limit the amount of plant monoculture on your property.					
Maximize the proportion of perennial plants.					
Plant cover crops of multiple species following annual gardening or cropping.					
Plan a crop rotation for gardens and annual crops.					
Consider opportunities for agroforestry, intercropping and perennial polycultures.					
Integrate livestock to improve nutrient cycling.					
Amend with organic matter and nutrients based on soil test results.					
Review the "need to do" and "consider" columns. List management practices that would be beneficial to incorporate into your soil management. Use extra paper as needed.					

Results

Review the results of Worksheets 1 and 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the "Need to do" and "Consider" columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these.

1.

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Photo: Scott Duggan, © Oregon State University

Pasture management links to other land resource topics such as soil, water quality and wildlife habitat. This module will help landowners recognize practices that support beneficial resource conditions.

Dryland and irrigated pasture

Introduction

Program participants will have read *Pastures: Stewarding a Working Landscape*, EM 9303. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline," below). This module can be delivered as a part of a complete Land Steward Training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics. This Module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

This module focuses on management practices for dryland and irrigated pasture. Elements of the module could also be used for wild grassland habitats. (See "Field sites" below). The goal of the module is to give an overview of best practices and expose program participants to some on-the-ground examples of pasture management strategies. They will recognize how pasture management can impact other resources topics such as soil and water quality, wildlife habitat, and invasive weeds. They will choose management activities that support beneficial resource conditions.

Logistics

TIME NEEDED

Five-hour class: 30-60 minutes in the classroom, 4-4.5 hours in the field including travel time

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITES

Site characteristics: Choose one irrigated and one dryland pasture. Another option is a nonpasture grassland habitat. Select field sites where you can observe different practices and conditions. Examples

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

Content outline

Program participants will have read Pastures: Stewarding a Working Landscape. Use this document as guidance for the content provided, both by the natural-resource specialist and the selection of field sites. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and knowledge of the field sites. Suggested content topics:

- Soil
  - Testing: why and how, including resources to complete testing.
  - Soil types: why these matter and how to determine type.
- Management practices such as tillage and stocking levels that affect soil quality
  - Management of forage production and quality.
  - Rotational grazing.
  - How to determine when to rotate.
  - How to measure forage yields.
  - Seeding: when and why or why not.
- Weeds
  - Integrated Pest Management: what is it and why use it.
  - How management practices impact weed establishment.
  - Importance of maintaining healthy forage population to avoid weeds.
  - Importance of weed identification.
  - Herbicides: IPM and how and why to minimize herbicide use.
- Pasture infrastructure management
  - Irrigation: types of irrigation (flood, overhead, pods); benefits and drawbacks.
    - » Water conservation impacts.
    - » How to protect water quality when using flood irrigation.
  - Fencing.
    - » Types of fencing (wildlife considerations).
    - » Use for herd management.
  - Reducing heavily impacted pasture areas by distributing cattle resources such as water, mineral supplements, shade structures, etc.
- Protecting other natural resources.
  - Riparian areas.
    - » Potential impact of cattle on streams and why it matters.
    - » Strategies to limit negative impacts (fencing, timing of grazing, hardened crossings, off-stream watering strategies, etc.).
  - Wildlife habitat: how and why to consider wildlife in pasture design.
    - » Management examples: forage rows, wind breaks, bird nesting, forage harvest, wildlife-friendly fencing, etc.
- Rules and regulations: Agricultural Water Quality Management Act
  - What it says and why it matters.

include: rotational grazing, mob grazing, special weed conditions, specific irrigation systems, reseeding techniques, particular forage species, fencing design and materials, wildlife-friendly fencing, hedgerows, silvopasture, and holistic management techniques. You could also highlight how good pasture management can support multiple land uses, such as streams, woodlots or other wildlife habitat. Take advantage of whatever features and practices are available for demonstration.

Site logistics: Review “Field site logistics” in “Module delivery guidance,” page 9

NATURAL-RESOURCE EXPERT NEEDED

Natural-resource experts could be local university Extension agents, Soil and Water Conservation District personnel, Natural Resource Conservation Service personnel, or private individuals or educators with significant pasture experiences. Choose someone who can serve as a future resource to landowners.

Lesson plan

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Identify characteristics of a healthy pasture.
- Recognize how pasture management affects other landscape components (streams, forest, soil and wildlife).
- Identify management strategies for improved pasture health.

BEHAVIOR OBJECTIVES

- Use pasture characteristics to assess pasture health.
- Identify areas of concern and select management actions that support healthy pastures.
- Identify goals for your pasture and create a management plan that supports natural-resource health.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Pastures: Stewarding a Working Landscape*, EM 9303, and review worksheets 1 and 2.
  - Print and bring entire document to the next field class. At a minimum, bring worksheets 1 and 2.
- Read additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

- Using *Pastures: Stewarding a Working Landscape:*
  - Use Worksheet 1 to complete an assessment of the health of your pasture.
  - Use Worksheet 2 to assess your current pasture-management practices.
- In the Land Steward Property Management Plan under the "Pasture" box, summarize the results of your assessments and list your pasture-management goals for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of the pasture using Worksheet 1. The purpose of this is to reinforce observing the characteristics of pasture health and to familiarize participants with the assessment that they will perform at home on their own land.

- Ask participants to work in small groups with one notetaker.
- Distribute clipboards, pencils and copies of Worksheet 1, as needed.
- Allocate 10–15 minutes for the participants to explore the property to assess the pasture.
- Reconvene the participants and invite them to share questions and a few interesting findings.

Materials needed for field day

- Copies of reading assignment for the next class, usually the Rural Resource Guidelines. (Some participants prefer to access these online, so uou may not need a full class set may not be needed.)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from the Rural Resource Guidelines.
- Clipboards and pencils
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

Background resources

In "Module delivery guidance," review "Background resources," page 9.

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page 9. The coordinator should share the suggestions with the natural-resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page 12.

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

Photo: Jackson Soil and Water Conservation District

A pod irrigation system is a pressurized system designed for pastures. A UV-resistant thick plastic shell protects the sprinklers.

PASTURES:
Stewarding a Working Landscape

Clint Nichols and Gordon Jones

Whether you're growing hay for market or providing forage for livestock, a healthy pasture maintains healthy soil, produces high yields, excludes weeds and has a positive impact on the environment. Proper management — more than any amount of fertilizer, seed, water or herbicide — is the key to a healthy pasture.

Begin by taking a good look at the soil beneath your pasture.

Clint Nichols, rural natural resource planner, Jackson Soil and Water Conservation District. Gordon Jones, assistant professor of practice, Southern Oregon Research and Extension Center, Oregon State University.

Improve or preserve soil health

- **Know what's in your soil.** Conduct soil tests every two to three years to guide your fertilizer applications so you are not over- or underapplying amendments. Applying too much fertilizer can lead to nutrient pollution in streams. Too little can limit forage production and quality. Both over- and underapplication can waste money.
- **Manage soil fertility to your objectives.** Pastures that are well-managed and grazed by livestock recycle nutrients efficiently, while harvesting hay will remove nutrients from your soils. Adding sulfur and phosphorus can increase the amount of legumes in some pastures. Adding nitrogen will increase grass hay yield. Adding organic matter will improve the

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3 EASY STEPS

Use this document to evaluate your pastureland

1. Read *Pastures: Stewarding a Working Landscape.*
2. Use Worksheet 1: Resource assessment for pastures, page 5, to assess the condition of your resource.
3. Use Worksheet 2: Management activity assessment for pastures, page 7, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local Extension office, Soil and Water Conservation District or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties but is applicable to other areas.

water-holding capacity of your pasture and boost nutrient supply.

- **Know your soil type.** Use soil survey tools listed in "References," page 4, or see other publications in this series to learn about your soil texture, rooting depth, potential productivity and other information.
- **Avoid grazing and machinery traffic on wet soils.** Wet or saturated soils are susceptible to compaction, and soil compaction makes it harder for grasses to grow. Move animals to a hardened area or better drained pastures when soils are wet.

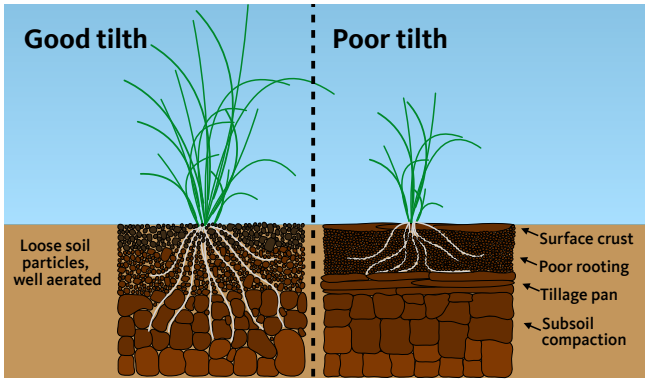

Illustration: based on *Building Soils for Better Crops* by Fred Magdoff and Harold van Es

The plant at left is growing in soil with good tilth. The plant at right, growing in compacted soil, has restricted root production.

Photo: Natural Resources Conservation Service

Paddocks separated by an electric fence. The paddock on the right has recently been grazed, and the paddock on the left has seen extended rest.

Manage forage production, grazing and hay harvest

Perennial grasslands have an important role in our landscape. In addition to providing low-cost feed for livestock, healthy pastures and hayfields can help to improve water quality, reduce erosion and provide wildlife habitat.

- **Use rotational grazing practices.** Rotational grazing means moving livestock to different areas of a pasture to prevent overgrazing. This strategy allows pasture plants to recover and grow after grazing. Rotational grazing practices can increase forage yields, reduce weedy competition, improve soil health, and minimize erosion and pollution. Divide your pasture into relatively equally spaced paddocks and move livestock from one paddock to the next to allow for controlled management of forage removal and regrowth.
- **Monitor forage height.** Do not graze your pastures much lower than 4 inches, and wait to graze until 8 inches have regrown. "In at 8 inches, out at 4 inches" is the rule of thumb for most common Oregon pasture grass species. Many irrigated pasture grasses grow more slowly in summer than in spring, so base your grazing or mowing schedule on the height of the plant rather than by some calendar date. Pastures that grow to exceed 12 inches could be taken out of the grazing rotation and harvested for hay.

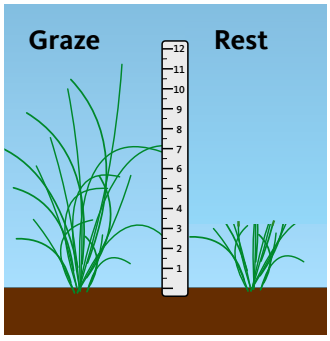

Illustration: Gordon Jones, © Oregon State University

Photo: Jackson Soil and Water Conservation District

A no-till drill seeder can plant forage seeds without disturbing the soil.

- **Document your management** by recording the dates you move animals into and out of pastures. Records of pasture quality and weed abundance can also be helpful. Measure forage yields using the clip and weigh method, grazing sticks and visual assessments. Record the rotation length and livestock type and numbers. Documenting this information will reveal whether the pasture is improving or declining over time and allow you to make management adjustments without relying on memory alone.
- **Seed only when necessary.** Good grazing management can improve the growth of many pastures, but sometimes few or even no desirable forage plants are present. In these cases it might make sense to reseed. Use low-impact planting methods such as broadcast seeding of legumes and a no-till drill seeder. Replanting large areas of pasture can be risky, and can take a pasture out of production for more than a year. Successful establishment depends on appropriate weather and limited weed competition.

Use integrated pest management to fight weeds

Weeds are opportunistic, and forage plants are competitive. Maintaining a thick and vigorous pasture is the best defense against weeds. Grasses tolerate repeated grazing, while many weeds do not.

- **Ensure adequate soil fertility** and uniform irrigation coverage to prevent weeds from taking hold.
- **Know your weeds**. Being able to correctly identify weeds and understand their biology is the key to integrated pest management. The only way to know if you're choosing the best combination of tools is to understand how specific weeds grow and to target weak points in their life cycles.
- **Apply herbicides judiciously and follow the label**. Herbicides, like all management tools, have potential risks in addition to their benefits.
- **Develop an integrated pest management strategy.** Rather than relying on a single tool to manage weeds, combine several practices such as mowing, tillage, hand-pulling, grazing, fire, fertilization and herbicides. The goal of an IPM approach is to use a combination of methods to manage pests or weeds by the most economical means — and with the least possible hazard to people, property and the environment.

Comparing traditional pest management and IPM

	Traditional pest management	IPM
Program strategy	Reactive	Preventive
User education	Minimal	Extensive
Potential liability	High	Low
Emphasis	Routine pesticide application	Pesticides are used when alternate methods are inadequate
Inspection and monitoring	Minimal	Extensive
Pesticide application frequency	By schedule	By need
Pesticide application target	Areawide spraying	Spot treatment

Adapted from Eric Stormer, Center for Applied Biology

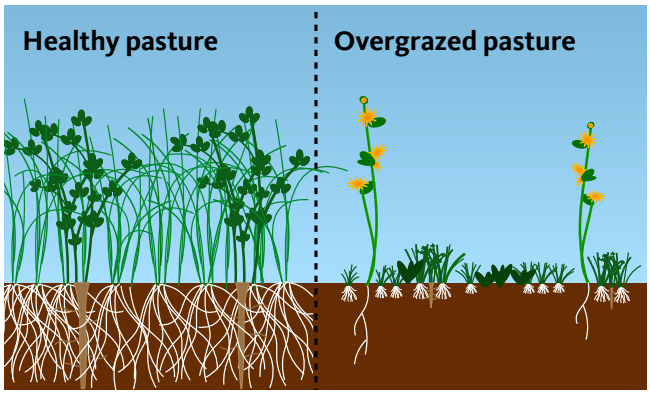

Illustration: Gordon Jones, © Oregon State University

Careful management results in healthy, resilient pastures that provide high-quality feed, outcompete weeds and recycle nutrients. Overgrazed pastures supply less forage and allow weeds to invade. Plants in overgrazed pastures have weak root systems, which makes the pasture susceptible to stress.

Protect environmental resources

Take steps to protect waterways and wildlife.

- **Minimize livestock damage to streams.** Livestock can damage riparian areas if left unmanaged. Use fencing, hardened crossings, culverts and off-channel watering facilities to control access. Refer to other publications in this series for additional information on managing these areas.
- **Consider the impact to wildlife in your land management decisions.** Many types of wildlife — from rodents and birds to deer, elk and bear — can be drawn to your property. Create fencerows for shelter and habitat, use wildlife-friendly fencing, and keep key areas of your land undisturbed to provide habitat for wildlife. Limit mowing to those periods outside of nesting and rearing seasons. See other publications in this series.

Follow the rules

Oregon's Agricultural Water Quality Management Act helps farmers and ranchers address water pollution regulated under the Clean Water Act. The act bars agricultural practices from polluting waterways.

The Agricultural Water Quality Management Area Plan describes various types of pollution potentially caused by agricultural practices. The plan does not dictate to agricultural producers how to manage their land to prevent water pollution, but instead offers a suite of best practices to address potential water pollution concerns that could result from agricultural production. Contact your local Soil and Water Conservation District for information on this plan.

Video resources

South Dakota State University Extension, *Clip and Weigh Method*, *https://www.youtube.com/watch?v=8Hp0BIIwU9g*

Noble Research Institute, *Using a Grazing Stick to Determine Stocking Rates on Small Grains Winter Pasture*, *https://www.youtube.com/watch?v=PTMYjvbwtA0*

References

AgriMet station information and links: *https://www.usbr.gov/pn/agrimet/*

National Resources Conservation Service guide to basic infiltration tests: *http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052494.pdf*

Oregon State University Extension Service pasture resources: *https://extension.oregonstate.edu/crop-production/pastures-forages*

Oregon State University Extension Service, *Pasture and Grazing Management in the Northwest*, PNW 0614, *catalog.extension.oregonstate.edu/pnw614*

University of California, Davis, guide to integrated pest management: *ipm.ucdavis.edu/GENERAL/whatisipm.html*

University of California, Davis, Soil Research Lab — SoilWeb Apps: *https://casoilresource.lawr.ucdavis.edu/soilweb-apps*

University of Kentucky Cooperative Extension Service, *Determining Soil Texture By Feel*, *https://uknowledge.uky.edu/anr_reports/139*

USDA United States Department of Agriculture National Institute of Food and Agriculture

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Worksheet 1: Resource assessment for pastures

Use this checklist of characteristics to assess conditions. Use extra paper if necessary.	Yes	No	Not sure	N/A
Production objectives: What is the purpose of your pasture?				
Livestock pasture				
Hay production				
Horse boarding				
Wildlife habitat				
Forage: What is the existing forage like?				
Desired forage species grazed low to the ground				
More than 30% bare ground (field average)				
Forage appears yellow, spotted with disease, largely dead or brown				
Weeds: Are any of these concerns present?				
Significant presence of weeds (such as starthistle, medusahead, teasel)				
Undesirable riparian or aquatic plants present (rushes, sedges, blackberries)				
Infrastructure: What is the current state of fences, irrigation systems, etc.?				
Irrigation coverage is uneven, leaving dry spots or areas with standing water				
Irrigation infrastructure has leaks, overvegetated ditches, gopher holes				
Perimeter fencing in poor condition or absent				
Cross/electric fencing in poor condition or absent				
Stock water tanks in poor condition, surrounded by eroding soil or absent				
Livestock shade structure surrounded by erosion, in poor condition, absent				
Mineral supplements surrounded by erosion, in poor condition, absent				
Soil erosion or compaction where livestock congregate				
Environment: Is there the potential for negative impacts?				
Irrigation runoff returns to stream				
Buffers absent from riparian areas				
Livestock have excessive access to stream for grazing, loafing, watering				
Erosion evident along stream				
Passage across stream eroded; culverts, fords or bridges absent				
Livestock-handling facilities located near stream				
Runoff from manure piles reaches stream				

Review the results of Worksheet 1

Are there healthy conditions present? List these conditions.

Are there areas of concern? List these areas.

How would you characterize the overall condition of your pasture?

☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Not sure

Review any questions marked "not sure." List topics to investigate further.

1.

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4.

5.

Worksheet 2: Management activity assessment for pastures

Use this checklist of management practices to identify activities you incorporate into your pasture management. Use extra paper if necessary.	**Ongoing**	**Completed**	**Need to do**	**Consider**	**N/A or not feasible**
Improve or preserve soil health					
Conduct a soil test at least once every three years					
Know the soil type(s) present: texture, rooting depth, infiltration rate, agriculture class					
Apply fertilizers to match soil nutrient deficiencies and forage need.					
Minimize heavy equipment traffic					
Cover or seed bare ground					
Use no-till seeding practices to plant vegetation with minimal soil disturbance					
Manage forage use and production					
Implement a management-intensive or rotational grazing plan					
Document time, intensity and duration of grazing per portion of pasture					
Seed desired forage into existing vegetation when needed					
Measure dry matter in spring and fall to know annual forage production					
Regularly measure forage height visually; know when grazing needs to stop					
Inspect forage for the presence of pests; implement IPM practices to limit production losses					
Use integrated pest management to fight weeds					
Identify weeds present and know their biology					
Use integrated pest management practices to control weeds and other pests					
Prevent irrigation from creating overirrigated or underirrigated areas					
Improve infrastructure to manage livestock and equipment					
In flood irrigation systems, use ditches, berms or pipes to control water					
Convert from flood irrigation to pressurized irrigation systems					
Repair leaking sections of pipes and ditches; remove excess vegetation					

Use this checklist of management practices to identify activities you incorporate into your pasture management. Use extra paper if necessary.	**Ongoing**	**Completed**	**Need to do**	**Consider**	**N/A or not feasible**
Match sprinkler application rates with soil infiltration rates to prevent runoff					
Match irrigation application to forage needs.					
Observe set times, monitor irrigation to eliminate ponding and runoff					
Use and maintain perimeter fencing					
Use and maintain cross/electrical fencing for rotational grazing systems					
Match stock water tanks to livestock needs					
Keep mineral supplements, shade structures and stock water apart					
Develop or utilize existing shade structures for livestock					
Create hardened surface areas in places where livestock must congregate					
Suggestions for maintaining water quality and wildlife habitat					
Use ponds, reuse systems to keep return flows from entering streams					
Create appropriate buffers along streams					
Manage grazing in riparian areas with fencing, herding or off-channel watering and supplement areas					
Create hardened areas to enter and cross streams					
Replant bare ground along streams					
Keep livestock handling facilities a safe distance away from streams					
Control runoff from structures and manure piles					
Allow wildlife shelterbelts to develop along fences, riparian, wetland areas					
Follow the rules: Do your practices comply?					
Read the Agricultural Water Quality Management Area Plan					
Be aware of other state or local regulations regarding agricultural practices					

Results

Review the results of Worksheets 1 and 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these.

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Photo: SoilScience.info, CC BY

Water is a critical resource, and landowners want to learn practices that will help them keep systems like a septic tank running.

Water systems and infrastructure

Introduction

Program participants will have read *Water Systems: Taking Care of a Precious Resource,* EM 9243. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline," below). This module can be delivered as a part of a complete Land Steward Training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

Rural living usually involves maintaining many more systems and elements of infrastructure than urban living. Things that are taken care of by municipalities are frequently under the individual landowners' responsibility in the country, including rural roads, fences, electricity, off grid-systems and building maintenance. In this module, we have focused on water systems and infrastructure, based on persistent landowner needs and interest. However, the "systems and infrastructure" topic of this module could be modified or replaced by other topics as needed by the audience the program serves. Other potential topics include roads, fences and off-grid systems. Water is a critical resource, and its conservation and management are of great interest to most landowners. In this module participants will learn management practices for several rural water systems that will support the continued function of these important investments.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field including travel time.

Content outline

Program participants will have read *Water Systems: Taking Care of a Precious Resource,* EM 9243. This document serves as guidance for the content provided by the natural-resource expert, as well as concepts to highlight during the property tour. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites. Suggested topics:

- Acknowledge the importance of conservation and maintaining good water quality.
- Maintaining systems takes knowledge and effort. Landowners will be involved in this process either personally or by hiring contractors.
- Water rights: the need to know.
- Wells
  - Proper location is important.
  - Check flow and monitor. Keep records.
  - Periodically test for contaminants
- Springs
  - Check flow and monitor. Keep records.
  - Periodically test for contaminants.
  - Maintain spring box.
  - Consider treatment systems.
- Agricultural irrigation water
  - Prioritize water conservation and maintaining water quality.
  - Clarify when and why fish exclusion is necessary.
  - Avoid erosion.
  - Protect waterways from sedimentation.
  - Protect water sources from agricultural fertilizers and pesticides.
- Ponds
  - While desirable for many, they are prone to problems.
  - Artificial ponds require maintenance (liners, containment dams).
  - Avoid problems with stagnation.
  - Prevent problems caused by high nutrient levels.
  - Avoid invasive species and disease vectors.
- Septic systems
  - Understand basic function.
  - Keep chemicals, additives and artificial waste out of these systems.
  - Regular pumping is essential.
  - Keep free of woody vegetation.
  - Locate properly.
- Rainwater harvest
  - Be aware of regulations.
  - It is not considered potable unless treated.
- Graywater systems
  - Be aware of regulations.
  - Avoid addition of chemicals.
- Stormwater control
  - What is stormwater?
  - Slow it down, spread it out.
  - Keep it away from structures.
  - Drain it away from contaminants.
  - Learn the advantages of low-impact development for stormwater control.
  - Understand special considerations of pastures, forests and streams.
- Water infrastructure management: general guidelines for any system
  - Conserve water.
  - Regularly inspect and maintain systems.
  - Document location.
  - Keep good records (owner's manuals, instructions, etc.)
  - Develop a contingency plan in case of failure.
- Regulations
  - Water systems are highly regulated; be aware of what applies to your systems.

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITES

Site characteristics: Select one or two properties that showcase a variety of water systems, such as: septic tank, well, spring, rainwater harvest, graywater systems, bioswales, ponds, rain gardens, residential or agricultural irrigation systems and stormwater management systems.

Site logistics: Review "Field site logistics" in "Module delivery guidance," page 9.

NATURAL-RESOURCE EXPERT NEEDED

Choose an expert with experience in the systems you will be addressing. For water systems, appropriate choices could be university Extension personnel, permaculture experts, civil engineers, Soil and Water Conservation District Personnel or private contractors. Choose someone who can serve as a future resource for landowners.

Lesson plan

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Identify basic principles and practices of critical water infrastructure, including wells, springs, irrigation facilities, ponds, septic systems, graywater systems, rainwater harvest systems and stormwater control.
- Apply the basic knowledge of water infrastructure to assess whether existing water infrastructure is functioning properly and determine appropriate approaches to water-system improvements.
- Create a management plan that will maintain water systems and infrastructure components in working order while protecting natural resources.

BEHAVIOR OBJECTIVES

- Assess the operation and function of water system infrastructure on property.

- Identify areas of concern and select actions that support system function.
- List goals for improving systems and create a management and maintenance plan that supports operations.

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in canvas (or print out):
  - Read *Water Systems: Taking Care of a Precious Resource* and review worksheets 1 and 2.
  - Print and bring entire document to water systems field class.
- Read additional resources provided, optional.

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

- Using *Water Systems: Taking Care of a Precious Resource:*
  - Use Worksheet 1 to complete an assessment of the water systems present on your property.
  - Use Worksheet 2 to assess your current system management practices.
- In the Land Steward Property Management Plan under "Natural resource assessment summaries," summarize the results of your assessments and list your forest-management goals for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

WORKSHEET 1

Time needed: 25 minutes.

At one field site, allow time for the participants to practice an assessment of a water system Worksheet 1. The purpose of the exercise is to familiarize them with the assessment that they will perform at home on their own land as homework. If you have only 25 minutes, select a portion of the assessment to complete. For example, participants could calculate the amount of rainwater that might be available for harvest from a building roof.

Supplies: tape measures, annual rainfall information, conversion equations for cubic inches to gallons, and information on average annual household water use.

- Ask participants to work in small groups with one notetaker. Assign each small group one or two sections of the assessment, depending on your class size. They will share the results of their section/s at the end.
- Distribute clipboards, pencils, and copies of Worksheet 1, as needed.
- Allocate 10–15 minutes for the participants to explore the property to assess the habitat. Instruct them to start with their assigned section and then proceed with the rest of the worksheet as time allows.
- Reconvene the participants and ask each group to share the results of their assessment section. Discuss briefly as a group.

Materials needed

- Copies of reading assignment for the next class, usually the Rural Resource Guidelines. (Some participants prefer to access these online, so a full class set may not be needed.)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from *Water Systems: Taking Care of a Precious Resource.*
- Supplies for your chosen activity.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

Background resources

In "Module delivery guidance," review "Background resources," page xx.

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day," page 9. The coordinator should share the suggestions for the natural-resource specialist and landowner, as appropriate.

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page xx.

OREGON STATE UNIVERSITY EXTENSION SERVICE

LAND STEWARD PROGRAM | RURAL RESOURCE GUIDELINES

WATER SYSTEMS:
Taking Care of a Precious Resource

Stan Dean and Rachel Werling

Everyone needs high-quality water, but water is a limited resource. These best practices for wells, ponds and other water systems can help you secure a safe, reliable water supply adapted to your needs. These practices also help to ensure that we protect our streams, lakes and groundwater.

Wells

The useful life of a well can extend for decades with little or no trouble, but a variety of factors can lead to problems. These steps can help:

Stan Dean

A well casing projects above ground so no water can enter the top. Note the identification tag issued by the Oregon Department of Water Resources.

- **Periodically check the flow** of the well to make sure that it remains good.
- **Periodically test for contaminants** in wells used for potable water. The quality of the water can change over time. Regulations require that well owners test for coliform bacteria, arsenic and nitrate during real estate transactions. It may be important to test for other contaminants as well.
- **Make sure wells are sited appropriately.** Wells may need maintenance at any time of

Photo: Rachel Werling, © Oregon State University

Ron and Pam Hillers check out their rainwater collection system in Ashland, Oregon. Pipes underneath the tank move water through an irrigation system.

Stan Dean, OSU Extension Land Steward and civil engineer, and Rachel Werling, coordinator, OSU Land Steward program.

Oregon State University

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3 EASY STEPS

Use this document to evaluate and improve your own water systems

1. Read *Water Systems: Taking Care of a Precious Resource.*
2. Use Worksheet 1: Resource Assessment for Water Systems, page 8, to assess your resource.
3. Use Worksheet 2: Management Activity Assessment for Water Systems, page 11, to assess your current management practices and identify areas for improvement.

If you have questions, contact your local Extension office, Soil and Water Conservation District, or regulators, such as the watermaster from the Department of Water Resources or the Department of Environmental Quality.

About the Rural Resource Guidelines

This is one of a series developed for private landowners with little or no technical background by the Land Steward program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general terms and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties, but many of the practices are applicable to other areas.

year. Consider the consequences if a well fails and you can't get to it in snowy conditions or when dry grass creates a fire hazard in the summer.

Springs

- **Periodically check the flow** of your spring and test for contaminants. The performance of a spring can change seasonally and from year to year.
- **Maintain the integrity of spring boxes.** Developing a spring means constructing facilities to help get the water from the ground into your delivery system. Most spring boxes gather water in an enclosed structure, preventing contact with rodents and mosquitoes.
- **Consider installing treatment systems** if the water is used for potable purposes. This depends on the quality of the spring water and the security of the spring box and other parts of the system.

Agricultural irrigation water

- **Use water wisely.** Whether water is supplied from surface water, an irrigation district, or from wells, a key management practice is efficient delivery that minimizes waste. Water conservation in agricultural applications has the potential for large savings.
- **Screen surface water intakes** to keep fish out. Intakes located in the watercourse should be screened wherever surface water diversions are used.
- **Reduce contamination.** Excess water moving off farmed areas can be a significant source of contaminants to our streams, rivers and groundwater. Consider these steps to cut down on contamination:
  - **Practice farming techniques** that minimize soil loss and keep sediments out of waterways.
  - **Practice techniques** that minimize the amount of percolation to groundwater to help keep groundwater clean.
  - **Apply the least amount of fertilizer necessary.** Excessive fertilizer can run off to surface waters or seep into the groundwater and become pollutants.
  - **Exercise caution** when using herbicides and pesticides. Do not allow these products to enter surface or groundwater. Herbicides and pesticides should not be used as an automatic first choice; use them only as one part of an Integrated Pest Management strategy that considers multiple management tactics.

Ponds

Ponds offer enjoyment and can serve a variety of purposes, but they commonly fail over time for a number of reasons. They can cease to hold water due to burrowing animals, pond liner failure and erosion. Inlet, outlet and overflow facilities can also fail. Ponds accumulate silt and other debris over time, decreasing their capacity.

Ponds can develop water quality problems, including stagnation and odors. They can be havens for mosquitoes, and submerged and floating aquatic vegetation can become a nuisance. Here are some steps that can help:

- **Prevent stagnation.** If stagnant water is not acceptable, try aerating the water, harvesting excessive weeds and removing accumulated sediments.
- **Dredge responsibly.** If sediments are dredged, check with the Department of Environmental Quality regarding proper disposal of dredged material. It may also be necessary to control pests such as mosquitoes.

Photo: Rachel Werling, © Oregon State University

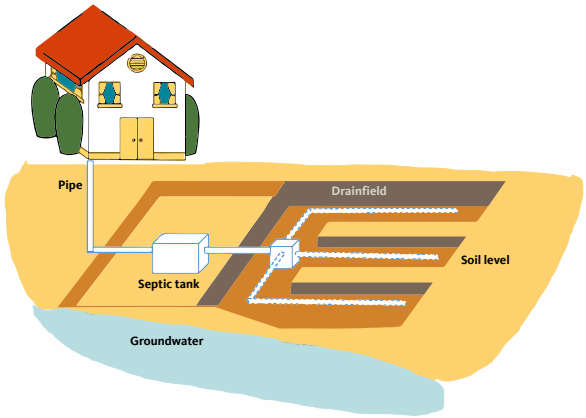
This pond located near animal pastures shows an excess of algae growth. Such an "algae bloom" can be an indication that there is too much nutrient runoff from fertilizer or manure in nearby agricultural lands.

- **Prevent runoff and manage nutrients.** Excessive nutrients, such as nitrogen and phosphorous, often cause water quality problems. Excess nutrients are difficult to remove from ponds, since these nutrients will continue to be cycled through the water column and sediments. Dredging sediments and removing vegetation can help, but these efforts could fall short. One key management practice is to prevent runoff from lands receiving fertilizer applications from entering ponds.
- **Avoid invasives.** Exotic species of plants and animals can create serious problems in our natural waterways. When ponds overflow and come into contact with other surface waters, invasive plants like parrot feather, yellow flag iris and purple loosestrife can spread.

If the pond is suspected of being contaminated or of having warm water, check with the Department of Environmental Quality for guidelines on proper removal or release of the water.

Septic systems

When constructed and maintained in accordance with state standards, septic tanks and drain fields are usually reliable and safe for the environment. However, in certain situations, they can contribute excessive nitrate to groundwater. Failure that results in surfacing of wastewater can lead to odor, nuisances and pollution.



Graphic © Oregon State University

A septic system is a safe, reliable way to break down wastes. Keep harmful chemicals out.

Septic tanks rely on bacteria to break down wastes, and it is important to keep the bacteria healthy. Keep harmful chemicals and materials from entering the system.

Avoid or reduce the use of bleach. Small amounts of cleaning bleach will do little harm, but putting a large amount in the system could affect its biology.

- **Avoid fats, oils, grease and excessive food waste** (typically associated with heavy use of in-sink garbage

disposals). While food wastes will not harm the biology in the septic tank, the wastes will cause the tank to fill up faster than necessary.

- **Keep recreational vehicle waste out of septic tanks.**
- **Keep plastics and other wastes** that don't decompose out of the system.
- **Carefully consider the use of additives.** Some additives promise to enhance septic systems but are typically unnecessary.
- **Pump the solids out** of the septic tanks every few years, depending on use. If tanks fill with too many solids, they will not work properly.
- **Keep trees and woody vegetation** off drain fields because their roots can damage parts of the system. Encourage grasses on drain fields. Paving, vehicular traffic, structures, and large animals should also be kept off the drain fields.
- **Site septic systems appropriately.** Note that these systems can need maintenance at any time of year. Don't put a septic tank in a location that would make it difficult to pump out every few years.

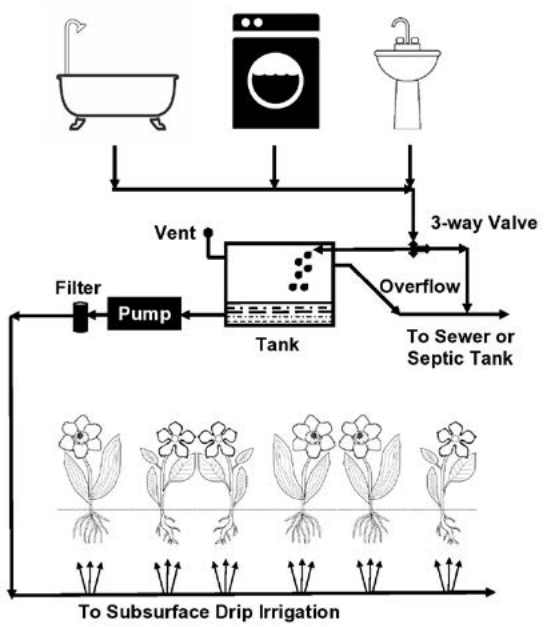
Photo: Rachel Werling, © Oregon State University

In this rainwater harvest system, water runs off the roof, is collected in gutters, and goes through pipes into a storage tank. Not shown are pipes running from the bottom of the tank underground to a pump, which moves the water through an irrigation system.

Rainwater harvest systems

Consult *Oregon Smart Guide: Rainwater Harvesting*, published by the Oregon Department of Consumer and Business Services. Systems that meet the recommendations in this manual are using good management practices. These practices address ways to keep the water free of debris and mosquitoes, allow the rainwater systems to be easily cleaned, and prevent freezing problems in the winter.

Most rainwater harvest systems are not intended to provide potable water, but it is possible for misunderstandings to happen. Nonpotable systems should be clearly identified with signs, or by painting pipes purple.



Graywater systems move drainage from household waste through irrigation systems.

Graywater systems

Keep harmful chemicals out of graywater systems. Depending on the uses of the graywater and the configuration of the system, chemical-free practices may be even more critical to graywater systems than they are to septic systems. Generally, graywater systems are highly regulated, and following the regulations results in excellent management practices.

Stormwater drainage systems

The way in which stormwater moves through and away from structures and developed areas can be critical.

- **Use pipes and ditches to convey stormwater** away from buildings. Water can damage structures.
- **Control water velocity** to prevent erosion of soils. Use retention basins, berms and drop structures to control velocity as water is conveyed.

Photo: Jason Johnson, USDA-NRCS

A rain garden can clean storm water before it enters waterways. It also allows water to percolate into the ground, adding to the groundwater supply.

- **Make sure that stormwater doesn't pick up contaminants.** The flow should not be routed through areas that contain stored manures, chemicals, or fuels.
- **Keep waste out of stormwater.** Encourage stormwater to percolate into the ground through facilities such as permeable pavement.
- **Try a rain garden.** Vegetative systems can enhance water quality, slow the movement of water and encourage percolation. Examples of vegetative systems include rain gardens, bioswales and buffer strips.

For drainage considerations outside developed areas, see other publications in this series in the OSU Extension Catalog, *catalog.extension.oregonstate.edu*.

Infrastructure management

These management practices apply to all of the above water facilities.

- **Practice conservation.** Surface water and groundwater are precious resources, and it is important to conserve water. At home, use water-saving appliances, along with low-flow showers, faucets and toilets. Outdoors, consider using drip irrigation systems.
- **Conduct inspections.** Water systems contain working parts, such as pipes, pumps, and a variety of mechanical and electrical equipment. To keep the systems functioning properly, periodically inspect parts of the systems and maintain them in good working order.
- **Document the location of underground pipes,** tanks and other facilities. It is easy to forget where things are buried years after the work is done. Marked maps and photos are good tools. When installing new systems, try using metallic tracer wire with plastic pipe so that metal detectors can locate pipes in the future.
- **Keep operation and maintenance instructions**. One good management practice is to organize a comprehensive set of instructions for the systems. The instructions should include published information supplemented with site-specific needs.
- **Develop contingency plans.** For critical systems, it is important to know how to respond in the event of a failure. For example, if a home is served by a single well and has no other source of potable water, the homeowner should know how to respond in the event of a well failure.

Follow the rules

In general, water systems are highly regulated by a variety of state and local agencies. Here are some regulatory highlights for the different types of systems.

WELLS

Water wells are permitted by the Oregon Department of Water Resources in accordance with specific standards.

- Approval for construction of domestic wells is nondiscretionary; as long as the well meets state standards, it is allowed. The standards address where wells can and cannot be located, and how they must be constructed.
- Wells must be constructed by a licensed and bonded well driller or by a landowner who has applied for and received a Landowner's Water Well Permit, as well as a landowner bond. Landowners or drillers must also follow reporting requirements during construction.
- Single-family residences served by wells can use up to 15,000 gallons per day for domestic purposes; those wells can also be used to irrigate up to a half-acre of noncommercial crops. Wells can also be used for up to 5,000 gallons per day for commercial purposes other than irrigation. Use of more water requires a water right permit, which may be difficult to obtain. The uses from a well that are allowed without a water right permit are limited per parcel (tax lot) or well system. (Regardless of the number of wells on a parcel or the number of parcels connected to a well system, the total exempt use remains the same: 15,000 gallons per day for domestic use, a half-acre of noncommercial irrigation and 5,000 gallons per day for commercial purposes).
- Within incorporated areas such as cities, ordinances generally prohibit private wells and require hookup to the municipal water supply system.

SPRINGS

Landowners can use springs under certain limited conditions. If, under natural conditions, flow from the spring would normally leave the property, it is considered water of the state. In that case, spring water can only be used with a water right permit from the Department of Water Resources.

SURFACE WATER DIVERSIONS

Surface water diversions require water rights permits issued through the Department of Water Resources. Water rights laws are complicated. Obtaining new water rights can be difficult and sometimes impossible.

IRRIGATION DISTRICTS

Irrigation district deliveries are typically made under an agreement between the district and the landowner. The agreements specify the amount of water that can be used, the times it is available and the location where it is available. Watermasters also have oversight of irrigation district deliveries.

PONDS

Ponds are regulated by the Department of Water Resources. Pond regulations include:

- A primary water right permit is required for construction of ponds and to hold water in ponds. Larger ponds (levees over 10 feet high and storing more than 9.2 acre-feet of water) must have the dam/levee designed by a licensed engineer to ensure that the facilities are constructed in a safe manner. Smaller ponds also require a primary water right permit, but the dam does not need to be engineered.
- A secondary water right permit can be required to actually use the water in ponds unless the water is only used for purposes that are exempt. Stock watering is an example of an exempt use that does not need a secondary permit. Another exemption is the collection and use of rainwater as long as it is collected from artificial impervious surfaces.
- Ponds holding rainwater collected from artificial impervious surfaces do not need a primary or secondary water right permit as long as the storage facility is designed in a way that prevents any other type of surface water from entering the pond.
- Bulge ponds that temporarily store irrigation water may also be exempt from needing a permit. Consult with your local watermaster.

SEPTIC SYSTEMS

Septic systems are permitted by Oregon Department of Environmental Quality in accordance with state standards. The standards address where facilities can be located and design requirements.

- In certain situations, owners must have maintenance contracts with certified professionals.
- Most cities prohibit septic systems wherever is it possible to connect to a municipal wastewater collection and treatment system.

RAINWATER

Rainwater can be collected and used as long as it has not touched the earth's surface and is captured from an artificial impermeable surface. Once it comes in contact with the earth it becomes property of the state. State requirements for rainwater harvest systems vary depending on how the water is used:

If rainwater is for potable use, plumbing standards govern design of the system, and proper treatment is required.

Another set of plumbing standards applies if the water is used for nonpotable, nonirrigation purposes, such as flushing toilets or cooling water.

- If the rainwater is used for irrigation only, it is not regulated by the state under the plumbing code; however, local building officials may have special requirements, and your project may need to meet building and electrical standards.

GRAYWATER

Graywater systems are subject to a stringent set of requirements by the Oregon Department of Environmental Quality. The extent of the requirements depends on the uses of the graywater. Permits and annual reporting and fees are required.

STORMWATER

Stormwater regulations originate at the federal level under the Clean Water Act, which is administered by the U.S. Environmental Protection Agency.

- One set of requirements applies to municipalities that collect stormwater in piping systems and discharge to water courses. In Oregon, responsibility for municipal stormwater systems is delegated to the Department of Environmental Quality and then to the local municipalities. The cities of Medford and Ashland manage their own stormwater program, while Rogue Valley Sewer Services oversees the program on behalf of the cities of Phoenix, Talent, Central Point and urbanized parts of Jackson County. These programs have elements that address public education and outreach, control of illicit discharges and management of large construction projects (over 1 acre).
- Stormwater programs typically require compliance through implementation of management practices.

- While these programs are not required for rural homeowners, the principles and practices for managing stormwater are good for everyone.

PUBLIC DRINKING WATER

For information on public drinking water systems, contact the Oregon Health Authority and the Oregon Department of Environmental Quality. OHA regulates drinking water systems, and DEQ has a source water protection program to help protect the quality of drinking water supplies.

More OSU Extension publications

Angima, S. *Harvesting Rainwater for Use in the Garden*, EM 9101, *catalog.extension.oregonstate.edu/em9101.*

Bowers, S. *Woodland Ponds: A Field Guide*, EM 9104, *catalog.extension.oregonstate.edu/em9104.*

Cahill, M., D. Godwin, J. Tilt. *Rain Gardens: Low-impact development fact sheet*, EM 9207, *catalog.extension.oregonstate.edu/em9207.*

Lucas, C., M. Livesay, *Keeping Your Well Water Well*, EM 8752, *catalog.extension.oregonstate.edu/em8752.*

Lucas, C., M. Livesay, *Twelve Simple Things You Can Do to Protect Your Well Water*, EM 8651, *catalog.extension.oregonstate.edu/em8651.*

More resources

Oregon Department of Environmental Quality: information on septic systems, graywater systems and stormwater permitting. See the Septic Smart page. *http://www.oregon.gov/deq*

Oregon Water Resources Department: information on wells, water rights, dams, water law, water conservation, and more. *http://www.oregon.gov/OWRD*

Oregon Department of Consumer and Business Services, *Oregon Smart Guide, Rainwater Harvesting. https://www.oregon.gov/bcd/Documents/brochures/3660.pdf*

Rogue Valley Council of Governments: a variety of resources related to stormwater under the heading Natural Resources. rvcog.org

Rogue Valley Sewer Services: a variety of resources related to stormwater under the heading Stormwater Quality. *www.rvsss.us*

Stream Smart: information on stormwater *www.stream-smart.com*

United States Department of Agriculture
National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, rural planner, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

This publication will be made available in an accessible alternative format upon request. Please contact puborders@oregonstate.edu or 1-800-561-6719.

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Worksheet 1: Resource assessment for water systems

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Water sources				
Well				
Municipal water				
Spring				
Stream diversion				
Irrigation district delivery				
Rainwater harvest				
Graywater				
Water rights				
Do you have documented water rights or agreements? *Water rights may be required for wells and are required for stream diversions. Agreements with irrigation districts are usually required.*				
Do you understand the requirements and limitations of the water rights or agreements?				
Potable water (assuming well water supply)				
Find out how much water the well produces. Is this enough?				
Is the quality of the water adequate? *pH, bacteria, nitrates, other chemicals, sand, etc.*				
Does the system function properly? *No leaks, mechanical and electrical equipment works, water pressure is adequate, etc.*				
Are facilities accessible?				
Potable water (assuming a spring)				
Does the spring produce enough water?				
Is the quality of the water adequate? *pH, bacteria, nitrates, other chemicals, debris, etc.*				
Does the system function properly? *No leaks, equipment is working, water pressure is adequate, etc.*				
Is there a spring box that protects the water from vectors?				
Are facilities accessible?				
Agricultural irrigation water				
Find out how much water is available. Is it enough?				
Is the time when water is available suitable?				
Is the quality of the water adequate? *Bacteria, nutrients, chemicals, algae and debris, etc.*				
Does the system function properly? *No leaks, equipment is working, water pressure is adequate, etc.*				
Are facilities accessible?				
Is the type of irrigation system suitable for the use? *Flood, drip, spray, etc.*				
Ponds				
Is the source of the water for the pond known?				
Does the pond hold water as intended?				
Do dikes and overflow facilities appear adequate to contain and release water?				
Are nuisance conditions present (e.g. weeds, odor, mosquitoes)?				

Worksheet 1: Resource assessment for water systems

Use this checklist of characteristics to assess your water systems. Use extra paper if necessary.	Yes	No	Not sure	N/A
Septic systems				
Does the system function properly? *No odors present, no backups or overflows, no soggy soils, no seepage that comes back to the surface, working mechanical and electrical equipment, etc.*				
Are facilities accessible?				
Rainwater harvest system				
Identify the uses of the rainwater. Are the uses appropriate?				
Does the quantity of available rainwater match needs?				
Does the system function properly? *No leaks, debris kept out of system, freeze protection works, water pressure is adequate, mechanical and electrical equipment works*				
Are facilities accessible?				
Graywater systems				
Identify the uses of the graywater. Are the uses appropriate?				
Does the quantity of available graywater match needs?				
Does the system function properly? *Odors not present, no leaks, mechanical and electrical equipment works*				
Are facilities accessible?				
Stormwater drainage systems				
After significant rain, is water left standing in undesirable areas (such as adjacent structures, wells and septic systems)				
Do roof downspouts direct stormwater in desirable directions?				
Does stormwater drainage contribute to soil erosion?				
Does stormwater drainage move through areas where it can pick up contaminants?				
Infrastructure management				
Do water systems prevent waste through water conservation?				
Are systems in good working order?				
Are locations of underground facilities known?				
Are operations and maintenance instructions available?				
Are there contingency plans for failure of parts of the system?				

Given your responses above, how would you characterize your current water systems?
Check one description. What actions are required, if any?

A. **Potable water** ☐ Excellent ☐ Fair ☐ Poor ☐ Not sure

List actions you can take to improve or maintain potable water.

1.	
2.	
3.	
4.	
5.	

B.	**Irrigation water**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to manage irrigation water.					
1.					
2.					
3.					
4.					
5.					
C.	**Ponds**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to improve or maintain ponds.					
1.					
2.					
3.					
4.					
5.					
D.	**Wastewater (septic systems, etc.)**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to improve or maintain wastewater systems.					
1.					
2.					
3.					
4.					
5.					
E.	**Rainwater harvest**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to manage rainwater.					
1.					
2.					
3.					
4.					
5.					
F.	**Graywater**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to manage graywater.					
1.					
2.					
3.					
4.					
5.					
G.	**Stormwater**	☐ Excellent	☐ Fair	☐ Poor	☐ Not sure
List actions you can take to manage stormwater.					
1.					
2.					
3.					
4.					
5.					

Worksheet 2: Management activity assessment for water systems

Use the checklist of management practices below to identify activities you incorporate in your water systems management.Use extra paper if necessary.	PRACTICE ASSESSMENT				
	Ongoing	**Completed**	**Need to do**	**Consider**	**N/A**
Potable supply with well water					
Well flow is periodically checked.					
Well water quality is periodically checked.					
The system components are accessible in all seasons.					
Potable supply with spring water					
Spring flow is periodically checked.					
Spring water quality is periodically checked.					
A secure spring box or equivalent means of protection is in place such as water treatment.					
Agricultural irrigation water					
Surface water diversions are screened.					
Farming techniques minimize soil loss.					
Runoff amount is minimized.					
Fertilizers, pesticides, and herbicides are used appropriately.					
Ponds					
Mechanisms for keeping ponds from getting overgrown with vegetation and becoming stagnant are available, if desired.					
Mosquitoes and other pests are controlled.					
Excessive nutrient loads are kept from entering ponds.					
Exotic plants and animals are not put in ponds than can overflow and connect with other surface waters.					
Septic systems					
Harmful wastes are not put into the system.					
Septic tank is pumped at appropriate intervals.					
Trees and woody vegetation are kept off drain field areas.					
Pavement, vehicles, structures, and heavy animals are kept off the drain field.					
The system components are accessible in all seasons.					
Rainwater harvest systems					
System has good mechanisms for control of debris, mosquitoes, and freezing conditions.					
Systems that do not provide potable water are clearly identified as nonpotable.					
Graywater systems					
Harmful wastes are not put in the system.					
Stormwater drainage systems					
Water is deliberately conveyed away from structures.					

Worksheet 2: Management activity assessment for water systems

Use the checklist of management practices below to identify activities you incorporate in your water systems management.Use extra paper if necessary.	PRACTICE ASSESSMENT				
	Ongoing	**Completed**	**Need to do**	**Consider**	**N/A**
Velocity of conveyed water is controlled.					
Stormwater does not pick up contaminants.					
Stormwater is encouraged to percolate into groundwater (through use of permeable pavement, for example).					
Vegetative systems such as rain gardens, bioswales, and buffer strips are used to enhance water quality.					
Infrastructure (applies to all systems)					
Water conservation practices are followed.					
System components are periodically inspected and repaired as needed.					
Location of underground facilities is known and documented.					
Written operation and maintenance instructions are kept and updated when system changes are made.					
Contingency plans are in place in the event of loss of critical systems.					
Know the rules (applies to all systems)					
Owner is familiar with applicable regulations.					
Facilities have all required permits and agreements.					
Facilities are built, operated and maintained in accordance with regulations.					

Review the results of Worksheets 1 & 2. Consider any resource concerns and healthy conditions identified in Worksheet 1, and practices that you checked in the “Need to do” and “Consider” columns in Worksheet 2. What are the most important potential follow-up actions? List and briefly describe these below.

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Economics and enterprise

Introduction

Program participants will have read *Economics and Enterprise: Financial Considerations of Rural Life*, EM 9315. Please review that content. A bulleted content outline based on the guideline is provided to aid resource instructors (see "Content outline" below). This module can be delivered as part of a complete Land Steward Training or used as a guide for a stand-alone field day. When conducting a training, it helps to remind participants to connect the concepts from this module with related training topics. This module will introduce best practices on the topic and allow participants to see and evaluate resource conditions in the field.

Whether a person's reason for owning land is to create a peaceful rural retreat, a family homestead or a land-based business like a farm, economics are always part of the picture. Many owners engage in a mix of land-use activities on their property. It is common for a single property to include forest and wildlands, as well as agricultural activities like pastures, orchards and crops, at a variety of scales. Landowners' economic goals may vary widely, from simply keeping a special assessment status such as EFU (exclusive farm use), to covering the expenses of maintaining infrastructure, like roads, forests and fences. For some the goal may be to have a hobby farm that contributes to the cost of running the operation. Other landowners may envision a farm or ranch business that will support their family and future. Some landowners may count on future timber harvest to help cover expenses of life and land. In this lesson, we will encourage landowners to think about the economic possibilities of their land so they can refine their goals and create a plan to achieve them.

Logistics

TIME NEEDED

Five-hour class: 30–60 minutes in the classroom, 4–4.5 hours in the field including travel time.

MODULE DELIVERY GUIDANCE

Review "Module delivery guidance," page 9. This has many important instruction and logistical suggestions that will be similar for every module.

FIELD SITES

Site characteristics: Select one or two properties that showcase examples of economic possibilities at different scales. Some landowners have many activities going on at once, such as selling vegetable seed commercially, leasing pasture to a neighbor and a farm-stay business. Others may be working at a commercial level or simply to generate income to maintain EFU status. Two sites will allow you to share a variety of economic strategies with your class. This topic allows for an especially wide range of possibilities, as there are many ways to earn income from property.

Site logistics: Review "Field site logistics" in "Module delivery guidance, page 9

RESOURCE EXPERT NEEDED

Possible resource experts include a university small-farms program agricultural Wxtension agent or a staff member from your local Soil and Water Conservation District. This person can provide an overview of rural economic considerations. Staff from your county assessor's or planning office could be included on the field site. For this module, the landowner or farmer is usually one of your topic experts. Possibilities include a small farmer, an independent logger or a hobby-farm owner.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

Lesson plan

LEARNING OBJECTIVES

- After completing this module, participants will be able to identify economic resources available for land management.
- Outline economic strategies for their property.
- Synthesize resources and strategies to create economic goals.
- Incorporate goals into a Land Steward Property Management Plan.

BEHAVIOR OBJECTIVES

- Examine economic resources and review lifestyle values.
- Review possible economic strategies for property.
- Synthesize resources and strategies to create economic goals.
- Incorporate economic goals into a land Land Steward Property Management Plan.

Content outline

Program participants will have read *Economics and Enterprise: Financial Considerations of Rural Life.* This document serves as guidance for the content provided by the natural-resource expert as well as concepts to highlight during the property tour. Select topics and apply them to the specific enterprise being showcased for the class. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites. Suggested topics:

- Economics and enterprise can operate at many scales. Your goals will influence your approach and what you need to know.
- Zoning
  - Zoning regulates how you can use your land to earn income.
  - Special assessments (farm, forest or riparian lands) can reduce taxable value.
- Explore ways to save on land management costs.
  - Highlight cost-share and incentive programs available with local agencies (ODF, USDA, etc.).
  - Brainstorm ways to save on costs, such as work trades, product trades, skill bartering, etc.
- Woodland income opportunities
  - Sell timber
  - Sell nontimber forest products (floral greens, mushrooms, etc.)
  - Factors that can affect feasibility of generating timber income (access, terrain, species mix, etc.).
- Choosing income strategies for farms and ranches
  - Consider your personal resources (health, finances, etc.).
  - Consider your strengths. (Are you organized? Do you like people, etc?)
  - Be realistic about lifestyle (family values, time, physical labor).
- Physical resources of your land
  - Soil classes. (What class is needed and is it offered?)
  - Water. (Do you have the needed water rights and sufficient amount of water available?)
  - Climate. (Choose species that will thrive you are.)
  - Infrastructure (buildings, irrigation, machinery, etc.).
- Considerations for earning farm/ranch income
  - Think outside the box. (Are there ways you can diversify or multiply your products?)
  - Do market research; explore nontraditional products.
  - Know the needs of the crops you select to produce.
  - Start small to reduce your financial risk as you learn.
  - Access to labor: How much do you need and do you have it?
- Methods to market your products (neighbors, community-supported agriculture, farm stands, contracts, restaurants, institutions).
- Agritourism (farm stays, workshops, etc.).
- Capital considerations.
  - Risk: Be realistic about the financial risk of your business.
  - Access to capital (How much do you have and how much do you need?) Research government/organizational financing assistance programs.
- The future beyond your tenure.
  - Succession planning. What do you want to happen to your land and business after your time?
  - Conservation easements:
    - » Ensure that your values continue to influence the management of your land.
    - » Create tax deferrals.
- Possible talking points for any farmer hosting a Land Steward visit.
  - Begin with your story. How did you start doing this business? Share your goals and values.
  - Orient people to your property as needed.
  - Lifestyle considerations (values, goals).
  - Zoning and regulations that need to be considered.
  - What personal resources does this business need (time, energy, skills, financial resources) ?
  - What physical/material resources does it need (climate, soil, infrastructure, equipment)?
  - What are the special requirements of this business?
  - How do you market?
- Capital
  - What is the exposure to financial risk?
  - What are fiscal resources (organizations, grants, technical assistance)?
- What is your approach to the future of your land/business?

READING ASSIGNMENT (TO COMPLETE BEFORE FIELD CLASS)

- Online in Canvas (or print out):
  - Read *Economics and Enterprise: Financial Considerations of Rural Life* and review worksheets 1 and 2.
  - Print and bring entire document to Economics and Enterprise field class.
- Read any additional resources provided (optional).

HOMEWORK (TO COMPLETE AFTER FIELD CLASS)

- Using *Economics and Enterprise: Financial Considerations of Rural Life:*
  - Use Worksheet 1 to complete an assessment of your economic priorities, resources and goals for your land.
  - Use Worksheet 2 to assess your current system management practices.
- In the Land Steward Property Management Plan under "Natural resource assessment summaries," summarize the results of your assessments and list your economic goals for your property.
- Bring your results and any questions to the next class for discussion.

Field exercise

Time needed: 25 minutes.

The Economics module is highly variable, given the many ways that landowners engage in earning income from their property. For this module, work with your host landowner to find a way for class participants to experience some aspect of their business or lifestyle.

Examples:

- For a farm that produces seed: Try cleaning seed.
- Pick or clean some produce.
- Observe or help feed or move livestock.

Materials

- Copies of reading assignment for the next class, usually the Rural Resource Guidelines. (Some participants prefer to access these online, so a full class set may not be needed.)
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from Economics and Enterprise: Financial Considerations of Rural Life
- Supplies for your chosen activity.
- Clipboards and pencils
- Camera or phone to capture the day
- First-aid kit.
- Watercooler and cups.

Background resources

In "Module delivery guidance," review "Background resources," page 9.

Instructor guidance for the field day

In "Module delivery guidance," review "Instructor and coordinator guidance for the field day, page 9. The coordinator should share the suggestions with the natural resource specialist and landowner, as appropriate.

Agenda

The order of agenda items will be similar for each five-hour class. Travel time will be the most significant variable. Suggested times are given for a field module in "Sample agenda," page 12.

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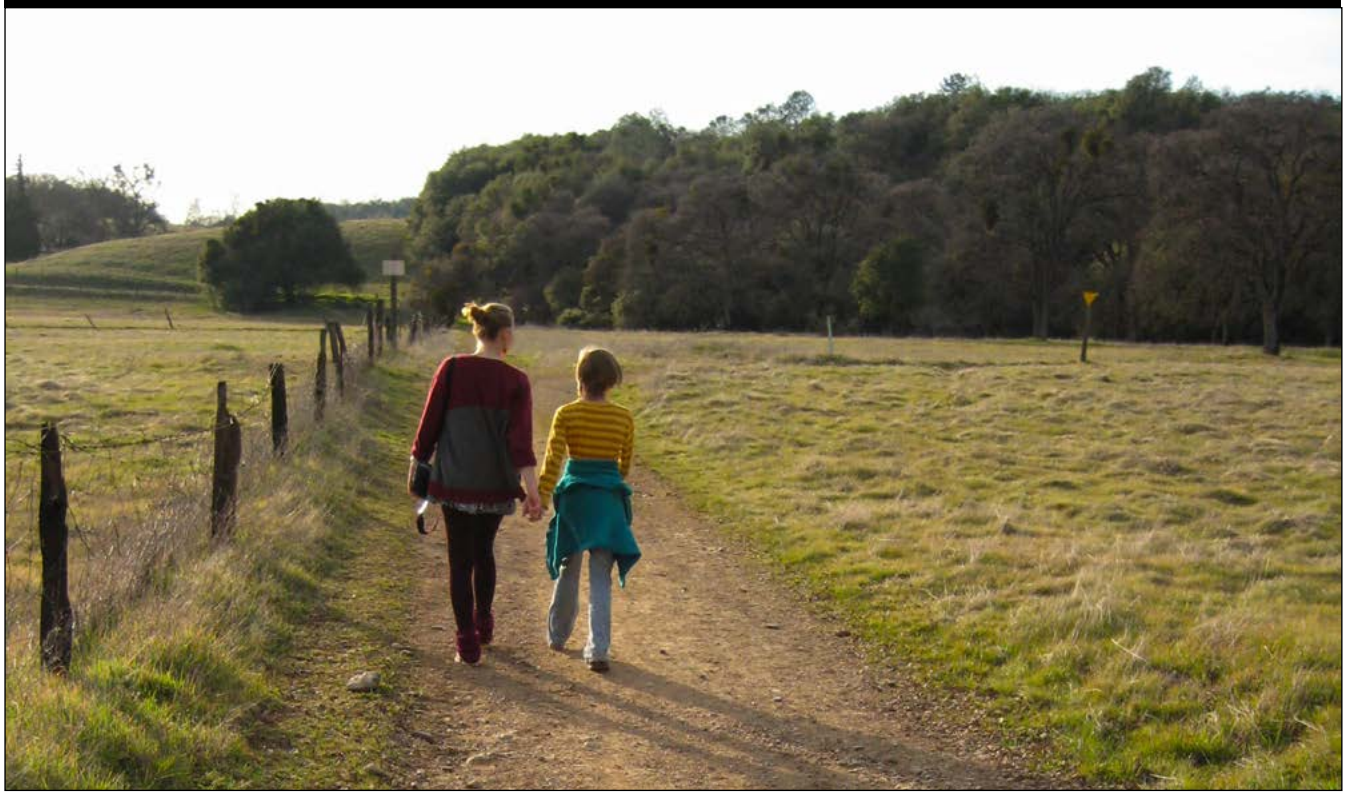

Learn to factor finances into the goals of your rural enterprise.

Photo: Rachel Werling,
© Oregon State University

ECONOMICS AND ENTERPRISE:

Financial Considerations of Rural Life

LAND STEWARD PROGRAM

RURAL RESOURCE GUIDELINES

Rachel Werling and Max Bennett

Some people choose to own property because they want to create a peaceful rural retreat. Others seek to establish a family homestead, or to build a business such as a farm. Whatever the motivation, economics are a part of the picture.

Many landowners have a mix of activities happening on their property. Forests and wildlands may exist alongside agricultural features like pastures, orchards and cropland. Landowners' economic goals may vary from simply preserving their current tax status, to covering the costs of maintaining roads, forests and fences.

Rachel Werling, Extension faculty and Land Steward Program coordinator, Jackson County; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor, Southern Oregon Research and Extension Center; both of Oregon State University.

Oregon State University

EM 9315
June 2021

2 EASY STEPS

Use this document to evaluate your economic picture

1. Read *Economics and Enterprise: Financial Considerations of Rural Life.*
2. Use the Worksheet, "Economics resource assessment," page 9, to help clarify the economic goals you have for your property.

If you have questions, contact your local Extension office, Soil and Water Conservation District or other local resources.

About the Rural Resource Guidelines

This is one of a series developed for private landowners by the Land Steward Program of Oregon State University's Southern Oregon Research and Extension Center. This guide covers general concepts and helps users assess resources and manage property in a responsible manner. This guide was developed for use in Jackson and Josephine counties but is applicable to other areas.

Perhaps the goal is to have a hobby farm that generates income to offset some costs. Other landowners want to have a farm or ranch business that will support their family and future. Some landowners are counting on a future timber harvest to help cover the cost of college for their kids or other expenses.

In this publication, we hope to get you thinking about the economics of land ownership and rural enterprise. We'll cover:

- Zoning and tax deferrals.
- Costs of land management and ways to save.
- Income possibilities for forested land.
- Enterprise possibilities for farms and ranches.
- The future: conservation easements and succession.
- Setting economic goals.
- Assessing resources and values.

Zoning and taxes: What is possible for your property?

Western lands have seen a great deal of development in rural areas. Often the best acreage for farming, forestry or wildlife is also desirable to developers and homeowners. States use zoning to protect these natural resources and to provide for conscientious development and growth. Local cities and counties adopt zoning and land-division ordinances that help to implement the statewide plan.

Photo: Rachel Werling, © Oregon State University

The U.S. Department of Agriculture defines a farm as "any operation that sells at least $1,000 of agricultural commodities or that would have sold that amount of produce under normal circumstances."

Learn more about Oregon's land planning goals at the Oregon Department of Land Conservation, *https://www.oregon.gov/LCD/Pages/goals.aspx.*

What you do with your land can be affected by the zoning district it occupies. A zoning district is an area of land where certain land uses are permitted. Here are selected examples of zoning districts from Jackson County, Oregon:

- Rural residential: RR-5, RR-1.5, RR-0.
- Exclusive Farm Use, or EFU.
- Woodland Resource.
- Open Space Reserve.

Special assessments

Regardless of your zoning, your land could have a special assessment — a kind of tax deferral — that would put it into a different property type or class, potentially lowering its taxable value. This could mean a big savings in tax payments. Below are some examples of special assessment categories applied to rural land. If you have any of these special assessments, you will need to know what is required to maintain that designation. In some cases, a change in land use practices, such as a decision to stop farming, may trigger a higher tax rate.

Examples of special assessments

- **Farmland —** land currently used primarily for creating profit through a variety of agricultural activities. Some income must be documented

each year. Your rate of assessment may depend on whether or not your property is an Exclusive Farm Use zone:

- *Oregon Assessment of Farmland in an EFU Zone, https://www.oregon.gov/DOR/forms/FormsPubs/assessment-farmland-zone_303-644.pdf*
- *Oregon Assessment of Farmland Not in an EFU Zone, https://www.oregon.gov/DOR/forms/FormsPubs/assessment-farmland-not-zone_303-645.pdf*

- **Forestland –** land used predominantly to grow and harvest trees. The main qualification is meeting the minimum stocking standard, or the number of trees per acre. There is no income requirement, but land must be managed for eventual harvest.
  - *Oregon Special Assessment Programs for Forestland, https://www.oregon.gov/DOR/forms/FormsPubs/special-assessment-programs-forestland_441-649.pdf*
- **Riparian lands –** lands within 100 feet of a stream.

Check with your local county government planning and assessor's departments to make sure that you understand the possibilities and requirements for your land and how they affect your property taxes.

The costs of land management and ways to save

Even under the best circumstances, rural land requires a certain amount of maintenance. You may need to thin forests for fire safety. You may have a weed problem or a road that needs maintenance. You may need new equipment to modernize the way you grow crops. These projects require work and capital. Most landowners would like to find ways to help offset some of these costs and maybe some of the effort.

Cost share and incentive programs

State and federal agencies sometimes provide funding to private owners to help with the cost of land management or production improvements. Money could be available for things such as forest fuels reduction, noncommercial thinning, manure management, farming efficiency, weed abatement, streamside tree planting and wildlife habitat projects, or to help homeowners create defensible space around their homes for wildfire safety. Some of these are cost-share programs, requiring the landowner to put up a percentage of the funding or complete some of the work. They can make a significant dent in the cost of needed work. Programs often target specific geographic areas based on agency priorities and the availability of federal funding. Contact the Oregon Department of Forestry, the Natural Resources Conservation Service, the Farm Service Agency or your local Soil and Water Conservation District and ask about current opportunities. ODF may also help offset the cost of a consultant to write a forest management plan.

Photo: Rachel Werling, © Oregon State University

This commercial chipper is made available through agency programs at no cost to communities working on reducing their forest fuels.

Explore My Land Plan, *https://mylandplan.org/content/financial-assistance-programs,* to discover some financial incentive programs for forested lands

There are other creative ways to reduce expenses, such as:

- **Work trades.** Helping each other is a time-honored rural tradition. Many hands make light work.
- **Product trades.** If you need firewood but can't cut it, offer to trade some wood for the labor. Pay a farmer to bale your hay in bales of hay.
- **Rent for work.** Offer an extra dwelling or room in your house as trade for help with upkeep.
- **Creative grazing.** Can animals help with the work? A pasture grazed with good practices can be healthier and more weed-free than a fallow pasture. Find a neighbor who needs pasture, and the animals can help keep the land in good shape. If you lease your land to another person who is earning income from the farm, their profit can work to keep your land's special assessment.
- **Skill bartering.** Do you have an off-farm skill you could trade? Perhaps you paint houses, or know carpentry or bookkeeping? You may be able to trade these skills for having a fence built or tilling a field.

Income opportunities

Woodlands or forests

Most woodland owners are not in it to make a buck. However, most also would appreciate periodic revenues or other financial benefits to offset the costs of management, such as fuels reduction, cleanup, road maintenance and taxes. There are several potential ways to offset costs and generate revenue.

Photo: Max Bennett, © Oregon State University

A carefully planned harvest can generate revenue and reduce fire risks, but timber harvests can be a once-in-a-lifetime event.

- **Sell timber.** Woodland properties are different from farms in that there is not an annual crop to sell. Timber harvests occur periodically, with the frequency depending on growth rates, the size of the property and many other factors. In many cases, timber harvest is a once-in-a-lifetime event for an individual owner, but one that can generate substantial revenue. Most buyers will not be interested in an individual tree or a few trees; there must be a couple of log truckloads of logs, at minimum. However, a well-thought out and carefully implemented harvest can generate revenue and help meet important goals such as improving forest health, reducing fire risks and even improving wildlife habitat. See *Small-Scale Harvesting for Woodland Owners*, EM 9129, *https://catalog.extension.oregonstate.edu/em9129.*
- **Sell or utilize small-diameter timber products.** These include things like small posts and poles, wood chips and pulpwood, and firewood that are often generated in thinning or fuels-reduction projects. Selling small-diameter timber is a usually a break-even proposition at best, but marketing some of the material can help offset the cost of expensive treatments. There are limited markets for posts, poles and pulpwood, and prices will probably be less than the cost of harvest and transport. There is a lot of demand for firewood, but firewood production is labor intensive. The Oregon Forest Industry Directory has listings of buyers and sellers of many timber and timber-related products.
- **Sell nontimber forest products.** These include floral greens, medicinal plants, cones, boughs, mushrooms, madrone burls and many others. There are often local markets for these products, but they are not well advertised. It takes some research and entrepreneurial flair, but this option could be a good fit for some owners.
- **Other opportunities.** What about farmstay or forest-stay tourism? Or hunting leases? Or even selling the carbon sequestration value of standing timber? Carbon markets to date have focused mostly on large-acreage properties, but new initiatives are targeting small ownerships. See *https://ecotrust.org/helping-small-landowners-break-into-carbon-markets/*.
- **Factors to consider.** There are a few factors that will affect the feasibility of using a woodland property to generate timber income:
  - **Access.** Does the property have adequate roads? Are there adequate stream crossings?
  - **Terrain and slope.** Logging costs are much higher on steep slopes (those greater than 35%).
  - **Species mix.** Conifers have markets; hardwoods generally don't (with the exception of firewood).
  - **Size of timber.** Larger timber is more cost effective to harvest; you need adequate volumes to attract a buyer.
  - **Soil productivity.** Soil influences the potential for long-term, sustainable timber production.
  - **Availability of contractors.** There are fewer and fewer loggers available, and good ones are in high demand.
  - **Rules and regulations.** The Oregon Forest Practices Act governs timber harvest activities on private lands. Know the rules.

  See *Forests and Woodlands: Protecting an Ecosystem*, EM 9245, *https://catalog.extension.oregonstate.edu/em9245.*

Enterprise possibilities for farms and ranches

Farming or ranching can happen at many different scales. If you have decided that you want to have a farm or ranch business that generates all or a substantial part of your income, there are many factors to consider. Many of these topics will be more important for large operations than they would be for a small family homestead supported by an alternate source of income.

- **Assess your personal resources.** Those launching agricultural businesses have many motivations: You may want to live and work close to the land, or you may just want to work for yourself. Some people envision a life that lives up to their ideals of rural community and family values. Some people have personal convictions about food and nutrition, and others have a practical need to make a living. Whatever the drive, understand that agriculture requires a broad suite of skills that go beyond working the land or animal husbandry. It is a business like any other, and also a business unlike others.

- **Use your strengths.** In choosing an enterprise, consider what you love. Land and animal husbandry require a lot of effort, so pick crops and animals that give you joy to work with! That is an important part of the reward of rural life.
- **Consider your skills.** What do you know or do well? Are you organized? Are you mechanically inclined? Do you know bookkeeping? Are you good at managing people? Do you have marketing skills? Will your family members provide skills that will help the enterprise? Will you hire someone to fill any gaps you might have in your skill set? For some things, hiring good help is the best option.
- **Be realistic about a farm lifestyle.** For many agricultural products — plant or animal — the production calendar is not anything like a 9-to-5 job with three weeks of vacation time. There may be a season of intensive, nonstop work. The ability to travel or vacation will be very different. You may need to have trained help to be able to step in and manage your systems if you need or want to be gone. Farm living will impact the whole family. Thorough discussions about what that may mean for everyone will help make the dream possible.

Assess your land's physical resources

Here are a few reminders that are especially important for a farming enterprise.

Soil

Quality soil is one of the most critical resources for a farm. Get your soil tested and understand the results. Be sure your soils can support what your agricultural goals are and develop good management practices to maintain soil health. The Natural Resources Conservation Service defines soil health or soil quality as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans." What soil health strategies you use depend on the soil type and your management goals.

- Limiting physical disturbance and enhancing organic matter in the soil are key to soil health. NRCS has developed four principles of soil health to implement on your property:
- Maximize continuous living roots.
- Minimize disturbance.
- Maximize soil cover.
- Maximize biodiversity.

OSU Extension offers several publications on soil:

- *A Guide to Collecting Soil Samples for Farms and Gardens*, EC 628, *https://catalog.extension.oregonstate.edu/ec628*
- *Analytical Laboratories Serving Oregon*, EM 8677, *https://catalog.extension.oregonstate.edu/em8677*
- *Soil Test Interpretation Guide*, *https://catalog.extension.oregonstate.edu/ec1478*
- *Soil: The Dirty Secrets of a Living Landscape*, EM 9394, *https://catalog.extension.edu/em9304*

Water

Water is the other key natural resource critical for a farm. You need to have the water available, the rights to use it and the infrastructure in place to get it where you need it. Remember that a domestic well can water half an acre of noncommercial plants. Understand your water rights and contact your regional water master from the Oregon Water Resources Department if you have questions.

See *Water Systems: Taking Care of a Precious Resource*, EM 9243, *https://catalog.extension.oregonstate.edu/em9243.*

Climate

The local climate will play a role in what you choose to grow on your land. The USDA Plant Hardiness Zone Map of your area can help you choose your crops, but it's also important to understand the unique microclimate of your property. What is your elevation? What is the aspect or direction your land faces? How do frosts affect different areas of your land? Are you in the rain shadow of a local mountain that affects your annual precipitation? Knowing your property's local climate character is important for crop choice and placement.

Infrastructure

Does your farm or ranch have the necessary buildings, irrigation, fencing and other systems in place and in good working condition, or will you need to upgrade? Do you have the capital to undertake improvements?

Earning income

Small can be beautiful

Some rural landowners have modest economic goals. You may want to enjoy your land, grow some of your food or maintain your land's special assessment as farmland. This requires you to earn income from your land, but a large profit is not necessary. Even a small homestead can generate income. There are many ways you can make money on your land. Find out what other people in your region are doing. Here are a few ideas:

- Rent out a pasture to a farmer with animals.
- Lease a pasture to a farmer who cuts and sells the hay.
- If you keep bees, sell some honey.
- Sell some orchard crops or fresh produce to a local food cooperative or restaurant. Many restaurants like to get fresh, local specialty herbs, greens and other produce.
- If you have your own meat animals like cattle or goats, you could provide a herd-share where people purchase an animal or a part of an animal.
- Egg money! Fresh, free-range eggs are always in demand.

Types of crops or products

Before you choose your product, do your research! Know the biology, equipment needs, production cost and marketing possibilities. You may want to go with a tried and true product for your area, or search out a nontraditional product that could give you a marketing advantage. If you choose something nontraditional, be sure that the other pieces of the production chain are available to you. Talk with farmers and producers in your area. Learn what is working and what pitfalls to avoid.

Crops differ in terms of how long they take to establish, the kind of land and climate they require to produce, what kind of labor they need for maintenance and harvest. Here are some examples of crops grown in Oregon. They vary widely in production costs and techniques, time to harvest and returns per acre.

Perennial or semi-perennial crops

- Christmas trees (Douglas-fir or true fir)
- Blueberries
- Apples
- Wine grapes
- Hazelnuts
- Greenhouse and nursery plants
- Container or bare root plants

Annual crops

- Lettuce
- Radishes
- Garlic
- Hemp or cannabis
- Wheat
- Cut flowers

Forage and livestock

- Grass/legume hay
- Cow/calf
- Sheep

Start small

If you are a new farmer or rancher, choose a venture that you can grow gradually. This can reduce the financial risk while you are on a learning curve, working out your production, financing and labor needs, etc.

Access to labor

Many farm products have intensive and time-sensitive labor needs. Know how you will get the hands to help if and when you need them.

Ways to market

How you market your products will partly be shaped by the size and goals of your enterprise. Beyond wholesale and retail markets there are many alternative markets for farm goods. There are pros and cons with each of these. Here are a few ideas:

- **Neighbors.** Selling to folks in your area can make it possible to sell enough farm produce to maintain farmland special assessment status.

Photo: Lynn Ketchum, © Oregon State University

Fresh lavandin on display at the Corvallis Farmers' Market. Nontraditional products like cut flowers or container plants could give you a marketing advantage.

- **Community-supported agriculture.** In a CSA, community members agree to receive and pay for supplies of farm produce weekly based on what is available. Some CSAs have labor trade agreements.
- **Farmstand.** Selling a variety of products can help boost sales. Be sure you understand local regulations on materials, permits and insurance, etc.
- **Farmers markets.** You will need to meet the requirements of your local market's administration.
- **Restaurants and caterers.** Many restaurants like to get fresh, local specialty herbs, greens and other produce.
- **Institutions.** Some schools, hospitals and other institutions can be good clients.
- **Agritourism.** Farm-stays, classes, workshops and farm festivals are examples of agritourism. Be sure to understand liability issues and local regulations.

Capital

Balancing risk

Like any business, agriculture involves financial risk. Farmers and ranchers are true entrepreneurs, and having a clear understanding of your financial resources will improve outcomes. Understand what you can invest, how long you can wait for returns, how you will assess whether your enterprise is working, and what you will do if you need to change course. A business plan is a good idea.

Access to capital

Several government programs will help support beginning farmers and ranchers in need of resources. Farm financing assistance can come in many forms, including:

- Traditional bank loans
- Federal programs such as the U.S. Department of Agriculture's Farm Service Agency and the Natural Resource Conservation Service

- State programs such as the Beginning and Expanding Farmer Loan Program (Aggie Bond Program)
- Individual development accounts
- Microloans
- Local small business development centers

Resources to help you navigate these and other financing options include:

- Friends of Family Farmers, *http://www.friendsoffamilyfarmers.org/*
- Center for Rural Affairs, *https://www.cfra.org/farm-food/farm-finances*
- USDA Small Farm Funding Resources, https://www.nal.usda.gov/ric/small-farm-funding-resources

There is a lot to consider when starting an agricultural enterprise. This is just an introduction to what will be an in-depth planning process. Here is a common timeline that the OSU Small Farms Programs sees with beginning farmers:

Years-1–3

- Figure out what you can grow.
- Figure out what you like to do.
- Figure out markets.

Years 3–5

- Determine which enterprises are profitable.
- Determine which markets are profitable.
- Account for labor.

Years 5–10

- Continue to innovate.
- Often, but not always expand.
- Consider long-term planning.
- Quality of life becomes more important.

If your goal is to earn a living with your agricultural enterprise, dig deeper into all of these topics by reading:

- *What Can I Do With My Small Farm, Selecting an Enterprise for Small Acreages*, EC 1529, *https://catalog.extension.oregonstate.edu/ec1529.*
- *How to Begin Your Small Farm Dream,* Sustainable Agriculture Research and Education, *https://www.sare.org/resources/how-to-begin-your-small-farm-dream/*

The future

A final economic consideration for your land is how you want to approach the stewardship of your land beyond your time.

For some owners, selling their land when they no longer want to work it is part of their financial retirement strategy. In this case, keeping the land's resources in healthy condition will help to maintain a good market value. Other landowners would like to see their stewardship values continue, either with family members or regardless of ownership. Succession planning and conservation easements are two possible pathways for preparing for the future of your land. But there are other options, such as selling to a conservation-minded buyer, entering into a lease-to-buy agreement and donating the property, among others.

Succession planning

About 64% of Oregon farm and ranch property will change hands in the next two decades, according to the Oregon Department of Agriculture. Property owners who create a succession plan can save their heirs the expense and worries of an unplanned estate. Without a plan in place, heirs are sometimes forced to sell land and equipment to pay for attorney's fees.

The Department of Agriculture says it can take years to plan for a smooth succession. By starting early, property owners can pass their estate to the next generation in the way they intend.

Explore succession planning resources:

- Oregon.gov succession resources, *https://www.oregon.gov/ODA/programs/NaturalResources/Pages/LandUse.aspx*
- Oregon Farm Link, *https://oregonfarmlink.org/search-resources/family-farm-succession-planning/*
- Ties to the Land, OSU succession planning for forest owners, *http://tiestotheland.org.*

Leaving a legacy through conservation easements

Open land and land used for agriculture are vital resources for our country. From meadows and forests to ranches and farms, there is an ongoing pressure toward development.

It is common for prime agricultural land to be divided into smaller and smaller parcels, converted to housing developments or other uses of less rural character. Nationally, this has cumulative negative impacts on issues ranging from agricultural production to fire risk, habitat loss and wildlife conflicts.

Some landowners turn to conservation easements to ensure that their stewardship values will be preserved in the future. Stewardship easements are usually flexible, and the landowner is able to choose the scope of the agreement according to their values. Common forms allow sustainable farming, logging and ranching activities, but do not allow land division. These agreements also often make you eligible for a special assessment tax deferral. Reach out to your local land trust and find out if this alternative is for you.

Conservation resources

- Coalition of Land Trusts, *http://oregonlandtrusts.org*
- Land Trust Alliance, *https://www.landtrustalliance.org*

Defining your economic goals

It is important to know what you want economically for your land, and to establish goals that lead in that direction. How you approach economic enterprise on your land will come from an interaction between your goals, your land's resources and your personal resources.

Your goals for your land

- What are your needs and values (personal, family, community, business)?
- What are your income goals? Consider supplemental vs. whole income.
- What are your stewardship values?

Land resources

- Zoning and regulations.
- Physical resources: Other titles in this series have focused on helping you to assess and understand the natural resources on your land: soil, water, forest, climate.
- Existing infrastructure and possibilities of infrastructure development.

Personal resources

- Time, health and energy.
- Financial resources.

Example goals

Here are some sample goals that can help kick-start the process of thinking about your own unique goals:

- Maintain special assessment tax status.
- Reduce maintenance costs.
- Generate enough income to cover taxes.
- Have an enjoyable small rural enterprise that covers the cost of operation.
- Provide some extra income.
- Have a successful farm business.

Know the rules

Where money, taxes, business and food are concerned, there are always regulations. We have referenced some of these, but rules may change or be applied differently in your case. None of this material should be construed as legal advice. Landowners should consult appropriate local governmental offices and be sure they know what rules and regulations apply in their area and to their land.

References and resources

Selling timber

- Small-scale Timber Harvesting for Woodland Owners, EM 9129, *https://catalog.extension.oregonstate.edu/em9129*
- Logging and selling timber, Partnership for Forestry Education, *https://knowyourforest.org/learning-library/logging-and-selling-timber*

Nontimber forest products

- Nontimber forest products, Partnership for Forestry Education, *https://knowyourforest.org/learning-library/non-timber-forest-products*
- My Land Plan: Profit from Your Woods, American Forest Foundation, *https://mylandplan.org/profit-your-woods*

Agricultural enterprise

- The Capital Press, *http://www.capitalpress.com*
- Growing for Market, *http://www.growingformarket.com*
- Farmer to Farmer Podcast, *http://www.farmertofarmerpodcast.com/episodes*
- OSU Small Farms website, *http://smallfarms.oregonstate.edu*
- List of alternative crops, *http://afsic.nal.usda.gov/list-alternative-crops-enterprises-small-farm-diversification*

USDA United States Department of Agriculture National Institute of Food and Agriculture

WESTERN SARE Sustainable Agriculture Research & Education

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This series was developed by the Oregon State University Land Steward working group: Rachel Werling, Land Steward coordinator; Max Bennett, Extension Forestry and Natural Resources faculty and associate professor; Clint Nichols, rural planner, Jackson County Soil and Water Conservation Service; and Land Stewards Stan Dean, Jack Duggan, Don Goheen, Scott Goode and Cat Kizer.

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Worksheet: Economics resource assessment

Use this checklist to help clarify your economic goals for your land. Use extra paper if necessary.	Yes	No	Not sure	N/A
Values and vision				
How will my land create income?				
Income from natural resources (timber, nonforest products, etc.)				
Income from agricultural products or business				
Real estate investment or speculation				
Other:				
Level of economic return desired				
Money is not an issue or motivation				
The value of the land is part of my retirement plan				
Offsetting property management costs would be nice, but is not essential				
Offsetting property management costs is essential				
Need enough income to maintain tax status (farmland, forest, etc.)				
Want to generate regular income from property				
Want to generate periodic income from property				
Farm or property business is a main source of income				
Other:				
How does your enterprise relate to your quality of life and values?				
I want to take care of the land				
I want to grow food for my family				
I want to grow food for the community				
I want to spend time with my family				
I want to be my own boss				
Other:				
What are your plans for the future of your land beyond your time?				
I plan to sell land as real estate investment				
I plan to pass the land or business on to family members				
I have a succession plan in place				
I have a conservation easement created				
I plan to donate the land				
Other:				

Use this checklist to help clarify your economic goals for your land. Use extra paper if necessary.	Yes	No	Not sure	N/A
Land charactistics and resources				
Are there any zoning or tax issues that affect your economic goals?				
Zoning questions?				
Special assessment?				
Other regulations? (land use, farm, forest, food handling, liability?)				
Other:				
Infrastructure				
Do you have the necessary infrastructure for your enterprise? List any new infrastructure needs here:				
Do you need to perform maintenace or upgrades? List here.				
Natural resources				
Review your assessments from the other Land Steward Rural Resource Guidelines. Are there any issues that pertain to your economic goals for your land? List them briefly below.				
Water/stream:				
Forest/woodland:				
Wildfire preparation:				
Wildlife habitat or management:				
Pasture:				
Soil:				
Other:				

Personal resources

How much time/energy do you have to put into your enterprise?

- Currently
- In five years
- In 10 years

Who will do the physical work on the property? (Fencing, mowing? Treating animals? Farm labor, etc.?)

Describe how your family or management relationships might influence how you manage your land/enterprise.

What financial resources do you need for your enterprise?

Where will you secure these resources?

- Personal resources (savings, second job, etc.)
- Family resources
- Borrowing/financing resources

Do you have a current business plan?

Summary

Review your responses. What are the most important potential follow-up actions needed? List and briefly describe these below. Summarize your findings in your management plan.

1.

2.

3.

4.

5.

Agency open house (optional class)

Introduction

Consider offering an agency open house event after the field classes are complete. This is an effective way to share additional resources with landowners. It offers an opportunity for representatives of agencies and organizations to provide a brief overview of how they and their organization support landowners, as well as alerting landowners to important regulations or other resources. They can also briefly clarify frequently asked questions. Limit each presenter to 10 to 12 minutes. Reserve the last half hour for a meet-and-greet, so landowners can speak with specific agency representatives and collect materials.

The goals of the agency open house are to:

- Connect landowners with agencies and organizations that support or regulate natural resources
- Inform landowners of specific resources and important regulations.
- Clarify frequently asked questions about resources and regulations.

Logistics

TIME NEEDED

Five-hour class: Time will depend on the number of representatives available in your area. With a typical five-hour class, we often have 12–15 agencies and organizations. Each speaker is allocated about 10–12 minutes. We include a 20-minute snack break and a 30-minute meet-and-greet after the presentations. Total time may vary.

CLASSROOM NEEDED

Classroom venue with projector and seating adequate for the class. Writing tables are recommended.

INSTRUCTOR AND PRESENTERS

Coordinator: The professional who will be coordinating the whole course will lead this class, introduce speakers and keep time on presentations.

Agency and organizational representatives: These individuals will give brief overviews of what they offer to landowners.

Lesson plan

LEARNING OBJECTIVES

After completing this module, participants will be able to:

- Identify agencies and organizations available to support landowner goals.
- Identify regulations and resources that apply to land and property.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda of the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and session structure.
- Send reminder emails to class participants, natural-resource experts and landowners three to seven days before site visits (see samples in appendices).
- Print directions for carpooling to field sites.

BEHAVIOR OBJECTIVES

- Collect contacts and information relevant to your property.
- Connect with representatives from agencies and organizations and ask questions.

CONTENT OUTLINE

10-12 minute presentations by local agencies and organizations that offer support or regulate land use. Possibilities include, but are not limited to, representatives from:

- Extension programs
- Soil and Water Conservation District
- Natural Resource Conservation Service
- Oregon Department of Agriculture
- Water master
- County planning
- County assessor
- County code enforcement
- Department of Forestry (stewardship foresters, Firewise coordinators)
- Department of Environmental Quality
- Land trust
- Watershed council
- Cooperative weed management area
- Presentation content should touch on these topics:
- Introduce the organization.
- Highlight resources they may provide to landowners.
- Highlight regulations that may be important in their area of service.
- Clarify a few frequently asked questions.

HOMEWORK

No homework. Continue working on your plan and presentation.

CLASSROOM SET-UP

- Sign-in table
  - Handouts (see materials needed available at check-in)
  - Nametags
  - Administrative paperwork
- Refreshments on a table
- Seating for the participants at tables (for taking notes)
- Tables and chairs for agency presenters. In a large classroom, you can place tables around the edge of the room. This gives them a place to display brochures or other materials.

Agenda

12:00 p.m.	Welcome and agenda
12:10–2:00 p.m.	Agency presentations (10–12 minutes each, 2 minutes for transitions)
2:10–2:30 p.m.	Break (coffee and snacks)
2:30–4:30 p.m.	Agency presentations
4:30–5:00 p.m.	Meet and greet

Materials

- Snacks and beverages (provided by participants?).
- Supplies for snacks.
- Name tags.
- Projector/LCD.
- Enough tables for your presenters (one to two pertable) to set up displays or materials
- Other informative materials: upcoming workshop flyers, publications
- Sign-in sheet for presenters.
- Handouts: one each
- Agency contact list (see template in Appendix).

Land Steward Property Management Plan presentations

Introduction

The last class in the full training is the presentation day. This is the day the Land Steward Property Management Plan is due. Each participant or landowner couple will present a brief five- to seven-minute presentation of their plan. In general, this is a great motivation for people to complete their plan. However, keep in mind that some people have a serious aversion to public speaking. Inform the class that presenting is encouraged but is not required. If a participant opts not to present, encourage them to attend the final class to support their classmates. Be understanding of this situation and reassure them that they are still part of the community. If this is a volunteer program, the end of this class is an appropriate time to review any volunteer opportunities available to participants. Examples include program committees, tabling events or service with other organizations. If you offer mentor visits to properties, this is also a convenient time for participants to sign up for those visits.

The goals of the presentation class are to:

- Provide motivation to complete the stewardship plan.
- Create an opportunity to showcase the participants' progress on developing their plan and making progress on achieving their goals.
- Build community.
- Share volunteer opportunities (optional).
- Sign up for mentor visits (optional).

Logistics

TIME NEEDED

Five-hour class: Time will depend on the number of participants who choose to give presentations. In a typical five-hour class, we often have 25 presentations. Each speaker is allocated about five to seven minutes. We include a 15-minute snack break. If this is a volunteer program, the end of this class is an appropriate time to review volunteer opportunities available to participants. Examples include program committees, tabling events or service with other organizations.

CLASSROOM NEEDED

Classroom venue needed with projector and seating adequate for the class.

INSTRUCTOR AND PRESENTERS

Coordinator: The professional who will be coordinating the whole course will lead this class, introduce speakers and keep time on presentations.

Coordinator preparation

- Prepare materials and handouts.
- Edit timed agenda of the class.
- Reserve a classroom.
- Send reminder emails three to seven days before class (see samples in appendices).

Materials

- Snacks and beverages (provided by participants?).
- Supplies for snacks.
- Projector/LCD.
- Other informative materials: upcoming workshop flyers, publications
- Collect at check-in:
  - Check-off sheet for those submitting their plans.
  - Sign-up sheets for volunteer opportunities.
  - Sign-up sheet for mentor visits.
- Copies: one each
  - If this is the end of the program, distribute certificates to those completing all requirements. (See Appendix for template)

Land Steward participants: These individuals will give brief overviews of their stewardship plans.

Lesson plan

LEARNING OBJECTIVES

- Introduce your land to your classmates and share what you have learned.
- Support your classmates in their stewardship planning.

BEHAVIOR OBJECTIVES

- Submit a copy of your plan to the coordinator.
- Present a brief summary of your plan to the class.
- Register for volunteer opportunities.
- Sign up for a mentor visit.

HOMEWORK

No homework.

CLASSROOM SETUP

- Sign-in table:
  - Attendance sheet.
  - Box to accept completed plans.
- Refreshment table.
- Seating for the participants.

Agenda

12:00	Welcome and agenda
12:10–2:00	Participant presentations (five to seven minutes each)
2:10–2:30	Break (coffee and snacks)
2:30–4:30	Participant presentations
4:30–5:00	Volunteer opportunities

Content outline

Content tips to share with participants:

- Show your land map: Share your management zones as an overview of the land.
- Share your vision and goals.
- Share your first projects.
- Recommend nine slides.

Format suggestions:

- Bring it to class on a thumb drive (flash drive, USB etc.).
- Make it in PowerPoint.
- Create it in Google Drive.
- Check compatibility with Mac versus PC systems.
- You can also do an interpretive dance, use flip charts or any other idea you have.

Presentation tips:

- Fewer words are better: Use text to prompt what you know, rather than reading full paragraphs.
- Minimum of 24-point font.
- Use font that contrasts with your background. Dark text on a light background is easy to see.
- Use photographs.
- Practice your presentation and know how to cut it short if you find yourself going long in the class.
- Enjoy!

Part 5

Hybrid course instructor's guide

Overview

The online instructor-led hybrid Land Steward Course (shortened to hybrid hereafter) is an efficient delivery of a broad selection of natural-management best practices. It is designed as a tool for use by any natural-resource professional. There are nine online self-paced modules that participants complete at home. The three instructor-led contact classes can be delivered in person or as virtual sessions.

The hybrid course is housed in Oregon State University's Professional And Continuing Education unit. It features an online platform known as Canvas. Nine online lessons introduce participants to best management practices.

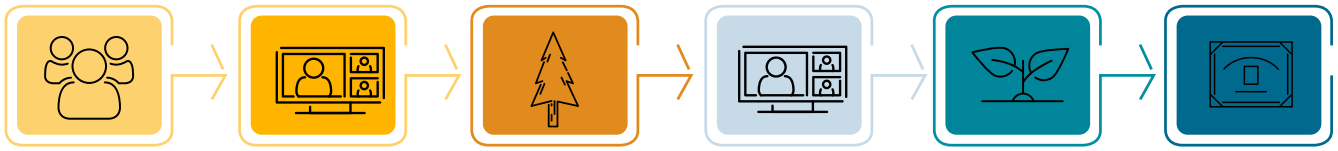
The instructor coordinates two field days incorporating local sites, resource topic experts and experienced landowners. One field day is focused on wildland natural-resource topics and the other on more agricultural natural-resource topics. he field days may be replaced by virtual classes with local topic experts.

Assessments and management plan: Hybrid course participants complete assessment activities from the Rural Resource Guidelines for their property on each module topic and use the results to create a management plan with a provided template.

This course can be delivered without access to the online course by using the Rural Resource Guideline documents in the "Topic module" section of this curriculum. These contain the content delivered in the online modules, as well as the assessment worksheets needed to create the management plan. The plan template is in the first module on planning.

There is no volunteer component to the hybrid course.

Nine-week instructor-led Land Steward hybrid course sequence



Introductory class and stewardship planning

In person or remote

5 online modules and assessments

- Planning
- Forest
- Fire
- Wildlife
- Streams

Wildland resources field day or webinar

4 online modules and property assessments

- Soils
- Pasture
- Water systems
- Rural economics

Agricultural resources field day or webinar

Land Steward Property Management Plan + certificate of completion

Quick-start planning sheet

☐ **Choose dates of course** (start planning six to 12 months before course begins)

- Nine-week span for the online modules. Dates: _____

☐ **Instructor will coordinate:** intro class, wildland field day (or virtual class), agricultural field day (or virtual class).

☐ **Basic planning:** introductory class, 2–2.5 hours

- Date/time _____
- Venue _____

☐ **Basic planning:** wildland matural resource field day (five to seven hours) or virtual class (two hours), about five weeks after introductory class

- Date/time. *Example: Field day, Saturday, 9 a.m.–4 p.m.* _____
- Select two to three field sites or landowners (forest and wildfire, wildlife habitat, stream)
  - » _____
  - » _____
  - » _____
- Select natural-resource specialists as needed related to (virtual or field):
  - » Woodland and forest _____
  - » Wildfire preparedness _____
  - » Wildlife habitat _____
  - » Streams and riparian areas _____
  - » Other _____

☐ **Basic planning:** agricultural resource topics field day (five to seven hours) or virtual class (two hours), about nine weeks after introductory class

- Date/time _____
- Select two to three field sites/landowners (pasture, soils, systems, economics and enterprise)
  - » _____
  - » _____
  - » _____
- Select natural-resource and topic experts as needed related to (virtual or field):
  - » Pastures _____
  - » Soil health _____
  - » Water systems _____
  - » Economics and enterprise _____
  - » Other _____
  - » Set registration cost (recommended $150–$250) _____
- You receive 60% of fees (PACE receives 30%, Land Steward program receives 10%).
- Implementation costs: Will vary depending on your program support and preferences for delivery. Minimum considerations include: your travel mileage, instructor or site host honoraria, hospitality (snacks) as desired, photocopies of driving directions and worksheets for the class). See costs worksheet.
- Set registration dates/cost
  - » Early bird rate ($20–$50 discount, four to six weeks before introductory class) _____
  - » Registration deadline (three weeks to two days before introductory class _____
  - » Set your minimum class size (recommended class size, field, 10–30; online, 5–70) _____

☐ **Contact PACE to set up online registration** (open registration three to five months before course begins)

- Open registration date: _____
- Clarify cost-share structure and accounts for distribution of course fees.
- Completion certificates: Inform PACE if you would like participants to receive digital completion certificates. Certificates requested _____

Planning calendar

DATE	
	• **Six to 12 months before introductory class.** ▪ Complete quick-start planning » Select dates. » Confirm needed information for registration (dates, costs, fee distributions). » Communicate with PACE and Land Steward Coordinator Rachel Werling, *Rachel.werling@oregonstate.edu.* ▪ Create marketing plan » Adapt flyer template. » Adapt brochure template. » If you will use an advertising mailing, plan to have materials arrive in mailboxes two months to three weeks before the early bird deadline. ▪ Begin securing sites and instructors.
	• **Three to five months before introductory class.** ▪ Open registration. ▪ Begin marketing campaign when registration is open. Options include: » Email lists. » News releases. » Post on websites. » Share with partners. » Distribute flyers/brochures. » If mailing, send about two months before the class starts. ▪ Continue securing sites and instructors.
	• **Two months before introductory class.** ▪ Complete preliminary site visits and meetings with instructors. ▪ Create DRAFT agendas and share with site hosts and instructors. ▪ Check Canvas updates. PACE will help modify dates. ▪ Review introductory PowerPoint and lesson plan; begin to adapt as needed.
	• **Two weeks before introductory class.** ▪ Send reminder welcome email to registrants.
	• **One to two weeks before introductory class.** ▪ Finalize agenda and supplies for introductory class.
	• **Once course begins.** ▪ Each week send a Monday reminder (template in attachments/box). Include: » Any announcements. » Activities and assignments to be completed by then. » Activities and assignments to be completed that week. ▪ One to two weeks before field days send reminder and finalized agenda to site hosts and instructors. ▪ See Field Day lesson outline for more on field days.
	• **When course is complete.** ▪ Distribute Qualtrics survey. (This could be done by Land Steward Coordinator Rachel Werling, *Rachel.werling@oregonstate.edu*.)

Cost worksheet

Examples are for a class size of 20 in 2019.

Travel cost estimate *Example: Mileage to and from six field sites 20 miles away, once for vetting the site, once for class implementation at $0.56 per mile = 6 x 40 miles x 2 visits x 0.56 = $270*	
Hospitality estimate (snacks and supplies) You can ask participants to bring their own lunches and snacks for the field days, or you can provide these as you prefer. We generally do not provide lunch. We do provide snacks for the evening class and some simple snacks for the field days. *Examples: Evening snacks for introductory class of 20 (oranges, crackers and cheese tray, veggies and dip tray, juice and tea or coffee = $50: Lunch bag lunches at $10 each for 20 = $200: Simple field day snacks (fruit, cookies, crackers/cheese, drinks): 2 X $50 = $100*	
Field day 1 cost estimate	
Snacks	
Lunch	
Travel costs?	
Other?	
Field day 2 estimate	
Snacks	
Lunch	
Travel costs?	
Other?	
Printed material cost estimate The minimum supplies needed to implement this course will be a few photocopies for participants. *Example: 151 copies* *The syllabus: 3 pages x 20 = 60* *One page of resource contacts = 20* *Driving instructions for two field days: 3 pages x 7 (carpools) = 21* *Worksheets for field days: 4 pages x 5 groups = 20* *Miscellaneous contingency copies = 30* There may be other printed management resources relevant to the course topics that you may want to distribute, at little or no cost, but these are not necessary to implement the course.	
Copy cost estimate	
Other optional printed material	
Honoraria. *Some coordinators offer their site hosts and/or guest instructors honoraria for participating in the program; this can vary from $0-$150 per honorarium.*	
Other costs Does staff time need to be paid? (Estimate about 100 hours.) Will you do a mailing for marketing (print/mail costs)?	
Cost sharing: PACE gets 30% of course fees; Land Steward Program gets 10%	
TOTAL COST ESTIMATE	

Hybrid Land Steward field day

LEARNING OBJECTIVES

- Identify best practices for resource management topics in the assigned modules.
- Recognize "healthy" or positive resource characteristics and resource concerns.
- Identify management strategies for improved resource condition.

BEHAVIOR OBJECTIVES:

- Practice assessing one or more natural-resource conditions (forest, stream, pasture, etc.). (Worksheet 1).
- Identify andprioritize activities needed to improve the resources.
- Create goals for the assessed resource.

CONTENT OUTLINE

Program participants will have read the online modules or Rural Resource Guidelines for the topics. Use these documents as guidance for the content provided by the natural-resource specialist and for choosing field sites. The content modules in this curriculum contain a distilled content outline in each guideline. Content providers should focus on issues based on their professional experience, frequent landowner misconceptions and questions, locally relevant resource concerns, and knowledge of the field sites.

HOMEWORK (TO COMPLETE BEFORE FIELD CLASS)

- Complete the online modules assigned before the field day.
  - Read the Rural Resource Guidelines and complete worksheets 1 and 2 for your property.
  - Print worksheets 1 and 2 and bring them to the field day for discussion at lunch.
- Read additional resources provided (optional).

ADDITIONAL HOMEWORK (IF NOT ALREADY COMPLETED)

- Using the Rural Resource Guidelines:
  - Use Worksheet 1 to complete an assessment of the health of your resources.
  - Use Worksheet 2 to assess your current management practices. (Not all modules have two worksheets).
- In the Land Land Steward Property Management Plan under resource topics, list your management goals, summarize the results of your assessments and outline potential follow-up actions for each resource topic.

Field exercise (for one or more of the topics)

WORKSHEET 1 FROM RURAL RESOURCE GUIDELINES

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of each topic using Worksheet 1.

Field day materials

- A few copies of Rural Resource Guidelines.
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from the Rural Resource Guidelines — one per person or one per each four participants to work on in a small group.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

This helps reinforce observations of the resource condition and familiarizes participants with the assessment that they will perform at home on their own land as homework.

- Ask participants to work in small groups with one notetaker.
- Assign each group a section of the assessment on which they will report to the group. Ask them to start with that section, but let them know they may continue to complete the assessment as time allows. Assign all sections of the assessment so the group can review the entire assessment together.
- Distribute clipboards, pencils,and copies of Worksheet 1 as needed.
- Allocate 10–15 minutes to explore the property to assess the property, focusing on the assigned topic.
- Reconvene the participants and ask each group to report on their assigned section, share questions and add any interesting findings. Invite the resource experts chime in to clarify as appropriate.

ALTERNATIVE EXERCISES

Be sure to use some of the assessments so students become familiar with them. However, you may substitute any activity that promotes understanding the resource conditions of their land. Alternatively, they may focus on just one portion of an assessment instead of the whole worksheet. Feel free to adapt the activities. A few alternative ideas are listed below. For simplicity, instructions for alternatives are not provided.

EXAMPLE ALTERNATIVE ACTIVITIES:

- **Pastures:** Ask students to measure the forage length to determine whether it is time to move animals in or out of a pasture.
- **Riparian:** Sample macroinvertebrates to determine water quality.
- **Forests and woodlands:** Assess four previously marked trees for health and vigor to determine whether to thin or retain them.

Land Steward hybrid field day delivery guidance

FIELD DAY DELIVERY OVERVIEW

The hybrid version of Land Steward includes two field days. One is focused on the more "wildland" natural resource topics, the second on the more "agricultural" resource topics. Each field day follows a similar delivery pattern. The participants will meet in the classroom to coordinate carpools and receive a brief orientation to the day's activities. We recommend that you visit two to three sites and alternate the topics.

At the field sites, the natural-resource experts will provide a brief review of best practices for each topic. This should be informed by their expertise and the content outline below (distilled from the Rural Resource Guidelines). This can take place in the classroom or at the field site. The group will travel to the first field site (carpool, caravan, group transport). After introductions by the coordinator and brief review of best practices by the natural-resource expert, the landowner will lead the group, beginning with an overview of their management plan and goals focused on the module topic.

The landowner then leads the group through their property, describing their management challenges and successes related to the module topic. During the landowner's tour, the natural-resource expert can help respond to questions and highlight features they identify as important. The group can then proceed to a second site and perhaps a third.

As time allows, participants can use Worksheet 1 from the Rural Resource Guidelines found in topic modules to practice the resource assessments. Participants will have completed worksheets 1 and 2 for their own properties as homework for the modules. They will incorporate their findings into their Land Steward Property Management Plan. Results of their assessments and questions will have been discussed in the weekly discussion activity online.

FIELD SITE LOGISTICS

- **Parking:** Prior to the class, discuss parking with the landowners. If using carpools and with a large class, you may have as many as 15 vehicles.
- **Site visit route:** Preview the location and work with the landowner to identify a good gathering spot for the introduction. If the natural-resource experts will deliver the review of best practices in the field, it helps if there is a protected place for the class to sit. You can ask participants to bring field chairs. A field mic is advisable. Also, identify stopping spots during the tour where a field class of 20–40 adults can gather to listen and discuss.
- **Facilities:** Arrange bathroom and water facilities, if any, in advance with the landowner.
- **Snack spot:** At one site, arrange for a place and a table to serve the snacks.

ALTERNATIVE DELIVERY METHODS

When possible, the natural-resource expert should deliver the content at the field site where the group can gather and sit in a sheltered area. If you choose to provide the content in the classroom, the coordinator will need to make appropriate arrangements. Try not to rely on a PowerPoint unless it is very brief. If you do use a PowerPoint, arrange for a computer and projector and any other necessary display materials .

BACKGROUND RESOURCES

If you have access to the Land Steward Online Course, direct participants to the reference library for further optional study, including the resources in the back of the Rural Resource Guidelines. Provide any other locally specific references as assigned or optional reading, as desired.

INSTRUCTOR/COORDINATOR GUIDANCE FOR THE FIELD DAY

- Review "Coordinator preparation," page xy.
- Upon arrival at the field site, gather the group in a comfortable place for the whole class to listen (sheltered or seated if possible).
- Introduce the natural-resource specialist and landowner.
- Announce the available bathroom and water facilities, if any.
- Review the agenda of the visit, including when there will be a snack break.
- Remind participants to stay together, stay on topic and avoid side conversations when presenters are speaking.
- During the visit, help guide the content as necessary, by asking questions of the natural-resource expert and landowner.
- Keep the event on time!
- At one site, lead the group through a practice of Worksheet 1 or a portion of the worksheet. (see "Field exercise," above)
- At each field site, highlight local topics when appropriate: plant species present (weeds and natives), special tools, special systems and infrastructure.

NATURAL-RESOURCE SPECIALIST GUIDANCE

Give a brief (15–20 minute) overview of best practices. Ideally, this will be delivered at the field site. If necessary, it can be delivered in the classroom prior to the field outing. Try not to rely on a PowerPoint unless it is brief.

- Focus on issues contained in the content outline for the module, the Rural Resource Guidelines, along with your professional experience, frequent landowner misconceptions and questions, and characteristics of the field sites.

- This is not a lecture-based program. The content is delivered as a brief overview to start, with the field site helping to expand on the concepts.
- During the following landowner's tour, be ready to help respond to questions or highlight features that you identify as important.

LANDOWNER GUIDANCE

The landowner will lead the group on a property tour designed to highlight management topics (about 60–90 minutes).

- Briefly introduce the history of the property. Describe your planning process, current management and goals related to the topic. Show maps and planning zones if applicable.
- Give tour of property. Highlight management practices underway. Share challenges and successes.
- Plan ahead for a few key stopping places where the whole class can gather to listen and discuss.
- Walking conversations are fine, but try to summarize the points that arise when you stop, so everyone can benefit from this learning.
- Be responsive to input from the coordinator and natural-resource expert when they help to clarify or guide the tour.

CHOOSING FIELD SITES

Site characteristics: It helps to work with landowners who are familiar with best management practices. The peer-to-peer learning experience is valuable. It also helps if sites demonstrate both well-managed areas and those in need of work. When participants practice assessments, a variety of conditions can help hone their understanding of the concepts. For the field days, we recommend two to three sites. The characteristics of the site will help determine your content.

Wildland natural resource field day: Choose a few sites that will show all four topics over the course of the day: forest and woodlands; streams and riparian areas; wildlife habitat; and wildfire prevention. Example site conditions include: riparian restoration, fuels treatment, small-scale timber harvest, old growth and wildlife habitat.

Agricultural resource field day: Choose sites that can offer management examples for pasture, soil, water systems, and economics and enterprise. Interesting characteristics could include: any plant or animal production, rainwater catchment, bulge ponds, irrigation systems, composting systems, pasture management, rotational grazing systems, manure management and soil-building techniques.

CHOOSING NATURAL-RESOURCE EXPERTS

Possible natural-resource field day experts include: local university Extension agents, personnel from the Soil and Water Conservation District, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Natural Resource Conservation Service, watershed councils, small farmers, small loggers, private individuals or educators with significant relevant experiences. Choose someone who can serve as a resource if participants need technical advice or resources in the future. Some professionals provide services for wildland and agricultural resources. Encourage these individuals to mention any resources or services they have that can help support rural owners. See list of agency resources, page xx, for ideas.

Coordinator preparation

- Recruit natural-resource expert.
- Select landowners and field sites.
- Create timed agenda for the field day.
- Familiarize natural-resource expert and landowners with objectives, content, agenda, instructor guidelines and structure of the session.
- Send reminder emails to class participants, the natural-resource expert and landowners three to seven days before site visits.
- Print directions for carpooling to field sites.

Hybrid Land Steward field day

LEARNING OBJECTIVES

- Identify best practices for resource management topics in the assigned modules.
- Recognize "healthy" or positive resource characteristics and resource concerns.
- Identify management strategies for improved resource condition.

BEHAVIOR OBJECTIVES

- Practice assessing one or more natural-resource conditions (forest, stream, pasture, etc.). (Worksheet 1).
- Identify andprioritize activities needed to improve the resources.
- Create goals for the assessed resource.

CONTENT OUTLINE

Program participants will have read the online modules or Rural Resource Guidelines for the topics. Use these documents as guidance for the content provided by the natural-resource specialist and for choosing field sites. The content modules in this curriculum contain a distilled content outline in each guideline. Content providers should focus on issues based on their professional experience, frequent

landowner misconceptions and questions, locally relevant resource concerns, and knowledge of the field sites.

HOMEWORK (TO COMPLETE BEFORE FIELD CLASS)

- Complete the online modules assigned before the field day.
  - Read the Rural Resource Guidelines and complete worksheets 1 and 2 for your property.
  - Print worksheets 1 and 2 and bring them to the field day for discussion at lunch.
- Read additional resources provided (optional).

ADDITIONAL HOMEWORK (IF NOT ALREADY COMPLETED)

- Using the Rural Resource Guidelines:
  - Use Worksheet 1 to complete an assessment of the health of your resources.
  - Use Worksheet 2 to assess your current management practices. (Not all modules have two worksheets).
- In the Land Land Steward Property Management Plan under resource topics, list your management goals, summarize the results of your assessments and outline potential follow-up actions for each resource topic.

Field exercise (for one or more of the topics)

WORKSHEET 1 FROM RURAL RESOURCE GUIDELINES

Time needed: 25 minutes

At one field site, allow time for the participants to practice an assessment of each topic using Worksheet 1. This helps reinforce observations of the resource condition and familiarizes participants with the assessment that they will perform at home on their own land as homework.

- Ask participants to work in small groups with one notetaker.
- Assign each group a section of the assessment on which they will report to the group. Ask them to start with that section, but let them know they may continue to complete the assessment as time allows. Assign all sections of the assessment so the group can review the entire assessment together.
- Distribute clipboards, pencils,and copies of Worksheet 1 as needed.
- Allocate 10–15 minutes to explore the property to assess the property, focusing on the assigned topic.
- Reconvene the participants and ask each group to report on their assigned section, share questions and add any interesting findings. Invite the resource experts chime in to clarify as appropriate.

EXERCISES

Be sure to use some of the assessments so students become familiar with them. However, you may substitute any activity that promotes understanding the resource conditions of their land. Alternatively, they may focus on just one portion of an assessment instead of the whole worksheet. Feel free to adapt the activities. A few alternative ideas are listed below. For simplicity, instructions for alternatives are not provided.

EXAMPLE ALTERNATIVE ACTIVITIES:

- **Pastures:** Ask students to measure the forage length to determine whether it is time to move animals in or out of a pasture.
- **Riparian:** Sample macroinvertebrates to determine water quality.
- **Forests and woodlands:** Assess four previously marked trees for health and vigor to determine whether to thin or retain them.

Materials needed

- A few copies of Rural Resource Guidelines.
- Directions to field sites for participants.
- Blank copies of Worksheet 1 from the Rural Resource Guidelines — one per person or one per each four participants to work on in a small group.
- Clipboards and pencils.
- Camera or phone to capture the day.
- First-aid kit.
- Watercooler and cups.

Example agendas for hybrid short course

Introductory in-person class: Land Steward hybrid course

Instructor's agenda: two-hour in-person class

SETUP

- Food: Hummus and veggies, chips, fruit, sugary snacks, coffee, tea, juice.
- Plates, forks, knives, napkins, spoons, coffee cups, creamer, sugar.
- Set up wall map of the region you are serving.
- Pins or labels for map
- Flip charts and markers for list of Land Steward characteristics.
- Seating in U-shape.
- Nametags.
- PowerPoint/LCD.
- Display table: Management plans with signage, flyers for upcoming workshops, publications, etc.
- Handouts:
  - Copies of syllabus.
  - Land Steward Property Management Plan template.
  - Sample Rural Resource Guideline (choose one).
  - How to stay in touch sheet (Facebook, Google forum, email).
  - Agency contact sheet.
- Administrative paperwork at check-in, including an emergency contact sheet

6:00 p.m.	**Check-in.** Ask participants to mark their property location on the map and place a dot or pin a label with their initials.
6:10 p.m.	**Welcome.** Introduce yourself. Present agenda for the evening. Quick housekeeping. Participants introduce themselves: Use the map people just marked. Each person: ▪ Locates themself on the map ▪ States name, property location, size, years owned, one thing they like about the property (two minutes each)
6:30 p.m.	**Course overview** (PowerPoint, Appendix, page xx) ▪ Overall goals of the course. What we hope you get out of it. ▪ Review schedule (handout) ▪ Logging on to Canvas and demonstration. (Students should have done this before, but this is a reminder.) ▪ Online module task list: lessons, quizzes, resource assessments, weekly time commitment. Stress the importance of keeping up. ▪ Ways to get help: Help thread for Canvas, email for coordinator. ▪ Field trips (or webinar dates): Topics, logistics, carpooling, field gear, Zoom links, etc. ▪ Importance of completing assessments and management plans.
7:00 p.m.	**Land stewardship discussion** (see page xx): Short introduction about land stewardship. Spend a few minutes jotting down your ideas for characteristics of a Land Steward. Then break into groups of three to four to discuss. In groups, write on flip charts or sticky notes. Create a definition or list characteristics. What are the characteristics of a Land Steward? What is land stewardship? See PowerPoint for instructions. Five-minute intro, three minutes to write, two minutes to form groups, 10–15 minutes to discuss in small groups.
7:25—7:40 p.m.	**Groups report back** on their definition of stewardship
7:45—7:55 p.m.	**Wrap-up and reminders**
8:00 p.m.	**Adjourn**

Field day agendas: Land Steward hybrid course

WILDLAND NATURAL-RESOURCE FIELD DAY AGENDA (2 PAGES) – SHARED WITH PARTICIPANTS

Topics: woodlands, wildfire preparedness, wildlife habitat, streams and riparian areas.

See field day guidance for coordinator, natural-resource expert and hosts.

In this field day, we will get some on-the-ground experience with the topics you have covered in modules 2–5. We will hear from landowners and resource professionals, and we will practice field assessments. The agenda will cover woodlands, wildfire preparedness, wildlife and riparian topics. This is our general outline, though some small details may change. We will be carpooling and caravanning to our three field sites.

Please be sure to check the weather and be prepared. We will be walking in uneven terrain and forested areas, and we will be standing for extended periods in whatever the weather is (rain or sun). There may be ticks, rattlesnakes or poison oak. Bring:

- Lunch, snacks.
- Writing materials (pencil, notebook).
- Camp chair; we will be eating in the field.
- Plenty of water for the day.
- Appropriate clothing for the weather:
  - Sturdy shoes.
  - Sunscreen.
  - Sun hat.
  - Trekking poles if you need them. (We are not going very far, but we may encounter uneven terrain.)

Resource professionals. Examples include:

- Department of Fish and Wildlife staff.
- Oregon Department of Forestry staff, Firewise coordinator, stewardship forester, etc.
- Watershed Council staff.
- Extension forester.

Site hosts: Three field sites with experienced landowners and a variety of natural-resource conditions to showcase.

8:45 a.m.	Meet at Southern Oregon Research and Extension Center, 569 Hanley Road, Central Point, OR
9:00 a.m.	elcome and introductions. Organize carpools.
9:10–9:40 a.m.	Travel to site 1 (30-minute drive). Topics: Riparian and stream ecosystems
9:40–10:30 a.m.	Site 1. We will examine the riparian restoration executed by the Applegate Partners and Watershed Council on Thompson Creek. We will hear about the restoration process from the landowner's and professionals' perspectives.
BREAK (BYO snacks)	
10:30–10:55 a.m.	Travel to site 2 (14-minute drive). Topics: Forest health, thinning, wildfire preparedness
10:55 a.m.–12:45 p.m.	Site 2. We will delve into defensible space and the Home Ignition Zone, as well as learning about the reduction of forest fuels in Don's woodland.
BREAK (BYO Lunch at Don's)	
12:45–1:20 p.m.	Travel to site 3 (35-minute drive). Topics: Forest health, wildlife habitat and riparian assessment
1:20–3:30 p.m.	Site 3. At Jack's historic property with more than 100 years of family management, we will apply what we have been learning and practice some tree and riparian assessments. We will also focus on how to balance wildlife habitat considerations with different management practices. (Jack's introduction to the property, brief history and management: 15 minutes)
BREAK (BYO snacks)	
3:30 p.m.	Depart for Extension
4:00 p.m.	Arrive at OSU Extension and adjourn

Coordinator's phone number for emergencies: xxx-xxx-xxxx

AGRICULTURAL RESOURCES FIELD DAY 2

Topics: soils; pasture management; water systems and infrastructure; economics and enterprise.

See field day guidance for coordinator, natural-resource expert and hosts.

Resource experts (list names and contacts):

- OSU Extension agriculture agent.
- OSU Extension Small Farms agent .
- Soil and Water Conservation District staff.
- Cooperative weed management area staff.

Site hosts (list names and contacts):

- Landowner: Small vineyard and farm.
- Landowner: Small teaching farm with livestock.

8:45 a.m.	Meet. Review agenda. Assemble carpools.
9:00 a.m.	Depart
9:30 a.m.	Arrive at Site 1. Topic examples (chosen based on the site and the host. These could vary): ▪ Riparian assessment. ▪ Using goats for blackberry control. ▪ Pasture management best practices. ▪ Tools. ▪ Compost. ▪ Vineyard practices. ▪ Yellow star-thistle control.
11:00 a.m.	Thanks and depart
11:30 a.m.	Arrive at lunch site, eat.
11:50 a.m.	Small-group activity. Bring draft plans. Choose two highlights from your plan, share with small group (10 minutes). Group discussion (10 minutes).
12:10 p.m.	Small farms agent: What should I do with my small farm?
1:00 p.m.	Depart for afternoon field site.
1:30 p.m.	Arrive second site. Topic examples: ▪ Small-farm management; running a diverse farm operation. ▪ Orchards, gardens, pond, pasture management, seeding, rotational grazing, irrigation, sheep, small livestock, fences, outbuildings.
3:00 p.m.	Thanks and depart (Some may wish to stay for further discussion.)
3:30 p.m.	Arrive at Extension office and adjourn

Example agendas for instructor-led online virtual classes

Introductory Zoom session, Land Steward online course

Instructors: (list names)

SETUP

- Pre-class communication with participants: Participants' computer options to get online for Zoom, phone.
- Set-up for Zoom.
- Set-up for Canvas.
- Sample Management Plans for display on screen.
- Handouts and resources — pdfs to be emailed after the class, resources in Canvas.

5:30 p.m.	Instructors join the Zoom, check set-up, review rolls.
5:50 p.m.	Participants invited to join.
6:00 p.m.	Welcome. ▪ Overview of Zoom functions for group. ▪ Share agenda. ▪ Introduce instructors: Roles as resource for participants.
6:10 p.m.	Participants introduce themselves (time depends on class size) ▪ Breakout rooms: four per room, seven minutes, 20-second warning. ▪ Share: name, property location, size, years owned, your interest in taking the Land Steward course (one minute each)
6:20 p.m.	Which topics are you most interested in? ACTIVITY: For online class of 50 (15 minutes) ▪ Go to menti.com for a live quiz. Ask participants to go to the following URL and paste in this custom code. The results will show why they showed up today. *https://www.mentimeter.com/s/6a07dea209fad04eeae66a5bea78775b/109d73ab652c/edit* ▪ Alternatively, create a poll in Zoom that lists the module topics covered in the course.
6:35 p.m.	Course overview (PowerPoint) (35 minutes) This could be a recording. ▪ Overall goals of the course. What we hope you get out of it. ▪ Logging on, using Canvas demonstration. (Participants should have done this before, but this is a reminder.) ▪ Online modules: lessons, quizzes, resource assessments, discussion, weekly time commitment. ▪ Stress the importance of keeping up. Review schedule (reference syllabus) . ▪ Share ways to get help (Clarify technical questions vs. course content help). For course content, call or email Rachel Werling. ▪ Go over the next two discussions: when they will take place, how they function and the importance of the discussion to gathering questions. ▪ Stress the importance of completing management plans. ▪ Certificate of completion requirements. » Complete all modules. » Complete the management plan.
7:10 p.m.	Questions?
7:15 p.m.	Land stewardship discussion exercise: Short introduction about Leopold and the land ethic article, or share quotes about stewardship. Spend a few minutes jotting down your ideas for characteristics of a Land Steward. Then break into groups of four to five to discuss. In groups, discuss your own ideas about land stewardship. What is land stewardship? What are the characteristics of a Land Steward? What is important to you? See PowerPoint for instructions. ▪ Five-minute introduction, read quotes. ▪ Three minutes to write. ▪ Two minutes to form groups, assign to breakout rooms. ▪ Ten to 15 minutes to discuss and draft. Reconvene when done. This will be done in breakout rooms and entered into chat when they return. Capture in a document and create a live word cloud using *https://monkeylearn.com/word-cloud/*.

7:30 p.m.	Groups report back, see the word cloud, discuss.
7:50 p.m.	Reminders, final questions
8:00 p.m.	Adjourn

For virtual class email the below resources. Have them available to share on screen.

- Stewardship activity (in welcome email).
- Day of class, email:
  - Syllabus.
  - PowerPoint PDF.
  - Agency contacts sheet PDF.
  - Blank Land Steward Management Plan as a Word document.

Wildland natural resources topics Zoom — instructor's agenda *(adapt for agricultural class)*

County Soil and Water Conservation District

Date/time_____

AUDIENCE

- Land managers and landowners in county.
- Many new to land management, inheriting land from family, considering purchasing land, or assisting with land management on behalf of family.
- Variety of land uses including residential, farm, forest/woodland and riparian/wetland.

CLASS GOALS

- Introduce participants to local natural-resource representatives who provide technical and financial assistance.
- Provide participants with local context on first four online learning modules (wildlife, streams, forests, wildfire).
- Answer questions that participants encounter as they go through their natural-resource assessments and create their management plan.

NATURAL-RESOURCE EXPERTS (EXAMPLES)

- Rural conservation specialist, Soil and Water Conservation District.
- Habitat conservation specialist, SWCD.
- Forest conservation specialist, SWCD.
- Stewardship forester, Oregon Department of Forestry.

SCHEDULE

5:30 p.m.	Host Instructors open Zoom room check-in review process and rolls.
5:40 p.m.	Instructors join for technical check. Check sound, video, screen share and slides.
5:50 p.m.	Participants check in to the Zoom room. Room opens 10 minutes early to allow participants to resolve any potential technical issues.
6:00 p.m.	Class begins. Lead welcome, go over Zoom basics, process and agenda and introduce speakers (name, title and organization)
6:05 p.m.	Wildlife — rural conservation specialist, SWCD ■ Presents (10 minutes) and answers questions (15 minutes). ■ Others monitor chat for problems and questions.
6:30 p.m.	Streams — habitat conservation specialist, SWCD ■ Presents (10 minutes) and answers questions (20 minutes). ■ Others monitor chat for problems and questions.
7:00 p.m.	Forests and wildfire — forest conservation specialist, SWCD and stewardship forester, Oregon Department of Forestry ■ Presentation (10 minutes each). ■ Others monitor chat for problems and questions.
7:20 p.m.	Forest and wildfire questions and discussion ■ Answer questions (35 minutes) ■ Monitor chat for problems and questions
7:55 p.m.	Coordinator wraps up and adjourns meeting at 8 p.m.

INSTRUCTOR GUIDANCE

Content: The participants have completed four online modules with some basic information about wildlife habitat enhancement, caring for streams and riparian areas, managing forests and woodlands, and preparing for wildfire.

- You DO NOT need to teach the whole topic; rather, this is your chance to focus on what you think is most important (the top three things, for example) for participants to know about your topic.
- Consider the frequent questions or issues you see with landowners. Include any key regulations or rules relevant to your resource topics that you think landowners should know.
- Showcase resources and services you offer landowners and a quick overview of any other financial or technical assistance available (other agencies, cost-share programs, etc.).

Timing: We will have about 30 minutes per topic. A aim for 10 minutes (or less) from each of you with 20 minutes for Q&A.

Questions: Course participants are completing a set of assessments for their property as they progress through the course. The assessments will eventually help them build their management plans. We have encouraged them to use this time to answer questions that will help them complete their resource assessments.

Appendix A. Marketing and administrative templates

Flyer

- **Have land but not sure how to take care of it?**
- **Want to make the right decisions when purchasing land?**
- **Need a plan for your property?**

2021 OSU Land Steward Training

Weekly classes: Tuesdays, 1-5:30 p.m., Sept. 8–Dec. 1

OSU Extension, 569 Hanley Road, Central Point • 541-776-7371

SAVE $50! Register by Aug. 7 and pay $150 for entire series ($200/couple)

This award-winning program helps landowners learn what they have, decide how to manage it and make a plan to get there. The program covers topics from forests to farms, soils, water, streams, pasture management, fire awareness and economics. Learn how to connect to resources that will help you reach your goals. Hurry! Registration ends Aug. 14.

Contact: rachel.werling@oregonstate.edu

extension.oregonstate.edu/sorec/land-steward-program

Oregon State University