INSIDE OREGON'S FORESTS

A high school forestry curriculum

OREGON'S FOREST HERITAGE

Oregon Forest Resources Institute

Introduction

Inside Oregon's Forests is a high school curriculum developed by the Oregon Forest Resources Institute (OFRI) to help students build a deep understanding of Oregon's forests. The seven modules are loosely organized around topics and concepts from the *Oregon Forest Literacy Plan*, a forest-education conceptual framework developed by OFRI and available at learnforests.org.

Curriculum Goals and Objectives

The overall goal of this curriculum is to provide engaging, standards-based lessons that help high school students understand the environmental, economic and social importance of Oregon's forests, as well as the principles behind forest management. Through the lessons, students will be able to:

- explain basic tree biology
- identify the forest types in Oregon
- describe the environmental, economic and social benefits Oregon's forests provide
- explain scientific and economic principles involved in managing Oregon's forests
- describe current issues facing Oregon's forests
- identify actions they can take to help ensure the sustainability of our forests

Curriculum Overview

Following is a description, as well as a suggested sequence and time frame, for each of the seven modules in the curriculum.

Sequence & Time Frame	Module	Description
Weeks 1-2	Oregon's Forest Heritage	Students are introduced to Oregon forests and their history, and examine some changes in our state's forestland over time.
Week 3	Forest Basics	Students gain an understanding of both tree biology and the forest types in Oregon, and practice identifying and measuring trees.
Weeks 4-5	Environmental Importance of Oregon's Forests	Students explore the environmental importance of forests: for example, how they protect our water resources, provide habitat and store carbon.
Week 6	Economic Importance of Oregon's Forests	Students examine Oregon's forest economy, including the products, energy and jobs that come from forests.

Weeks 7-9	Forest Management	Students learn about forest management and practice forest management skills, such as surveying a forest tract, analyzing forest soil and developing a management plan.
Weeks 10-11	Forest Management Issues	Students explore the impacts of fire, forest pests and climate change on Oregon's forests, and conduct an opinion survey related to a forest management issue.
Week 12-13	Our Responsibility to Oregon's Forests	Students learn about certification as a way to achieve forest sustainability, and plan and carry out a service-learning project.

How to Use the Curriculum

The curriculum is designed to be flexible. Teachers may select modules or lessons that fit their educational goals, as each lesson can either stand alone or build on prior lessons. This curriculum may be used:

- as the basis for a 13-week or semester-long course on forestry
- to teach a single unit on forestry within other high school courses, such as agricultural science and technology, or environmental science
- to help prepare students for the FFA Career Development Event (CDE) on Forestry, or for Envirothon

Curriculum Resources

The following Resources (available at learnforests.org) support teaching the curriculum:

- Glossary
- Supplies
- OFRI Publications and Videos
- Student Pages
- Field Investigations
- Oregon Standards Connections
- Oregon Forest Literacy Plan Concepts

About OFRI

The Oregon Forest Resources Institute supports and enhances Oregon's forest products industry by advancing public understanding of forests, forest management and forest products.

OREGON'S FOREST HERITAGE

1: Introduction to Oregon's Forests

Overview

Students consider the truth of different statements about Oregon forests, and then use *Oregon Forest Facts* to validate or refute each statement.

Note that OFRI updates *Oregon Forest Facts* every couple years. The student page statements and possible answers are based on the 2023-24 edition.

Time Considerations

Preparation: 15 minutes

Procedure: One 50-minute class period

Learning Objectives

Students will be able to:

- Use resources to validate or refute statements about Oregon's forests.
- Describe ways Oregon's forests are important to the state's economic, environmental and social well-being.

Standards Connections

Oregon Science Standards

- HS.ESS3.1. Earth and Human Activity. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- Disciplinary Core Idea – HS.ESS3.A. Natural Resources. Resource availability has guided the development of human society.
- Science and Engineering Practice – Analyzing and Interpreting Data. Evaluate the impact of new data on a working explanation and/or model of a proposed process or solution.

Oregon English Language Arts Standards

- Reading Science and Technical Subjects – RST.9-10.1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

Oregon Forest Literacy Plan Concepts

- 2.A.1. Forests improve air and water quality, and help stabilize soil.
- 2.B.1. Forests provide multiple economic benefits, including jobs, a source of forest products and business opportunities (e.g., recreation and tourism).

Materials

- *Oregon Forest Facts* (either one copy for each pair of students, or on-screen access), available at learnforests.org
- "Oregon Forests – True or False" student page

Background Information

One of our state's greatest resources is its forestland, which represents nearly half of Oregon's 61 million acres. Healthy forests provide vital environmental, social and economic benefits our communities rely on. Some of the many forest benefits include:

- clean air and water
- wood, paper and other renewable, recyclable forest products
- balanced and vigorous plant and animal communities
- fish and wildlife habitat
- recreation

It takes a collaborative effort of public, landowner and legislative support to maintain healthy forest ecosystems, a thriving forest sector economy and a recreational playground.

Key Vocabulary

Clearcutting

forest sector

reforestation*

sustainable forest management*

timber harvest*

**included in Glossary*

Preparation

Make copies of the student page.

Procedure

1. Introduce the curriculum and the lesson by pointing out that throughout Oregon's history, forests have been a crucial component of the state's environment and economy.
2. Give each pair of students a student page and allow them a few minutes to read the different statements and decide which they think are true and which false.
3. Provide copies of *Oregon Forest Facts* or direct students to the booklet online. Direct pairs to use the data provided in the booklet to either validate or refute each statement, citing the evidence they find.
4. As an entire class, discuss the students' findings:
    a. Which statements did you find to be true? Which were not true?
    b. Did any of your findings surprise you?
    c. What did you learn about Oregon's forests from this exercise?
5. Ask the class, "From what you found, how would you say forests contribute to Oregon's environmental, economic and social well-being?" List their responses on a class chart, such as this:

Environmental Well-Being	Economic Well-Being	Social Well-Being

Assessment

Ask students to write a brief essay describing how forests contribute to Oregon's environmental, economic and social well-being.

Extension Idea

Help students connect to Oregon's forests by visiting one near you. See the "Field Programs" tab on the "Grades 9-12 Programs & Resources" page on learnforests.org for a list of field programs around the state.

Possible Answers to "Oregon Forests – True or False?" Student Page

1. True. Nearly half (47 percent) of Oregon's total acreage is forestland.
2. True. Oregon's forestry sector employs tens of thousands of workers.
3. False. The amount of forestland acreage and the volume of wood growing in Oregon have remained about the same since at least the 1920s.
4. True. In 1971, the Oregon Forest Practices Act became the first law in the U.S. to regulate forest practices, ensure reforestation and safeguard water, fish and wildlife habitat, soil and air.
5. False. Federal and state governments manage nearly twice as much acreage of forestland in Oregon as private landowners.
6. False. The majority of timber produced in Oregon comes from large private landowners.
7. False. Oregon's forests are managed to reflect the varied objectives and practices of landowners. For example, some are managed primarily for timber production, while others are set aside as parks, wilderness areas or reserves to protect habitat.
8. True. Oregon is the top softwood-lumber-producing state and the top plywood-producing state in the nation.
9. False. Oregon forests provide a wide range of products, including lumber, plywood, engineered wood products, paper and paper products, composite wood products, posts, poles and timbers, etc.
10. False. The Oregon Forest Practices Act places limits on clearcuts.
11. True. Under the Oregon Forest Practices Act, forest landowners must replant within two years after harvest.
12. True. In eastern and interior southwest Oregon forests, high growth combined with high mortality has created unusually dense forests that are susceptible to insects and disease and are at risk for larger and hotter fires.
13. True. Under the Oregon Forest Practices Act, timber harvesting, road building and chemical use are restricted near waterways to protect fish habitat and water quality.
14. True. Millions of acres of Oregon forestland are certified under three major certification systems.

STUDENT PAGE

LESSON 1

NAME(S): _____

Oregon Forests – True or False?

First, for each statement underline whether you think it is true or false. Then look for evidence in *Oregon Forest Facts* to verify or refute each statement. Circle the correct answer based on your findings.

True or False?	Statement	Supporting Evidence and Page Number
T F	1. About half of Oregon's land area is forest.	
T F	2. The forest industry accounts for tens of thousands of jobs in Oregon.	
T F	3. The amount of forestland in Oregon has shrunk dramatically since 1950.	
T F	4. Oregon was the first state in the country to pass a law regulating forestry practices on all its forestland.	
T F	5. Private property owners control most of the forestland in Oregon.	
T F	6. Three-fourths of the timber harvested in Oregon comes from federal land.	
T F	7. All forests in Oregon are managed in the same way for the same objectives.	
T F	8. Oregon is one of the top lumber-producing states in the U.S.	
T F	9. Wood from Oregon forests is used only for making paper and lumber.	
T F	10. Forest owners in Oregon may clearcut (log all or most of the trees) on their own land without any restrictions.	
T F	11. Oregon landowners must replant forest trees after harvesting them.	
T F	12. A high amount of forest growth has led to a greater fire risk for much of Oregon's forests.	
T F	13. In Oregon, logging is restricted near waterways to protect fish and water quality.	
T F	14. More than 4 million acres of Oregon forest are certified by a sustainable forest certification system.	

2: History of Forestry in the U.S. and Oregon

Overview

Students explore the importance of forests in our nation's and state's history by reading about the Western views of three historical figures in forestry and comparing them to Indigenous views on forests. Then, after reading a summary of Oregon's forestry history, they research forest-related events in Oregon's history to create a timeline of forestry in Oregon.

Note that in this lesson, the term Western refers to cultures and belief systems stemming from European tradition..

Time Considerations

Preparation: 15 minutes

Procedure: Two to four 50-minute class periods, plus time for student research

Learning Objectives

Students will be able to:

- Identify three key Western figures in the history of American forestry and describe how their philosophical views helped shape the field of forestry in the U.S. and in Oregon.
- Compare the perspectives of the three Western figures to Indigenous perspectives on forests.
- Describe important events in the history of Oregon forestry.

Standards Connections

Oregon Science Standards

- HS.ESS3.1. Earth and Human Activity. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- Disciplinary Core Idea – HS.LS4.D. Biodiversity and Humans. Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and

productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.

- Disciplinary Core Idea – HS.ESS3.A. Natural Resources. Resource availability has guided the development of human society.
- Science and Engineering Practice – Engaging in Argument from Evidence. Compare and evaluate competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues.

Oregon English Language Arts Standards

- Reading Science and Technical Subjects – 9-10.RST.1. Analyze what science and technical texts say explicitly as well as inferentially, citing evidence attending to the precise details of explanations or descriptions.
- Writing History, Science, and Technical Subjects – 9-10.WHST.7 and 11-12.WHST.7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Oregon Forest Literacy Plan Concepts

- 2.C.1. Forests have been central to the region's history and are an integral part of Oregon as we know it today.
- 3.B.2. From time immemorial, Indigenous people of Oregon have used fire and other practices such as girdling trees and land clearing to manage the forest. Their traditional ecological knowledge of Oregon's forests informs forest management practices that sustain forests.
- 3.D.3. Oregon has had a history of conflict over forest management issues. For example, conflicts have arisen over the preservation of ancient or old-growth forests, the protection of endangered species, and whether logging is appropriate on public lands.

Materials

- Optional: *The Greatest Good: A Forest Service Centennial Film*, available at c-span.org
- "Western Perspectives on Forests" student page
- "Indigenous Perspectives on Forests" student page
- "Tracing Oregon's Timber Culture" student page
- "Creating a Timeline of Oregon Forestry History" student page
- Optional resources for research:

    - *The USDA Forest Service: The First Century* by Gerald Williams. 2005. Available at fs.usda.gov.
    - *Forests, People and Oregon: A History of Forestry in Oregon* by Ray Miller. 2004. Available at the State Library of Oregon Digital Collections, digital.osl.state.or.us. (Note: Though out of print, this book contains a detailed timeline of important events in Oregon related to forestry.)
    - *Conserving Oregon's Environment: Breakthroughs that Made History* by Michael McCloskey. 2020. (Originally published in 2013.)
    - *A Glimpse into History: What Prominent People Have Said about Nature in Oregon and the Need to Conserve It* by Michael McCloskey. 2018.
- Optional: materials for making a physical timeline (such as index cards and string) or a virtual one (such as a word processing, presentation or spreadsheet app)

Background Information

See the "Tracing Oregon's Timber Culture" student page for an overview of Oregon's forest history and the "Western Perspectives on Forests" and "Indigenous Perspectives on Forests" for differing views on the value of forests.

Key Vocabulary

forestry*

**included in Glossary*

Preparation

Look over the student pages and decide which of the first three you want to use with students. For example, you may choose to have students read and compare the "Western Perspectives on Forests" and "Indigenous Perspectives on Forests" student pages, or read just the "Tracing Oregon's Timber Culture" student page, or use all three. Copy the chosen student pages or make them available electronically. Identify potential resources for student research on the timeline (see Materials for some possibilities).

Procedure

1. Lead a brief discussion to assess students' understanding of Oregon's historical connection to forests, asking questions such as:
    - How have forests shaped Oregon's history?
    - How has Oregon's history shaped forests?
    - In what ways do you think Oregon's forests have changed over time?

    - How do you think our use of and perception of forests have changed over time?
2. (Optional) Show *The Greatest Good* or have students read portions of *The USDA Forest Service: The First Century*.
3. Ask students what they think the term "conservation" means in relation to forests and other natural resources. Point out that just as they might have differing views about what it means, people in the past have also struggled with how to both use and sustain a resource such as forests.
4. Provide students with the "Western Perspectives on Forests" student page and direct them to read about John Muir, Gifford Pinchot and Aldo Leopold, three individuals who greatly influenced forest conservation in the United States.
5. Instruct students to use the questions listed on the student page to examine the reading in more detail. You may choose to have them discuss the questions in groups of four or as an entire class, or to write their responses to some or all the questions as homework.
6. Have students read the "Indigenous Perspectives on Forests" student page and answer the questions on the student page. Lead a discussion about how the differing views presented on the two student pages influence how forests are used and sustained.
7. Introduce the idea that events in Oregon as well as in the nation have shaped both Oregon's forests and the field of forestry. Invite students to read the "Tracing Oregon's Timber Culture" student page and answer the questions provided.
8. Distribute the "Creating an Oregon Forestry History Timeline" student page. Explain that the groups' task is to create a timeline showing different events in Oregon's history and their significance to Oregon forests and forestry.
9. Provide research materials or online access, and allow time for students to research and create their timelines.
10. Invite groups to present their timelines to the class.
11. Discuss such questions as:
    - How has forestry developed over time in Oregon?
    - What events have been significant in Oregon's forestry history?
    - How have Muir's, Pinchot's and Leopold's views of conservation influenced forestry in Oregon?
    - How have Indigenous views influenced forestry in Oregon?
    - What future events might impact Oregon's forests? How might we minimize any negative impacts?

Assessment

Have students create a T-chart like the one below, adding evidence from their research.

How have forests shaped Oregon's history?	How has Oregon's history shaped forests?

Extension Ideas

- Have students research individuals who have influenced the field of forestry in Oregon to learn about their contributions. Some possibilities include:
    - Samuel Boardman
    - Francis Elliott
    - Stewart Holbrook
    - Thornton Munger
    - George Peavy
    - Edward Schroeder
    - TJ Starker
    - Loren "Stub" Stewart
    - John B. Waldo
    - Barbara Walker
- Have students read the following essays from *Forest Essays, Grades 7-12*, available at learnforests.org. Each one-page reading provides a historical perspective on Oregon's forests. Challenge students to identify where each of the events described would fall on their timeline, and whether it represents a particular conservation philosophy.
    - Community Members and School Kids Bring Back a Forest [about the Tillamook Burn]
    - Planting a Tree Could Change Your Life [about Hoedads, members of a cooperative tree-planting group in Lane County, Oregon]
    - 1920s Logger Becomes Leader in Sustainable Forestry [about Bill Hagenstein]
    - How Oregon's State Tree Got Its Name
    - Monster Storm Wreaks Havoc [about the Great Coastal Gale of 2007]
- Explore the history of the Oregon & California Railroad (O&C) lands, Tillamook State Forest or other local forestlands. Who has cared for these lands over time? What

philosophies, perspectives and conflicts have been involved? How do history, legislation and jurisdiction impact them today?

- Invite students to create and conduct an Oregon forest history trivia game. Encourage them to develop trivia questions based on research of historical figures, local place names (e.g., L.L "Stub" Stewart State Park), businesses (e.g., Stumptown Coffee), teams (e.g., the Timbers) or other cultural references that are connected to Oregon's forests and forest history. See the reference volume *Oregon Geographic Names* by Lewis A. McArthur and Lewis L. McArther, available in many libraries, for information about place names.
- Research to learn how the history of the United States is connected to trees and forests. As a place to start, see *American Canopy: Trees, Forests, and the Making of a Nation* by Eric Rutkow.

Western Perspectives on Forests

The history of forestry in the United States has been shaped by our nation's changing ideas about forests. Three Western individuals from the late 1800s to early 1900s greatly influenced those ideas through their work and their writing. Each cared deeply about America's forests, but had differing views on the value of forests and how to "conserve" or maintain them.

John Muir

John Muir was born in Scotland in 1838, and immigrated to Wisconsin with his family when he was 11 years old. As an adult he became devoted to learning about a world unchanged by humans or machines. He walked from Indiana to Florida, sailed to Cuba, New York and Panama, and eventually made his way to California, where he continued his walking explorations in the Sierra Nevada mountains.

Starting in the 1870s, Muir became known for his newspaper articles and essays, in which he wrote in poetic and spiritual terms about the natural world. He believed wilderness is important for its sheer beauty and its ability to renew the spirit. He also believed nature has value whether or not people can derive a direct benefit from it. For Muir, conservation meant leaving areas untouched by human hands.

Muir fought to preserve areas of pristine forest and keep them from human destruction. He wrote a series of essays pushing for the establishment of Yosemite National Park, which was eventually created in 1890. He also worked to create Grand Canyon and Sequoia national parks. In 1892 he co-founded and became the first president of the Sierra Club, an environmental preservation organization.

Quotes from Muir's writings:

- *"Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul alike."*
- *"It took more than three thousand years to make some of the trees in these Western woods—trees that are still standing in perfect strength and beauty, waving and singing in the mighty forests of the Sierra. Through all the wonderful, eventful centuries since Christ's time—and long before that—God has cared for these trees, saved them from drought, disease, avalanches, and a thousand straining, leveling tempests and floods; but he cannot save them from fools—only Uncle Sam can do that."*

Gifford Pinchot

Gifford Pinchot (PIN-show) was the first professionally trained forester in the United States. He was born in 1865 in Simsbury, Connecticut, to an upper-class family. When he entered Yale University, his father suggested he become a forester since he had always loved being in the woods. At that time, no university offered a degree or even a course in forestry, so Pinchot decided to study forestry in France after graduating.

When he returned to the United States, he worked as a resident forester for George Vanderbilt's Biltmore Forest Estate. In 1889 he became head of the U.S. Division of Forestry. In 1900 he founded the Society of American Foresters (SAF), a professional organization aimed at bringing high standards to the new field of forestry. In 1905 he was named Chief Forester of the newly formed U.S. Forest Service under President Theodore Roosevelt. Under his leadership, the Forest Service grew from 60 national forests covering 56 million acres to 150 national forests covering 172 million acres.

For Pinchot, the term conservation meant the efficient use of natural resources, and he held a utilitarian, or practical, view of forests. He believed forests are for people to use, but he also stressed their "wise use." His view was that natural resources should be managed by considering the "greatest good" for the greatest number of people over time.

Quotes from Pinchot's writings:

- *"Conservation is the foresighted utilization, preservation and/or renewal of forests, waters, lands and minerals, for the greatest good of the greatest number for the longest time."*
- *"Without natural resources life itself is impossible. From birth to death, natural resources, transformed for human use, feed, clothe, shelter, and transport us. Upon them we depend for every material necessity, comfort, convenience, and protection in our lives. Without abundant resources prosperity is out of reach."*

Aldo Leopold

Aldo Leopold was born in 1887 in Burlington, Iowa. After graduating from the Yale Forest School in 1909, he pursued a career in forestry, working for more than 20 years with the U.S. Forest Service in New Mexico and Arizona.

In 1933 he published the very first textbook about wildlife management. Later that year he became a professor of game management at the University of Wisconsin. In 1935 he and his

family began restoring a worn-out farm along the Wisconsin River, which further informed and inspired his understanding of the natural world.

Leopold advanced the idea of the "land ethic," which places value on all living things as well as their interactions in the environment. To Leopold, the term conservation meant managing natural areas based on ecological principles – not just based on economics. He recorded his findings and thoughts in short essays, which were published the year after he died in 1949 as the book *A Sand County Almanac and Sketches Here and There*. His words inspired many conservationists in the 1950s and 1960s, and helped spur the environmental movement.

Quotes from Leopold's book:

- *"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."*
- *"Civilization has so cluttered this elemental man-earth relationship with gadgets and middlemen that awareness of it is growing dim. We fancy that industry supports us, forgetting what supports industry."*

Questions

1. Compare the three views of conservation held by Muir, Pinchot and Leopold. In what ways were they similar? In what ways were they different?

2. Choose one of the quotes to analyze more carefully. What does this quote tell you about the person's beliefs about forestland and natural resources?

3. Name one way each person's views helped define our nation's current relationship with forests.

4. Each of these three people spent a lot of time outdoors and in nature. Do you think going outdoors is necessary to develop beliefs about the protection or use of the environment?

Indigenous Perspectives on Forests[1]

Following are excerpts from the article "Native American Forestry Combines Traditional Wisdom with Modern Science" by Gail Wells, describing some perspectives held about forests by Oregon tribal members:

- Ten thousand years ago, ancestors of today's Coquille Indians lived along the southern Oregon coast from Coos Bay to Cape Blanco, and along the inland valleys of the Coquille River drainage. A common misconception among European Americans is that Indians lived passively within their environment, "at one with nature." On the contrary, aboriginal peoples actively managed their landscape for their own objectives, using the technologies available to them. For coastal tribes and others, the key management tool was fire. The people regularly set fire to meadows and valleys to maintain grassy cover, keep brush at bay, improve habitat for deer and elk, and cultivate fire-adapted plants that were important sources of food and fiber. Hence, the land the first Euro-Americans took to be a pristine, park-like wilderness was in fact the product of thousands of years of Indigenous land management.

- "There's a tendency in today's culture," says Tim Vredenburg [head forester for the Coquille Indian Tribe in Oregon], "to fixate on a particular set of values within a forest, or an ecosystem: jobs, or timber receipts, or old growth or fish habitat – you name it, there's a position. The tribe's position is to value all of it. The idea of reserves, of drawing a line around a forest to keep people out, doesn't make sense to the Coquilles. But neither does the idea of taking everything away and leaving nothing for future generations."

- "We get many things from the forest – canoes, baskets, clothes, shelter, fir, cedar, spruce, beargrass, camas – and we use all of these things," explains Coquille tribal chief Ken Tanner. "But they also have a spiritual value which we honor as we honor our ancestors. What we take, we try to give back. What we don't need, we try not to take."

- One important reason for burning was to prevent the vigorous Douglas-fir from invading clearings. "The Douglas-fir timber they say has always encroached on the open prairies and crowded out the other timber," recalled Lucy Thompson (Che-nawah Weitch-ah-wah),

[1] Excerpted from: Wells, Gail. "Native American Forestry Combines Traditional Wisdom with Modern Science." February 22, 2016. *Solutions Journal*, thesolutionsjournal.com.

a Yurok woman of northern California, in 1991. “Therefore they have continuously burned it and have done all they could to keep it from covering the open lands.”

- In the Siletz language, the word for Earth may be translated roughly as “made for you.” People who depend on the land learn to pay attention to cycles of birth and death, of plenty and scarcity. Over many generations, the Indians of the Oregon coast learned where the best beargrass patches were and how to keep them flourishing, when to burn the high meadows of the summer campground to attract the elk and to keep the Douglas-fir at bay, and how to harvest and process the inner bark of the Port Orford cedar for making blankets.

- “I come from a people who did not have a word for preservation, or for the environment, or for ecology,” says Esther Stutzman, a storyteller of the Komema Kalapuya people of western Oregon and a member of the Confederated Tribes of Siletz. “The word they had was *respect*.”

Questions

1. How are the Indigenous perspectives of forests described in the article similar to and different from the Western perspectives represented by Muir, Pinchot and Leopold?

2. What are the underlying beliefs or values in each viewpoint?

3. Who or what is left out or missing from each?

Tracing Oregon's Timber Culture[2]

As Oregonians, we often encounter references to forestry in our everyday lives. Many place names, local sports teams and brands use forestry terms and aesthetics to reinforce their Oregon origin. This article from the World Forestry Center in Portland summarizes our state's complex forestry history.

When did Oregon and forestry become synonymous?

Before white settlers arrived in Oregon, it was home to over 20 Indigenous tribes whose people lived symbiotically with the land, maintained the forests, and worked to preserve the environment around them.

As a territory, Oregon was shaped through manipulation of land by the United States government. The Donation Land Act of 1850 dispossessed Indigenous Peoples and pushed white settlers into the territory. White males and married white women were each allotted a 320-acre plot of land in Oregon. Conflict erupted between these white settlers and Native Peoples; many tribes did not survive the wars. In 1854, U.S. army troops forcibly relocated most surviving tribal bands to a newly established coastal reservation. The Act expired in 1855, but resulted in a huge increase in Oregon's population of white settlers.

Today, there are only nine federally recognized tribes within the state. However, they continue to play a crucial role in the maintenance of forested lands and passing on Indigenous knowledge to other state residents.

The timber industry in Oregon grew alongside the California Gold Rush of the 1800s. As more white settlers moved west hoping to strike it rich, the need for lumber increased. When rail lines were extended into Oregon in the 1870–80s, the Ponderosa Pines of Eastern Oregon and the forested areas of the Western Cascades were there to meet the need. Between the 1880s and 1911, more railways were

[2] Source: "Tracing Oregon's Forestry Culture." World Forestry Center. Reprinted with permission from the World Forestry Center.

added and logging boomed. By 1938, Oregon was the nation's leading producer of wood. To this day, Oregon produces more wood building materials than any other state.

As Oregon, and its largest city, Portland, grew in the mid-1800s, more trees were cut to build homes. Because it was easier to leave the stumps instead of removing them, the city of Portland became known as Stumptown. Stumptown Coffee and the numerous other brands that use this moniker pay homage to Portland's early logging history.

Other brands and organizations have also embraced the city's logging history. The Portland Timbers was established in 1975 as part of the North American Soccer League (NASL). In 2011, the team earned a spot within Major League Soccer. Timbers' fans, proudly called the "army," celebrate their team with lumberjack-inspired apparel. Players' jerseys sport an axe-shaped logo and the team's woodsman mascot, Timber Joey, cuts rings from a Victory Log after every home goal.

Race and Forestry

Oregon's constitution originally included a racist provision that excluded free Black Americans from the state. It read that "No free Negro, or Mulatto, not residing in this state at the time of the adoption of this constitution, shall come, reside, or be within this state, or hold any real estate, or make any contracts, or maintain any suit therein." The constitutional provision was only repealed in 1926.

This racist provision meant that most of Oregon's early population and loggers were white. However, despite this prejudiced history, Black Americans and other people of color played a key part in our state's logging industry.

Maxville, Oregon in Wallowa County was a home base for Oregon's black logging population, as well as Greek, Japanese, and other loggers of color. Though the town and recreational activities were segregated, Black and white men worked side by side. Maxville was home to a vibrant logging community until the early-1930s, when lumber companies cut their holdings there and most families moved away. In the mid-1940s Maxville was destroyed by a storm.

An Evolving Economy

Oregon has been at the forefront of the development of logging practices since the very beginning. The state continues to lead the field. Originally loggers used the steam donkey engine to increase productivity, eventually trading it for electric tools.

Around 1925, when California's demand for lumber fell, Oregon's loggers began to suffer; mill closures and employee layoffs became commonplace by the beginning of the 1930s.

After World War II, however, Oregon's logging industry boomed once again. The post-war increase in production brought a second wave of logging prosperity. New technology, specifically the modern chainsaw, further increased efficiency.

Timber Today

Logging still accounts for a significant portion of Oregon's annual revenue. In the five-year period from 2017 to 2021, Oregon timber harvest averaged around 3.8 billion board feet per year.[3] Today, more than 61,000 Oregonians are employed in the forestry industry, and nearly half (47%) of the state is considered forestland. The state is the top U.S. producer of both softwood lumber and plywood. And, more recently, Oregon has become a leader in manufacturing innovative "mass timber" engineered wood products such as cross-laminated timber (CLT) and Mass Plywood Panels (MPP).

Forestry has shaped the state in countless other, more subtle ways. Portland's thriving arts, cultural and nonprofit organizations are indirectly supported by the timber industry, as many of the state's largest philanthropic donors have financial roots in forestry.

So, the next time that you see a new craft beer with a lumberjack on the logo, know that you have Oregon's timber history to thank.

Questions

1. What are five key events that shaped Oregon's forest industry?

2. The article lists several logos and organization names that show the importance of Oregon's forest industry. What are some locations, companies or brand names in your community that reflect the importance of forests and forestry?

[3] Source: Oregon Forest Facts and Figures, 2023-2024. Oregon Forest Resources Institute, learnforests.org.

STUDENT PAGE
LESSON 2

NAME(S): _____

Creating a Timeline of Oregon Forestry History

Events

Donation Land Act of 1850

Endangered Species Act

Homestead Act of 1862

Lewis and Clark Expedition in Oregon

National Environmental Protection Act

National Forest Management Act

Northern spotted owl listed as a threatened species

Northwest Forest Plan

Oregon became a state

Oregon became the nation's leading producer of wood

Oregon Forest Practices Act

Oregon Private Forest Accord

Oregon's first sawmill

Oregon State University College of Forestry established

The Oregon Trail

Transcontinental railroad completed

Directions

1. Divide up the list of events above so all the members of your group have about the same number to research.
2. For each, find out the following:
    a. When did this event occur?
    b. What was this event? (Describe it in one or two sentences.)
    c. How did this event affect Oregon forests or forestry? (Describe the effect in one or two sentences.)
    d. What sources did you use to learn about this event? (Cite the title, author, date and web page, if any, for each source.)
3. Write the information for each event on separate index cards or pages.
4. Sort all the cards or pages into chronological order.
5. Determine the earliest and the latest dates, and use these to decide on units of time for your timeline (1 year, 5 years, decades, etc.).
6. Decide how you will mark and label the dates and other information on your timeline.
7. Create the frame for your timeline, and then add the dates and other information for each event.

3: Changes in Oregon's Forestland

Overview

Students analyze land cover changes in Oregon, describing changes over time in elements such as forests, shrub or scrub, wetlands, cultivated crops and developed areas.

Time Considerations

Preparation: 15 minutes

Procedure: One 50-minute class period

Learning Objectives

Students will be able to:

- Evaluate maps of Oregon at different time periods and analyze differences in land and ecosystem elements.
- Articulate several key findings from their map analysis.

Standards Connections

Oregon Science Standards

- HS.ESS3.1. Earth and Human Activity. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- Disciplinary Core Idea – HS.LS2.C. Ecosystem Dynamics, Functioning, and Resilience. A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions.
- Disciplinary Core Idea – HS.ESS3.A. Natural Resources. Resource availability has guided the development of human society.
- Science and Engineering Practice – Analyzing and Interpreting Data. Analyze data using tools, technologies, and/or models in order to make valid and reliable scientific claims or determine an optimal design solution.

Oregon Forest Literacy Plan Concepts

- 2.C.1. Forests have been central to the region's history and are an integral part of Oregon as we know it today.
- 4.A.4. We can look to forests to help us address some of the challenges our society faces, including climate change, biodiversity loss, wildfire and human health issues.

Materials

- "Oregon Land Cover – 1851" student page
- "Oregon Land Cover – 2019" student page
- "Oregon Land Cover Definitions" student page
- "Oregon Land Cover Changes" student page

Key Vocabulary

cultivated crop

deciduous*

development*

evergreen*

herbaceous

perennial

scrub

shrub

wetland*

**included in Glossary*

Preparation

Plan to project the two "Oregon Land Cover" student pages or provide students electronic access to them. Make copies of the other two student pages or have them available electronically.

Background Information[4]

More than a century of mapping, managing and measuring has yielded quite a bit of information about Oregon's forests. Early maps provide a good general idea of what forests looked like around the mid- to late-19th century. From them, we know generally where logging, wildfire and other disturbances have occurred, and we know much about patterns of regrowth in forest ecosystems. And with modern tools such as satellites, other remote imaging techniques and

[4] Source: *What Do Western Oregon's Forests Look Like After a Century of Management?* Oregon Forest Resources Institute, 2009.

records from extensive on-the-ground mapping, we can gain an accurate and precise picture of what western Oregon forests look like today.

Comparing maps showing Oregon's land cover in 1851 and today yields an interesting picture of how it has changed from both human and natural influences. The two maps are snapshots in time of ever-changing forest conditions. The historic map does not represent a timeless or static state – it shows a particular moment in a dynamic history. In the same way, the modern map captures conditions in which human influences have been significant across the whole landscape. One of those influences has been ongoing, conscious management of forests by public and private owners. The forests today do not look the same as the forests of 50 years ago, and 50 years from now they will look different still.

In other words, a forested landscape is something of a moving target. Comparing these two snapshots and analyzing the influences – human and natural – that shaped and continue to shape Oregon's forests reveals a lot about the variability and resilience of forests in the Northwest.

It should be noted that past land managers made decisions based on the best information available to them, and in a cultural context that is different from today's. Since we have the benefit of hindsight when looking at the consequences of those decisions, it's tempting to be judgmental of them. It's also tempting to embrace a nostalgic view of historic ecosystems as being inherently "good." Past management practices left a footprint that is not necessarily "bad," but is certainly different than it would have been if other decisions were made.

It should also be noted that different data sources were used to make the two maps. The 2019 map comes from a national mapping effort called the National Land Cover Database, which is based on satellite imagery. It is very accurate in terms of its spatial and temporal representation, but has broad vegetation categories. The 1851 map is based on a surprisingly accurate and precise historic land-use and land-cover data set, and then converted to match the 2019 map's vegetation categories. Since the underlying data of the 1851 map was collected by people on the ground prior to GPS, the data set lacked the spatial precision of the 2019 map, but had more nuanced information about specific plants and their densities, much of which was lost when converting it to the 1851 map shown here.[5]

[5] The 1851 data set is more accurately an 1851–1937 composite that is derived from Andrews and Cowlin timber maps for Oregon and Washington (1936–1937), 1851–1920 General Land Office field survey data and notes where available, and modern soil and climate data that constrain the possible vegetation in non-forest areas outside the General Land Office footprint. A map of the underlying data set can be found at the Oregon Explorer Map Viewer at oregonexplorer.info. To find it, click on Land Use/Land Cover, and then on Historic Land Use & Land Cover 1851 (Level 2).

Procedure

1. Introduce the activity by asking students how they think Oregon's landscape has changed from 1851 to the present day. Project the two Oregon land cover maps or provide students electronic access to the maps.
2. Direct students to work in small groups to complete the "Oregon Land Cover Changes" student page by looking at the two maps and describing first the changes they observe (or infer) between the maps, and then any impacts they would predict from those changes. You might choose to have some groups compare specific sections of the map, and other groups compare the overall maps.
3. Have groups share some of their findings and predictions. Lead a discussion about their findings, asking such questions as:
    - What are the biggest changes you observed?
    - Which changes are state-wide and which are more local?
    - What surprises you about the changes you observed?
    - What do these maps tell us about Oregon's forestland? What don't they tell us about Oregon's forestland?
    - Which changes do you think will have the greatest impact in the future?
    - What challenges do these changes represent?

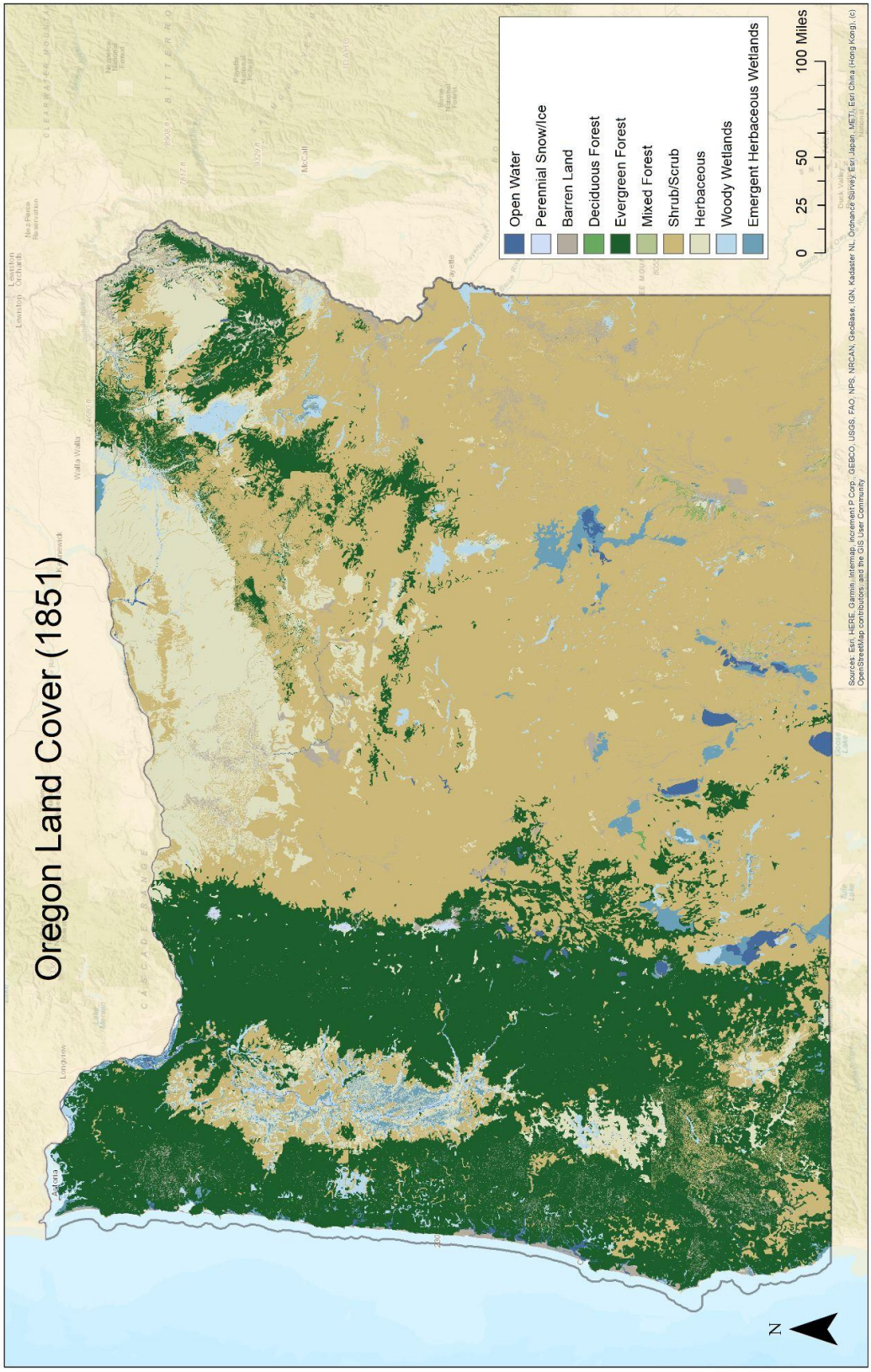
Assessment

Use student responses to the "Oregon Land Cover Changes" student page to assess their understanding of the lesson concepts.

Extension Ideas

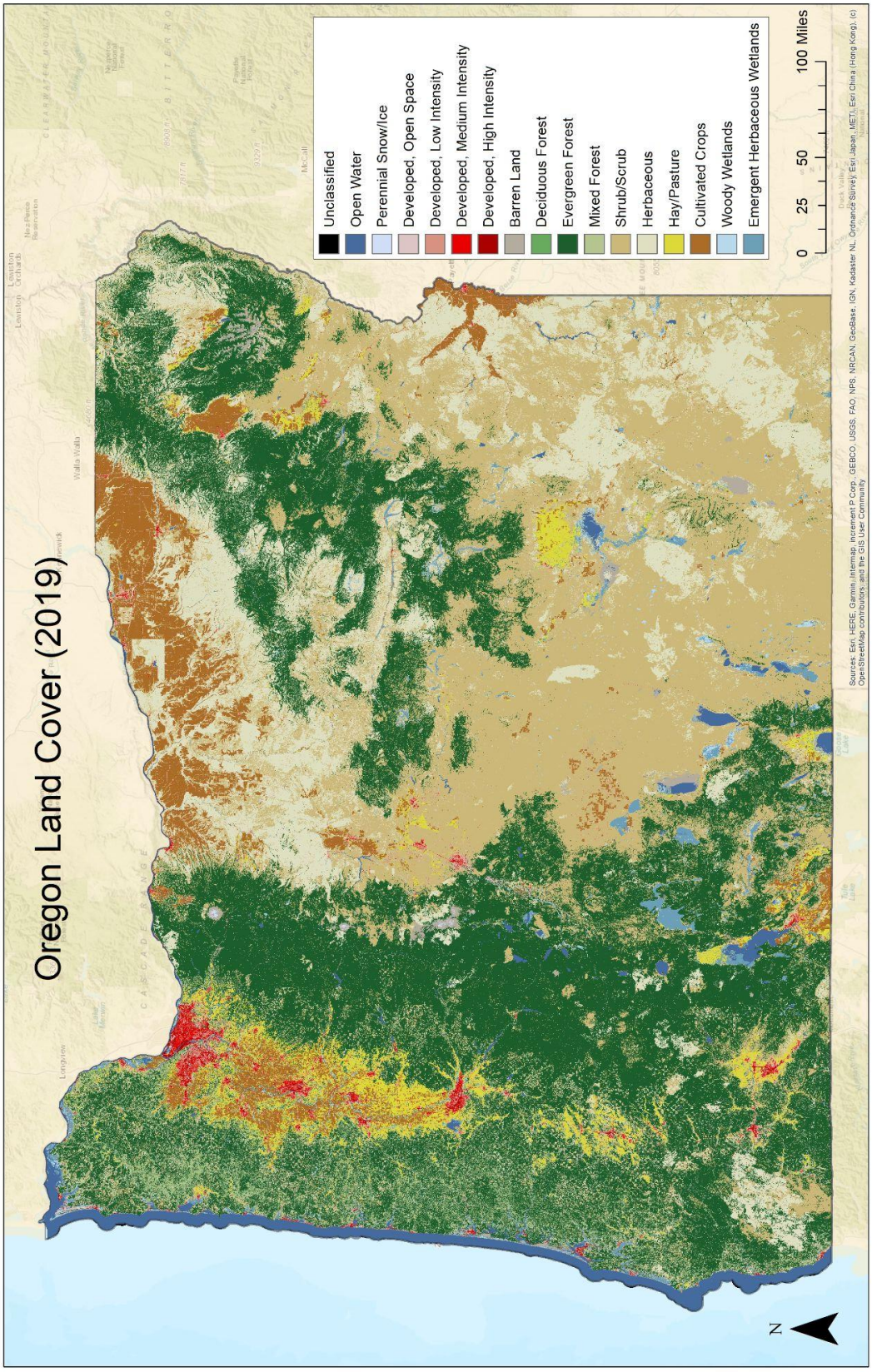
- Using Google Earth or other aerial imagery, look for land use changes in your local area.
- Visit the Oregon Department of Forestry's Forestry History Center in Salem, the World Forestry Center in Portland or your local history museum to learn more about the changing landscape of Oregon's forests and the role of forestry.

Oregon Land Cover – 1851[6]



[6] Source: Map downloaded from Historic Oregon Land Use and Land Cover 1851 (Generalized). Oregon Explorer Map Viewer, oregonexplorer.info.

Oregon Land Cover – 2019[7]



[7] Source: Map downloaded from National Land Cover Database (NLCD) 2019. Oregon Explorer Map Viewer, oregonexplorer.info.

NAME(S): _____

Oregon Land Cover Definitions[8]

Perennial Ice/Snow—Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.

Developed, Open Space—Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses and vegetation planted in developed settings for recreation, erosion control or aesthetic purposes.

Developed, Low Intensity—Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

Developed, Medium Intensity—Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

Developed High Intensity—Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

Barren Land—Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

Deciduous Forest—Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

[8] Source: National Land Cover Database Class Legend and Description. Multi-Resolution Land Characteristics (MRLC) Consortium, mrlc.gov.

Evergreen Forest—Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.

Mixed Forest—Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.

Shrub/Scrub—Areas dominated by shrubs less than 5 meters tall, with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.

Herbaceous—Areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

Hay/Pasture—Areas of grasses, legumes or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.

Cultivated Crops—Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.

Woody Wetlands—Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Emergent Herbaceous Wetlands—Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

NAME(S): _____

Oregon Land Cover Changes

Feature	Changes	Impacts
Perennial snow/ice		
Developed (open space, low intensity)		
Developed (medium intensity, high intensity)		
Forest (deciduous, evergreen, mixed forest)		
Shrub/scrub and herbaceous		
Hay/pasture		
Cultivated crops		
Wetlands (woody and emergent herbaceous)		

4: Oregon's Forest Resources

Overview

Students read (or listen to a brief teacher-prepared lecture) about the value of Oregon's forests and the resources they provide, and then answer questions based on the information.

Time Considerations

Preparation: 15 minutes (more if preparing lecture)

Procedure: One 50-minute class period

Learning Objectives

Students will be able to:

- Identify whether Oregon is losing forestland to other uses.
- Describe the Oregon Forest Practices Act.
- Explain how ecological, social and economic benefits of forests contribute to sustainability.

Standards Connections

Oregon Science Standards

- Disciplinary Core Idea – HS.ESS3.A. Natural Resources. Resource availability has guided the development of human society.
- Science and Engineering Practice – Obtaining, Evaluating, and Communicating Information. Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

Oregon Forest Literacy Plan Concepts

- 4.A.1. People have a reciprocal and complex relationship with forests: We both affect and are affected by forests.

Materials

- "Oregon's Forest Resources" student page
- "Oregon's Forest Resources – Questions" student page
- Optional: *Rules to Live By*, available at oregonforests.org

Background Information

See "Oregon's Forest Resources" student page.

Key Vocabulary

canopy*

conifer*

ecology*

economic value*

forest*

photosynthesis*

sustainability

**included in Glossary*

Preparation

Make copies of student pages or provide electronic access to them. (As an alternative to students reading the "Oregon's Forest Heritage" student page, you may choose to prepare a brief lecture based on the material.)

Procedure

1. Have students read the "Oregon's Forest Resources" student reading, or present a brief lecture based on the material.
2. Give students copies of the "Oregon's Forest Resources – Questions" student page, and allow time for them to answer the questions in pairs or groups.
3. (Optional) Explore the Oregon Forest Practices Act further by inviting students to read some or all the *Rules to Live By* report, and to identify the key rules and benefits of the Act.

Assessment

Use student responses to “Oregon’s Forest Resources – Questions” student page to assess their learning.

Possible Answers to “Oregon’s Forest Resources – Questions” Student Page

1. They help cool and regulate the earth’s climate by removing carbon dioxide from the atmosphere.
2. The amount of forestland in Oregon has remained fairly constant, with about 8 percent loss due to human development.
3. Ecological value: They provide food, shelter and habitat for wildlife; stabilize soil and prevent erosion; regulate temperature and moisture; capture carbon dioxide to produce oxygen; and filter water. Social value: They provide places for people to relax, rejuvenate, find food and have fun, as well as raw materials for wood products. Economic value: They provide softwood lumber and tens of thousands of jobs.
4. Ecological, social and economic benefits are all considered when we talk about forest sustainability.
5. A set of laws and rules governing harvest practices and forest management operations in Oregon.
6. Lumber, door and window frames, fencing material, plywood, newsprint, printer and photocopy paper, egg cartons, food containers, glues, packing material, furniture, toys, playground equipment, pencil stock, cabinets, cosmetics and more.
7. Individual consumer choices affect the demand for forest products – and, in turn, ecosystems and human communities – in Oregon and around the world.
8. Individual responses will vary.

STUDENT PAGE
LESSON 4

Oregon's Forest Resources[9]

Introduction

A forest is a living, complexly interrelated community of trees and associated plants and animals. Forests help provide the earth with oxygen necessary for life. Green plants take in energy from the sun and use that energy in their cells to transform water and carbon dioxide into oxygen and glucose, a carbon-based molecule. This process is called photosynthesis. High levels of carbon dioxide and other gases in the atmosphere contribute to global warming. Forests help cool and regulate the earth's climate by removing carbon dioxide from the atmosphere. The carbon-based molecules that result from photosynthesis are stored in trees' trunks, stems and leaves.

Trees take moisture and nutrients from the soil, and with the aid of sunlight they grow wood and other natural products used by humans. Oregon's forests are very diverse, ranging from mixed-species, old-growth trees in roadless wilderness areas to single-species, intensively managed industrial forests. To better understand forestry in Oregon, it's important to understand some of the basic facts that shape Oregon's forests.

Oregon's Forest Heritage

Of the 62 million acres of land in Oregon, some 30 million acres, or 47 percent, are classified as forestland. Over the past four centuries, the amount of forestland in the state has remained fairly constant, with about 1 percent having been lost to human development (agriculture, urban growth, highways, electric transmission lines and other infrastructure) since Europeans first visited the Northwest. While the amount of forestland has not changed considerably, its composition has changed, as much of the state's virgin forests were harvested for timber during the 19th and 20th centuries.

Forest Sustainability

The ecological, social and economic benefits of forests are all important to Oregon's citizens. Using our forests sustainably, so they continue to provide these important benefits far into the future, requires us to recognize the interdependent relationships among these various uses and acknowledge the need for balance among them.

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[9] Source: *Exploration of Oregon Forests: Module 1 – Oregon's Forest Heritage*. Developed by Julie Woodward based on the Oregon State University Forestry Extension's *Basic Forestry Short Course*.

- **Ecological Value:** The forest floor provides food, shelter and habitat for animals, from the simplest worm to the biggest bear. Tree roots help stabilize the soil and prevent erosion. The top portion of the forest, called the "canopy," helps regulate forest temperature and moisture. Forests also capture carbon dioxide (a greenhouse gas), produce oxygen and filter water to keep it clean. These are all important ecological functions, also known as ecosystem services, forests provide.
- **Social Value:** Forests provide places for people to relax, rejuvenate, seek food and have fun. Each year, thousands of Oregonians visit our forests to go hiking, biking, camping, hunting, fishing, foraging, off-roading and wildlife watching. Another reason forests are important to society is that they provide the raw materials for all the wood products that we use on a daily basis, such as housing, furniture, newspaper, books and cardboard.
- **Economic Value:** Oregon harvests more conifers (cone-bearing evergreens) than any other state, and is the leading producer of softwood lumber in the nation. Tens of thousands of people in Oregon earn a living by working directly with the state's forest sector. Forestry is especially important to rural economies, with most forestry-related jobs located in communities outside the Portland metropolitan area.

Oregon Forest Practices Act

All private and state forestland is protected under the rules of the Oregon Forest Practices Act (OFPA), the nation's oldest and one of the most comprehensive sets of laws and rules governing harvest practices and other forest management operations. Although US Forest Service and Bureau of Land Management (BLM) lands are not regulated by the OFPA, these federal agencies have agreed to meet or exceed many of its requirements. Oregon's landmark land-use laws offer further protection by tightly restricting the conversion of forests to other uses, attempting to ensure that future generations will have ample forest resources.

OFPA includes laws that:

- **Require Prompt Reforestation.** On average, more than 40 million new trees are planted each year in Oregon's forests. Reforestation is required any time forest density drops below established standards following harvest.
- **Require Written Plans.** The Oregon Department of Forestry must be notified of all harvesting operations and be provided site maps for review. In addition, some planned actions require that the landowner or timber operator submit a written plan that documents how the operation will meet the OFPA. In general, harvesting, road

construction or other operations conducted near streams or wetlands require a written plan.[10]

- **Protect Water Resources.** To protect water resources in forests, particularly where fish and domestic water supplies are involved, harvest operations are restricted within a certain distance from the banks of streams and water bodies.
- **Protect Wildlife Habitat.** Landowners must be responsive to the nesting and feeding needs of a wide variety of forest wildlife. For example, they must ensure that snags (standing, dead trees), fallen logs or standing green trees are present to provide nesting sites and other habitat for many birds, mammals and other animals.
- **Limit Clearcuts.** Clearcutting is when most or all the trees in an area are cut down. The OFPA limits the size and location of clearcuts.
- **Regulate Road Construction and Maintenance.** Strict regulations govern the location, construction, maintenance and repair of roads on both state and private forestland. Roads must avoid marshes, meadows, drainage channels, riparian areas and, when possible, steep terrain.

Oregon's Wood Products

Different types of trees lend themselves to different kinds of wood products. "Hardwood" broadleaf trees such as oak, cherry and walnut provide dense, durable wood – the kind commonly used to make flooring and furniture. "Softwood" cone- and needle-bearing trees such as pine, fir, spruce and cedar produce lumber that is less dense and lighter in weight. It is often used in construction and papermaking.

Beyond the "hardwood" and "softwood" distinction, the different characteristics of dozens of tree species, such as flexibility, straightness and tightness of grain, make for a wide range of applications.

Wood is a component in 5,000 different products, many of them not as easily recognizable as a baseball bat or table. While some products are made directly from hardwood or softwood lumber, many engineered wood products are made of combinations of sawdust, shavings and other waste materials. A wide range of products comes from wood pulp and plant chemicals extracted from wood pulp.

Oregon's wood and paper products are sold in all 50 states and some 40 foreign countries. They include lumber, door and window frames, fencing material, plywood, newsprint, printer and

[10] Source: "Forest Management Planning." Oregon State University, oregonstate.edu.

photocopy paper, egg cartons, food containers, glues, packing material, furniture, toys, playground equipment, pencil stock, cabinets, cosmetics and more.

Wood Use in a Global Context

U.S. wood consumption per person has increased 40% since 1960. Much of this demand has been met by imports from around the world. Across the globe, about 50% of all forests have been converted to other land uses (compared with 33 percent in the U.S. and 8% in Oregon). Timber harvests in countries without strong forest practice laws often destroy critical habitat such as tropical rainforests, and affect endangered species. Individual consumer choices help shape forests, ecosystems and communities, not only in Oregon, but across the United States and around the globe.

A Career in Forestry

A career in forestry or wood products offers an exciting chance to benefit Oregon's people, environment and economy. Forestry professionals are engaged in the practice of creating, managing, using and conserving forests and wood products in a sustainable manner to meet the needs, goals and values of forestland owners. They care for trees and other forest resources, including soils, water and wildlife, and make innovative products. Some people are drawn to forestry because they want to work outdoors. Many forest sector careers involve working in the forest, but there are other forest-related jobs that might surprise you: writing policy papers, managing timber investments, using satellite mapping technology, managing product quality and educating the public are just a few examples.

Types of job responsibilities among Oregon's forest sector professionals include:

- Growing trees for wood products
- Managing water quality
- Protecting endangered wildlife
- Ensuring healthy forests
- Planning recreational uses
- Researching tree genetics
- Planning and supervising timber harvests
- Developing mill technologies
- Creating new wood products
- Researching global markets
- Producing renewable biomass energy

NAME: _____

Oregon's Forest Resources – Questions[11]

1. How do forests help combat global climate change?

2. Over the last four centuries, what percentage of forestland has Oregon lost?

3. How do Oregon's forests contribute to the ecological, social and economic well-being of the state and beyond?

4. What factors are included when we talk about the sustainability of Oregon forests?

5. Describe the Oregon Forest Practices Act (OFPA).

6. What everyday products are made of wood or wood byproducts from Oregon trees?

7. How do consumer choices affect Oregon's forests?

8. Which forest-related job responsibility sounds the most interesting to you?

[11] Source: *Exploration of Oregon Forests: Module 1 – Oregon's Forest Heritage*. Developed by Julie Woodward based on the Oregon State University Forestry Extension's *Basic Forestry Short Course*.

5: Who Owns Oregon's Forests?

Overview

Students examine a map showing forest ownership in Oregon by ecoregion, and identify differences in ownership and forest management challenges.

Time Considerations

Preparation: 15 minutes

Procedure: One 50-minute class period

Learning Objectives

Students will be able to:

- Compare the different ecoregions of Oregon in terms of patterns in forestland ownership.
- Identify challenges faced by forestland owners in Oregon's different ecoregions.
- Recognize the forest management objectives for different types of forest landowners.

Standards Connections

Oregon Science Standards

- Disciplinary Core Idea – HS.LS4.D. Biodiversity and Humans. Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.
- Science and Engineering Practice – Using Mathematics and Computational Thinking. Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Oregon Mathematics Standards

- Mathematical Practice – MP.2. Reason abstractly and quantitatively.

Oregon Forest Literacy Plan Concepts

- 1.A.3. Many different forest types exist within a biome, typically named by their dominant tree species. Common forest types in Oregon include spruce-hemlock, Douglas-fir, ponderosa pine, mixed conifer, and juniper.
- 3.A.4. Oregon's forests are managed under private (e.g., family and industrial), public (e.g., state and federal) and tribal ownership. Each type of ownership may have different management objectives, and is subject to different protection laws and policies. Management objectives may even differ within classes of ownership.
- 3.A.5. Many forest landscapes are made up of a variety of ownerships, a mix of management objectives and a blend of forest ecosystems.

Materials

- Optional: *Forest Fact Sheet: Who Owns Oregon's Forests?*, available at learnforests.org
- "Oregon's Forest Landowners" student page
- "Who Owns the Forests?" student page
- Optional: "Who Owns the Forests"? interactive map, available at oregonforests.org
- *Oregon's Forests* posters, available to order from learnforests.org
- "Ecoregions" overviews, available from Oregon Department of Fish and Wildlife's Oregon Conservation Strategy website at oregonconservationstrategy.org
- Internet access
- Tracing graph paper

Background Information[12]

Oregon contains more than 30 million acres of forestland, and nearly half the state is forested. All that forestland is divided between tens of thousands of different landowners: federal, state and local governments; small businesses and large corporations; tribes, families and individuals.

By far the biggest single forest landowner is the federal government, which owns 60 percent of Oregon's forestland. Most of the federal forestland is managed by two agencies: the US Forest Service and the Bureau of Land Management.

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[12] Sources: *Forest Fact Sheet: Who Owns Oregon's Forests?* Oregon Forest Resources Institute, learnforests.org.

"Ecoregions." Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, oregonconservationstrategy.org.

Different landowners have different priorities when it comes to managing their forestland. Some grow timber to be harvested for wood products. Others focus on wildlife habitat. And many try to balance a mix of environmental and economic values.

In this lesson, students examine forestland ownership through the lens of Oregon's ecoregions – portions of the state with similar climate and vegetation. Oregon's diverse landscapes range from lush rainforests to deserts, contributing to diverse ecosystems that differ from one area to another. These differences, as well as the local history of human use, influence issues facing landowners. They also affect the way landowners perceive, value and manage their natural resources.

Key Vocabulary

ecoregion

federal government

private ownership*

state government

tribal government

**included in Glossary*

Preparation

Make copies of the student pages and of the Oregon Conservation Strategy "Ecoregions" overviews, or provide them electronically.

Procedure

1. Introduce the lesson by asking students who they think owns most of the forestland in Oregon: Is it owned by federal, state or local governments; by tribal governments; by private companies; or by families or individuals? (They may remember from Lesson 1 that approximately 60 percent of Oregon's forestland is owned by the federal government.) You may want to show them the *Forest Fact Sheet: Who Owns Oregon's Forests?* as a basis of the discussion. What impact might the ownership of a particular tract of forestland have on how that land is managed or used?

2. Display the Who Owns the Forests? interactive map or student page, and ask students whether they notice any patterns. Point out that the location of forests – and forest ownership patterns – vary in different areas (ecoregions) of the state.
3. Explain that students will be looking at different ecoregions of Oregon to learn more about patterns of forestland ownership in the various regions, as well as the particular challenges owners may face. Divide the class into eight groups, assigning each group one of the following ecoregions:
    a. Blue Mountains
    b. Coast Range
    c. Columbia Plateau
    d. East Cascades
    e. Klamath Mountains
    f. Northern Basin and Range
    g. West Cascades
    h. Willamette Valley
4. Give students copies of the "Oregon's Forest Landowners" student page and the "Who Owns the Forests?" student page, or access to the online interactive map. In addition, give them copies of (or online access to) the *Oregon's Forests* poster and the "Ecoregions" overview for their assigned ecoregion.
5. Allow time for groups to answer the questions on the student page, using the other materials as resources. Provide sheets of tracing graph paper, and suggest that students may use them to help estimate area on the map.
6. After groups have answered the questions on the student page, ask them to present their findings to the class. Discuss the differences and similarities among the various ecoregions. For example:
    a. Which ecoregion has the highest percentage of federally owned forestlands?
    b. Where are privately owned forests – forests owned by industrial companies or by families and individuals – more prevalent?
    c. What similar challenges do forest landowners face across the state? What are some regional differences?

Assessment

Use the student responses on the student page to assess their understanding and learning.

Extension Idea

Compare and contrast ecoregions in the United States. Download a map of ecoregions (such as from the U.S. Environmental Protection Agency's "Ecoregions of North America" web page at http://epa.gov). Have students research differences in the ecoregions and discuss why the differences exist. Create a visual key to compare their findings.

STUDENT PAGE
LESSON 5

NAME(S): _____

Oregon's Forest Landowners

Ecoregion researched: _____

1. Using the map on your ecoregion's overview, draw the boundaries of your ecoregion on the *Who Owns the Forests?* map.

2. Looking at the *Who Owns the Forests?* map, what patterns of forest ownership do you notice in this ecoregion?

3. Estimate the percentage of forestland owned by each of the following entities in this ecoregion. In addition to your answer, explain the method you used to estimate it.

    a. The federal government (including Bureau of Land Management, National Park and National Forest lands)

    b. Private industrial companies

    c. Families and individuals

    d. Tribal governments

    e. Oregon state government

4. Using the *Oregon's Forests* poster, identify which forest types are most prevalent in this ecoregion. Why do you think these types are most prevalent here?

5. Using your ecoregion's overview or other sources, identify possible challenges forest owners in this ecoregion face.

STUDENT PAGE
LESSON 5

NAME(S): _____

Who Owns the Forests?

Forestland ownership