

Lesson 3: How Forest Are Managed

NUTSHELL

In this classroom lesson, students use a familiar object to model multiple use and sustainability.

Watching a short video about forest management and answering questions help students explore forest management plans and their connection to sustainable forestry. Finally, through a quick game, students generate a list of factors that influence forest management.

ENDURING UNDERSTANDINGS

- Forests can be managed for single or multiple uses. These uses may require different management methods.
- There are environmental (e.g., forest composition, topography, endangered species), social (e.g., laws, knowledge, recreation, aesthetics), and economic (e.g., cost, return) factors that can influence management decisions.
- Management starts with planning. Wisconsin foresters prepare forest management plans based on landowner goals and objectives, capabilities of the forest site, and tools available (e.g., planting, harvesting, prescribed fire).
- Forests can be managed sustainably, while not limiting future options. Sustainable management of forests includes maintaining forest health, productivity, diversity, and integrity for both current human needs and the needs of future generations.

ESSENTIAL QUESTIONS

- What does it mean to say a forest is sustainable?
- How can we use forests for many different things at the same time?

OBJECTIVES

Upon completion of this lesson, students will be able to:

- Explain what multiple use management is.
- Define the term “sustainable forestry.”
- Identify environmental, social, and economic factors that influence management decisions.
- Outline what forest managers consider when preparing management plans and explain how these plans are tied to sustainable forestry.

SUBJECT AREAS

Language Arts, Science, Social Studies

LESSON/ACTIVITY TIME

Total Lesson Time: 85 minutes

- Introduction15 minutes
- Activity 120 minutes
- Activity 220 minutes
- Activity 325 minutes
- Conclusion5 minutes

STANDARDS CONNECTIONS

Standards for this lesson can be viewed online at the LEAF website (www.leafprogram.org).

FIELD ENHANCEMENT CONNECTIONS

This lesson ties closely with **Field Enhancement 2**, Forest Mapping.

BACKGROUND INFORMATION

Multiple Use Management

Forest management refers to practices which a landowner or forester does to meet specified goals and objectives. **Multiple use** management involves practices that promote a variety of benefits such as water quality, timber yield, wildlife habitat, recreation, and wilderness. Some uses are consumptive, which means the trees or tree products are taken out of the forest. Other uses (e.g., recreation) are nonconsumptive, leaving the forest basically unchanged as a result of the use.

Multiple use management may involve designating certain areas within a larger forest tract for specific uses. These areas may be managed for single purpose, such as a Christmas tree farm, pulpwood plantation, or a wildlife preserve.

Sustainable Forestry

In order to get continual benefits from forests now and in the future, forests must be managed sustainably. A definition developed by the Wisconsin Department of Natural Resources states that sustainable forestry is “the practice of managing forest ecosystems to provide ecological, economic, social, and cultural benefits for present and future generations.”

The forest industry promotes sustainable forestry through programs such as the Sustainable Forestry Initiative (SFI®). This program sets standards and measures for the perpetual growing and harvesting of trees, while ensuring the long-range protection of forest wildlife, soils, plants, water quality, and other conservation goals.

There are programs for private landowners such as the Managed Forest Law, which requires landowners to write and follow a management plan for their forests in order to receive tax advantages. These types of programs encourage forest owners to think sustainably when managing their property.

MATERIALS LIST

For Each Student

- Copy of Student Page  **1, How Forests Are Managed**



For Every 3 to 4 Students

- Common household object (paper clip, duct tape, rope, clothespin, carpet square, empty film canister, etc.)
- Newspaper: four or five sheets per group

For the class

- Marker board
- LEAF Video – *How Forests Are Managed*

For the Teacher

- Copy of Teacher Key  **1, How Forests Are Managed Key**
- Copy of Teacher Page  **2, Factors Affecting Forest Management**
- LEAF Video – How Forests Are Managed

VOCABULARY TERMS

Forest Management: The use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes.

Multiple Use: A type of forest management that promotes at least two types of forest use (e.g., for recreation and wildlife habitat).

Sustain: To nourish, keep up, or maintain.

Sustainable Management: Maintenance of forests to meet current and future ecological, economic, and social needs.

Factors That Influence Management Decisions

Many factors influence management decisions.

- Environmental factors include such things as forest composition (which species are present and which species one wants to promote), the topography (especially with regard to susceptibility to erosion), and whether or not the forest contains or is habitat for any endangered species.
- Social factors may relate to aesthetics (how people view a clearcut versus selective cutting), recreation (hiking, camping, fishing, hunting, use of motorized vehicles, etc.), and laws (zoning, protection of endangered species, etc.).
- Economic factors also play a role. The cost of a management method needs to be balanced by its return. Some people are willing to sacrifice some monetary profit for a return that benefits the environment or society; some are not.

Management Plans

Effective management starts with establishing a forest management plan. Individual landowners generally consult with a forester to help them create a plan. Foresters inventory existing resources and set goals and objectives that take into consideration what the landowner hopes to get from the forest now and in the future. Sound management involves deciding on strategies to achieve goals, implementing those strategies, and periodically reviewing both the plan and its results to determine if any changes need to be made. Management plans may include landowner objectives, a forest description, economic expectations, and legal restrictions. There are also recommendations of actions to help achieve objectives, considerations for Best Management Practices to protect water quality, and recommendations for protecting against fire, disease, and insects. Once a plan has been created, it is up to the landowner to implement it and follow through with sustainable forestry practices.

PROCEDURE

Introduction - Multiple Use Objects

1. Divide the class into groups of three or four. Give each group a different common object and challenge them to write down as many ideas as possible for its use in three minutes (e.g., piece of rope, paper clip, carpet square, duct tape, etc. Do not use newspaper; it will be the focus in Activity 1.). Encourage them to be as creative as possible, but to remember they are still at school! After time is up, have a few volunteers report their group's ideas. Tell students that they have just modeled the multiple use of a resource.
2. Have the class choose one object that will be the basis for further discussion, and list on the board the uses the group came up with for that object. Have other groups add additional ideas to the list. Now lead a discussion.
 - Could all the uses of that object occur at the same time? (No.) Why or why not? *(There's not enough of the object. One use makes the object less useful for another purpose; it may even destroy it. For example, if a piece of duct tape is used to fix a broken object, it cannot hang something on the wall.)*
 - Could some of the uses of the object occur at different times? (Yes.) Give examples. *(A piece of rope used to tie something together could later be used as a belt.)* Why are some uses more compatible with others? *(Uses that do not destroy the object leave it available for other purposes. When a use modifies or destroys an object, it is no longer useable for anything else.)*
 - Tell students that they are now going to relate this to forest use. Ask them what different ways people use forests. *(Recreation, products, aesthetics, wildlife habitat.)*

- Ask students if all these uses can occur at the same time. *(Probably not.)* Have them list some examples. *(Hunting and hiking wouldn't work in the same forest at the same time. They could be done at different times, though. Logging for timber in a camping area would not be ideal.)*
- Are there some uses that are compatible? *(Yes.)* Have them list some examples. *(Recreation areas can provide wildlife habitat. Areas of harvest could also provide wildlife habitat and recreation opportunities.)*
- Explain that just like the objects have multiple uses, so do forests. Some of those uses are more compatible than others.



Activity 1 - Sustainable Newspaper Management

1. Ask students what “sustain” means. If they don't know, direct them to a dictionary or use the word in a sentence or two to give them some context clues. *(They should eventually arrive at “to nourish, keep up, or maintain.”)* Use a familiar example such as a classroom pet. Talk about what needs to be done to sustain that animal. *(Provide it with food and water, adequate shelter, and reasonable attention.)* Now discuss what would happen if those things weren't done and what benefits the students and future classes might miss out on. Relate this to forestry. What things might be necessary to sustain a forest? *(Replant or allow for natural regeneration when trees are harvested, make sure it is large enough to support the mix of plants and animals that keep it and each other healthy, be aware of how uses impact it, and plan so that needs of the forest and uses of the forest are balanced.)* Finally, explain that sustainable forestry involves looking at the “big picture” and toward the future. Using a forest sustainably means it will be available for use in the future.
2. Next conduct a simple simulation.
 - Give each group two full sheets of newspaper.
 - Students have three minutes to use them in as many ways as they can.
 - They must record their uses and turn the list in (so there isn't a question that they added uses after observing another group's report) and must demonstrate the uses to the class at the end of the time (e.g., a folded hat, a pile of shredded paper with an explanation of its use, a part intact for reading, a piece folded as a fire starter).
 - Assign a “management score” to each group. Write the scores on the board. 1-3 uses = 10 points, 4-6 uses = 20 points, 7 or more uses = 30 points. Also assign a “sustainability” bonus, 5 points for each piece of paper that is at least $\frac{1}{4}$ the size of the original full sheet.
 - For round 2, groups again have three minutes to use the paper for as many uses as they can. This time, they may only use paper from the previous round that is at least $\frac{1}{4}$ the size of the starting full sheet. In addition, they get an extra full sheet for each piece of paper that is at least $\frac{1}{2}$ the size of the starting full sheet. (Don't tell this to groups ahead of time!)
 - Conduct round 2 in the same manner as round 1. After again assigning a “management score,” see which group(s) had the highest score.

3. Now lead a discussion connecting the activity to sustainability.

- Ask students how they would have “managed” the newspaper differently if they had known they would get more for the second round if they had larger pieces left after the first round. *(Have more uses that involved keeping pieces intact.)*
- *Would that have affected your “management score?” (Varies. Could be lower because having to maintain large pieces might make it more difficult to devise many uses quickly.)*
- Would having planning time before doing the activity have made a difference? *(Varies. In most cases it would. Students could think through the consequences of their actions beforehand.)*
- Would it help to have more paper? (Yes.)
- Ask students which part(s) of this activity relate to sustainability? *(When students had larger pieces of paper left, they got more for the second round. This was sustainable use.)*
- How does this connect to using forests sustainably? *(If a forest is managed as a large tract, some parts can have different uses. For example, some areas can be harvested, while other areas are not. As the harvested areas regrow and are used for other purposes, new areas can be cut. Just as if students would have had planning time, forest managers need planning time. The creation of management plans allows for consideration of which uses could be done now and still allow for other uses later.)*
- What would happen if there were more students doing this activity, but the same amount of paper? *(There wouldn’t be enough to go around. There might be more conflicts within and between groups. The paper would be used up more quickly.)* Point out that similar problems arise with human population growth or increased human demand for a particular resource. More people using the same forested area places more pressures on it.

Activity 2 - How Forests Are Managed Video

1. Ask students to give an example of something they have planned before — perhaps a party, vacation, or school event. What were some of the considerations they had to make when planning this event? (What was the purpose of the event? Who would be involved? When would it occur? Were there enough resources to make it happen [e.g., money, decorations]? Where would it occur?) What might have happened if they did not plan ahead of time? (No one would come to the event, there might not be enough food, people would arrive at the wrong time or place.) Explain that foresters also do planning when they manage a forest and create management plans. Explain to students that they are going to learn what is involved in creating a forest management plan by watching a short video and filling out a worksheet.
2. Hand out Student Page  **1, How Forests Are Managed**. Have students take notes to answer the questions while watching the video. An option is to divide the questions among the students. At the end of the video, students can share the information they were responsible for gathering so all class members can complete the entire sheet.
3. Show the LEAF Video – How Forests Are Managed (6 min. 38 sec.).
4. Go over the answers to the questions with the class. See Teacher Key  **1, How Forests Are Managed Key**.

Activity 3 - Factors Affecting Forest Management

1. Tell students that different forest owners will have different goals and objectives. For example, one owner may own land for hunting it and another may purchase land as an investment. Different “types” of forest owners will have different goals and objectives.
 - Brainstorm some of the other types of forest owners besides private individuals. (*State, national, county, tribal, industrial.*)
 - On the board, have students generate a list of as many different goals and objectives for all types of landowners as they can. (*Public recreation areas, wilderness areas, harvesting, aesthetics, making a profit, research, wildlife habitat, education, ecological benefits, etc.*)
 - Explain that even though the goals and objectives may differ, there are many factors influencing management that are the same for all owners. Give some examples of factors. There are ecological factors such as the topography or presence of endangered species in an area, social factors such as laws/regulations and aesthetic concerns, and economic factors such as the cost of management.
2. Tell students they will now be playing a game to see how many other factors they can come up with.
 - Have the students get into groups of three or four.
 - Each group should list on paper as many factors as they can think of that affect forest management. The group that comes up with the most factors will win. Any that are unusual/questionable will need to be explained to the rest of the class.
 - Give the groups a set amount of time, such as four minutes.
 - Go around the room and have each group read their list. Any groups with the same factors listed should cross them off (including the group reading). At the end, the group with the most factors left wins.
 - Using Teacher Page **2, Factors Affecting Forest Management**, suggest ideas that the class may not have thought of.

EXTENSION: Cut the factors listed on Teacher Page **2, Factors Affecting Forest Management**, into strips. Have students draw a factor from a hat. Give each student an opportunity to share how his or her factor affects forest management with the rest of the class.

Conclusion - Management and Me

Explain to students that all the factors they thought of must be taken into consideration when a forest management plan is created. Along with that are the goals and objectives of the landowner. Discuss how these things make sustainable management challenging but very important. Ask students how they think forest management decisions affect them even if they are not landowners. (*We all have a stake in our state and national forest land. We may recreate on these lands, get products made from wood harvested from these lands, enjoy the aesthetics of the forests and/or wildlife that lives there. All forests also provide ecologic benefits, such as oxygen production, carbon sequestration, erosion prevention, and cooling effects, that we all benefit from. Management decisions made about public land or even private land affect everyone.*)

CAREERS

The career profile in this lesson features Steve Grant, Forester, Wisconsin Department of Natural Resources, and is found on page 65. A careers lesson that uses this information begins on page 170.

SUMMATIVE ASSESSMENT

1. Study an actual forest management plan and outline considerations/actions included for multiple use and sustainability.
2. Compare multiple use management and sustainable management. How are they similar? *(Both involve considering a number of factors; both can be complicated; both can result in greater benefits if done well.)* How are they different? *(Multiple use is concerned with the variety of ways the resource is used. Sustainable management is concerned with maintaining the resource so it can provide benefits now and in the future.)*
3. Think of a wooded area you know. What are all the ways it is used? *(Examples might include a schoolyard or their own backyard. These places provide shade, a place to play, a home for some animals, food [like nuts and fruit], etc.)* What things do you think should be done to manage and sustain that area? *(Some possibilities are plant additional vegetation, set part of the yard aside for wildlife and the rest for recreation, and don't litter.)*

SOURCES

Sustainable Forestry: Commitment to the Future. [Newspaper]. (September 1995). Madison, WI: Wisconsin Department of Natural Resources - Bureau of Forestry. Publication FR 105-95.

Young, R. A., & Giese, R. L. (1990). *Introduction to Forest Science*. New York: John Wiley & Sons.

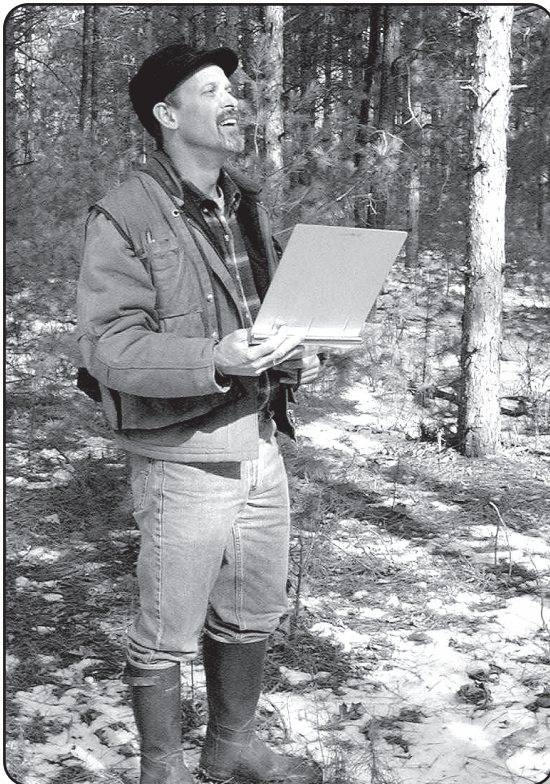
NOTES

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Career Profile

Steve Grant, Forester

Meet Steve Grant. He is a forester for the Wisconsin Department of Natural Resources in Wood County. Steve works with private landowners to help them manage their forests. He spends time helping landowners create wildlife habitat, choose trees for harvest, replant trees, get grant money to make improvements, solve insect and disease problems, and



Steve helps landowners take care of their forests.

enroll in programs to save them money on property taxes. Steve also spends some of his time helping to manage public property in the Wood County Forest. Steve shares his forestry knowledge with students by helping schools with education programs and providing assistance with school forest properties.

Steve's education includes a Bachelor's degree in forestry from University of Wisconsin-Stevens Point. He attends some sort of technical forestry training every year to learn about new research that is emerging. Steve is also a member of the Society of American Foresters.

Steve says there are a lot of things that make his job great. He likes being able to work with and help a variety of people. Being able to get into the woods and to set his own schedule without being tied to a desk are other things Steve enjoys about his job.

To work as a forester, as with any other career, you need to set yourself apart and work hard. Steve says, "Communication skills are extremely important, as forestry is as much a people-oriented career as it is anything else." Steve feels that getting some field forestry experience before you graduate from college is necessary to compete for permanent jobs.

HOW FORESTS ARE MANAGED KEY 🍏🔑

1. What are the family's goals and objectives for their new property?

Hiking, birdwatching, cutting firewood, recreation trails, hunting.

2. What is sustainable forestry?

Managing forest ecosystems to provide many benefits (ecological, economic, social) for present and future generations.

3. What is a forest management plan?

A plan created by a professional forester that explains what should be done on a forest property to meet goals.

4. What is included in a forest management plan?

- Inventory of the site
- Landowner goals and objectives
- Actions needed to meet goals and objectives
- Timeframe
- Map (optional)

5. What are some management actions/options that can be used to meet goals?

- Prescribed burns
- Harvesting
- Planting
- Building trails
- Creating wildlife habitat

6. What is multiple use management?

Managing a forest for many uses at the same time (e.g., hiking, birdwatching, hunting, harvesting, wildlife habitat, firewood, etc.).

7. How do management plans help with sustainable forestry?

Management plans help ensure forest health is maintained while having multiple uses.

FACTORS AFFECTING FOREST MANAGEMENT

NOTE: STUDENTS MAY COME UP WITH ADDITIONAL IDEAS. THESE ARE SOME EXAMPLES.

Ecologic

- Topography
- Soil type
- Soil conditions – wet, dry, etc.
- Rivers or streams
- Wetlands or marshes
- Endangered/threatened species
- Wildlife present/not present
- Tree species present
- Climate of area
- Age of trees present
- Disturbances – fire, insects, flooding, etc.
- Unique site features or species
- Regeneration needs – fire, planting, etc.

Social

- Adjoining property owners
- Age of person making decisions
- Laws/regulations
- Recreation considerations/conflicts
- Knowledge level of person making decisions
- Aesthetics
- Single/multiple owners
- Family considerations – size, inheritance, etc.
- Influence of local organizations
- Availability of a logger
- Availability of a forester
- Social perceptions of management technique

Economic

- Cost of management
- Value of land
- Current value of trees present
- Changes in wood market
- Long-term investment value
- Tax break incentive programs
- Value of land uses – recreation, etc.
- Economic needs of landowner

HOW FORESTS ARE MANAGED

1. What are the family's goals and objectives for their new property?

2. What is sustainable forestry?

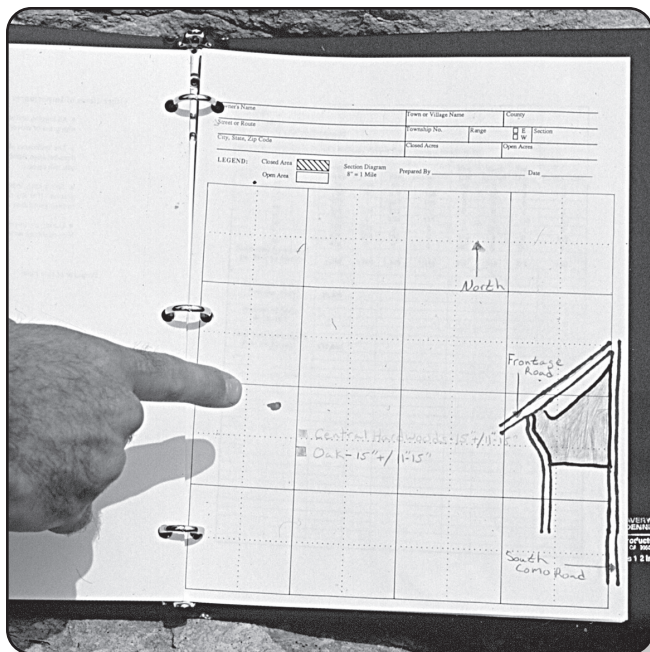
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5. What are some management actions/options that can be used to meet goals?

6. What is multiple use management?

7. How do management plans help with sustainable forestry?



A forest management plan example.



A forester taking a tree measurement.

***“It is our responsibility as woodland owners to manage healthy forests,
as this is the best way to sustain the health, diversity,
and productivity of the land.”***

Jim and Marlene Zdanovec, Wisconsin’s 2002 Outstanding Tree Farmers of the Year



A forester meets with a landowner to discuss a forest management plan.