LESSON 6
What Is Management?

BIG IDEAS
- Early logging, the resultant cutover, attempts to change land use, and the reforestation of pre-existing forest lands were activities that contributed to the need for forestry. (Subconcept 21)
- Forest management is the use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes. (Subconcept 34)
- Management can lead to changes in composition, structure, and growth of forests. (Subconcept 35)
- Forests can be managed for ecological (e.g., water resources, wilderness, wildlife), economic (e.g., forest products, recreation), and social (e.g., aesthetic appreciation, recreation) outcomes. Many of these outcomes are interrelated and can be managed for simultaneously. (Subconcept 36)
- As global demand for forest resources increases, more pressure is placed on existing forests. Forest management and advances in research and technological systems can help to ensure forest resources remain sustainable. (Subconcept 37)

OBJECTIVES
Upon completion of this lesson, students will be able to:
- Discuss the impact that early logging in Wisconsin had on the need for forest management.
- Identify ways that people promote, conserve, or alter forests to meet their wishes.
- Examine the ways that management can lead to changes in the forest.
- Explain that the management and use of forest resources will need to become more efficient to support the needs of the world's growing population.
- Indicate that forests can be managed for multiple uses such as ecological, economic, and social uses.

SUBJECT AREAS
Language Arts, Science, Social Studies

LESSON/ACTIVITY TIME
- Total Lesson Time: 110 minutes
- Time Breakdown:

Introduction.....15 minutes	Activity 2 .....45 minutes
Activity 1.....25 minutes	Conclusion.....25 minutes

TEACHING SITE
Classroom

NUTSHELL
In this lesson, students explore events in Wisconsin's history that led to modern forestry. They learn about forest management techniques and read a "choose your own adventure" type story about management to learn what can happen if various management decisions are made.

BACKGROUND INFORMATION
As the first wave of settlers arrived in Wisconsin in the early 1800s, forests covered between 63 and 86 percent of the state. When the population of Wisconsin increased, so did the demand for resources. By the end of the Civil War, logging became an important part of Wisconsin's economy. By 1893, Wisconsin had become the world leader in lumber production.

The growth of the logging industry did not come without costs. The volume of trees in the state dropped drastically as acre after acre was cut down. Fires that burned through the slash (tops of harvested trees) left behind destroyed property and took lives.

In reaction to what was happening to the forests of Wisconsin, E. M. Griffith was hired as the first Wisconsin State Forester in 1904. He worked to establish state-owned forest preserves, construct the first state tree nursery, and implement fire-control strategies. During the early 1900s, actions like these were taken by many agencies and organizations. Federal, state, county, municipal, and private forests grew from what was cutover land. These were the first steps toward what we know as modern forestry.

Today, Wisconsin's forests are thriving again. We've learned from many of the mistakes made during the logging era. Our forests are still logged, but good harvesting and management practices are keys to making that harvest sustainable.

WHAT IS FOREST MANAGEMENT?

Forest management is defined as the use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes. Even before those techniques are implemented, there must be a management plan. Management plans take into account the existing features of the forest like soil conditions, slope, species present, and locations of streams and other water sources. A very important part of the management plan is the landowner goals. Those goals often determine whether one type of management technique will be used or not.

MATERIALS LIST

FOR EVERY 2 TO 3 STUDENTS

- One *Choose the Management Story* booklet made from Student Pages **5A-U**, *Choose the Management Story*
- Copy of Student Page **4**, *Choose the Management Results*
- Copy of Student Page **3**, *Forest Management Vocabulary*
- Copy of Student Page **1**, *Wisconsin Forest History*
- Scissors

FOR THE CLASS

- Copy of Student Page **2**, *Management Techniques Definitions*
- Overhead projector

FOR THE TEACHER

- Copy of Teacher Key **1**, *Wisconsin Forest History Key*
- Overhead transparency of Teacher Page **1**, *Management Techniques*
- Copy of Teacher Key **2**, *Management Techniques Key*
- Box of toothpicks or paperclips
- Yarn or string for *Management Story* booklets
- Scissors

TEACHER PREPARATION

- Make an overhead transparency of Teacher Page **1**, *Management Techniques*.
- Cut apart Student Page **2**, *Management Techniques Definitions*.
- Assemble Student Page **5A-U**, *Choose the Management Story*. There are four stories labeled with ●, ■, ▲, and ✦. Make one story for each group of two to three students. Use all four stories at least once.
- Read through each of the management story booklets to familiarize yourself with the possible outcomes.

VOCABULARY

Clearcut: A management technique in which all the trees in an area are cut at the same time.

Coniferous: A tree that bears cones and has needles.

Deciduous: A tree that sheds all of its leaves annually.

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).

Natural Regeneration: Allowing trees to grow on a site from seeds, sprouts, or suckering.

Prescribed Burn: A fire planned and executed to achieve management goals.

Pulp: Fibrous material prepared from wood that is used to make paper.

Reforestation: Planting or use of natural regeneration to grow forests on land that had forests removed.

Seed-tree: A management technique in which most of the trees in an area are harvested, but a few trees are left to provide a seed source.

Selection Cut: A management technique in which specific trees in an area are chosen and cut.

Shade-intolerant: Describes a plant's ability to compete for survival under direct sunlight conditions.

Shade-tolerant: Describes a plant's ability to compete for survival under shaded conditions.

Shelterwood Cut: A management technique in which some trees are left during harvest to encourage trees that need partial shade to regenerate.

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

Thinning: A management technique in which some trees are removed to make room for other trees to grow.

MANAGEMENT TECHNIQUES

There are a number of techniques that management plans can suggest to achieve the goals of the landowner. Each has its own benefits and potential drawbacks. Those benefits and drawbacks depend on the type of forest being managed and the owner goals. For instance, if an owner wanted to maintain a white pine forest, they would not want to clearcut it. However, if the owner wanted to maintain an aspen forest, a clearcut would be an excellent choice. If a landowner wanted to preserve habitat for wildlife, they would need to consider what species of wildlife are most desirable to them because not all species benefit from the same conditions.

The following are some of the techniques forest managers might suggest to a landowner. A few benefits and drawbacks are listed as well. The list is limited, because forest management is a complex field. Forest managers typically have academic and experiential training to learn the many things required for the decisions they are asked to make.

- **Natural Regeneration:** Allowing trees to grow on a site from seeds, sprouts, or suckering. It is an inexpensive way to reforest property. However, it can take longer to reforest, and there is less control over the type of trees that grow back than if trees are planted.

- **Planting:** Using tree seedlings on a property to reforest it. Planting allows direct control over the trees that will grow on the site and it reforests the site quickly. It is more expensive than natural regeneration.
- **Clearcut:** A management technique in which all the trees in an area are cut at the same time. It allows trees that require lots of sun and little competition to grow, such as aspen or jack pine. Clearcutting is the most economically beneficial harvest method. However, because of its appearance, public sentiment is often against its use.
- **Selection Cut:** A management technique in which specific trees in an area are chosen and cut. This technique is usually the least noticeable from an aesthetic point of view because only some of the trees in a forest are removed. There is potential, however, that only the best trees may be removed in the selection cut, leaving the low-quality trees to reproduce. This method can only be used to promote shade-loving trees.
- **Prescribed Burn:** A fire planned and executed to achieve management goals. It is an effective way to control undesired plants and is inexpensive. Some species thrive in the presence of fire. Fire cannot be used in all situations. If homes are nearby or if the desirable species present doesn't tolerate fire, it cannot be used.
- **Shelterwood Cut:** A management technique in which some trees are left during harvest to promote species that need partial shade to regenerate. This technique protects trees that need shade, but can't be used to promote trees that need a lot of sunlight.
- **Seed-tree:** A management technique in which most of the trees in an area are harvested, but a few trees are left to provide a seed source. It is used for trees such as oaks and birch that need sunlight, but also need a nearby source for seed.
- **Thinning:** A management technique in which some trees are removed to make room for other trees to grow. It removes competition by taking out some trees. Sometimes it can produce income, but not when the trees being thinned are too small to be of economic value.

Just as the demands on the forests of Wisconsin increased with growth of the population in the 1800s, future demand will continue to increase as the world population continues to grow. Forests are renewable. With improvements in forest management techniques and in the efficiency of resource use, we can continue to meet the needs of Wisconsin and the world.

PROCEDURE

INTRODUCTION

1. Tell students that much of the forested land in Wisconsin today looks as it does because it has been managed. Define forest management. *(The use of techniques [e.g., planting, harvesting] to promote, conserve, or alter forests to meet desired outcomes.)* Tell them that forests weren't always managed. They are going to look at some things that have happened in Wisconsin history that led to forest management.

2. Divide students into groups of two or three. Hand out Student Page **1**, *Wisconsin Forest History*. Tell students to read the descriptions of events that happened in Wisconsin history, cut them apart, and put them under the time period headings they think they occurred.

3. After groups have had time to complete the list, gather the class together and discuss the answers. (See Teacher Key **1**, *Wisconsin Forest History Key*.) Make sure to explain that the point of view in the early years was that resources were endless. During the second phase, people started to realize that what was happening would be harmful. By the last phase it was accepted that if forests were going to come back, people needed to take responsibility to manage them, and steps were taken to do it.

ACTIVITY 1

1. Review the definition of forest management. *(Management is the use of techniques [e.g., planting, harvesting] to promote, conserve, or alter forests to meet desired outcomes.)* Determining landowner goals and planning are very important parts of management. Explain what management techniques are. *(Things that foresters do to meet the goals of landowners, like planting, different types of cutting, and prescribed burning.)*

2. Display Teacher Page **1**, *Management Techniques* overhead transparency. Hand out each of the definitions from Student Page **2**, *Management Techniques Definitions*, to a different student. Ask the students with definitions to read the definition aloud. As a class, decide which of the pictures on the transparency depicts the definition and write that word on the line below the picture. (See Teacher Key **2**, *Management Techniques Key.*)

3. Discuss that each of the techniques is used to meet a specific goal.

   - Clearcutting might be used if a landowner wants to create habitat for deer or grouse.
   - Thinning is used to reduce competition.
   - Select cutting might be used if a landowner wants to use the forest for timber production and hiking trails.
   - A prescribed burn might be used if the trees that the landowner wants to grow rely on fire to reproduce.
   - If the landowner wants the forest to grow back fast after it is cut, they may plant trees. If they are more concerned with keeping costs down, they may use natural regeneration.
   - Seed-tree cuts might be done if the owner wants to grow oaks or birches, which need to have trees that produce seeds nearby so new trees can grow.
   - Shelterwood cuts might be used if the trees the landowner wants to grow need some shade in order to grow.

ACTIVITY 2

1. Divide the class into groups of two or three. Hand out Student Page **3**, *Forest Management Vocabulary*, the *Choose the Management Story* booklets, and Student Page **4**, *Choose the Management Results*, to each group.

2. Ask the students if they have ever read a "Choose Your Own Adventure" book. Tell them that they will read a story that is set up in a similar way. They will choose the type of forest management that will be used in a particular situation. They will make decisions and find out if their choices met the goals of the landowners in the story. Show them Student Page **4**, *Choose the Management Results*. Explain that they should fill in the blanks as they read the story and make decisions.

3. After they have read the story once, ask them to read it again two or more times as time allows. Each time they read it, they should make different decisions and fill in the blanks on the student page. Remind students to refer to their vocabulary page if they need further explanation on a term.

4. When all groups have read their story, ask a member from each group to write their results (from the worksheet) on the board. Compare the results. Ask if the forests always end as the same type of forest they started as. *(No.)* Ask how different management techniques affect different forests. *(Clearcut in the aspen forest kept the forest the same, but in the mixed forest it changed the trees that grew there.)* Ask if the owners were always happy when the results of the management were the same.

(No. If the result didn't help them do what they wanted, they were unhappy.) Ask students if they think there is any one technique that is right for all situations. *(No.)*

5. Use the results written on the board to discuss that some owners wanted more than one thing from their property. Sometimes the management allowed more than one goal to be met at one time. *(A forest that was good for deer might also be good for grouse. A forest good for someone to hunt in might also be a good place to watch birds. A forest used to harvest trees to sell could be used to ride an ATV.)* When a forest is managed for more than one thing it is called multiple use. Ask students to help make a list on the board of activities that can be done at the same time in a forest.

CONCLUSION

1. Place approximately 100 toothpicks (or paper clips) on one end of a table in a "growing forest" pile. Explain that these toothpicks represent the trees used to make forest products that people use. Explain that they are going to play a game that looks at how forest management and population impact forests.

2. Chose ten students to come forward. Explain that these ten students represent a population in Wisconsin smaller than it is today. Ask them to each take one toothpick and place it on the other end of the table in the "cut forest" pile. Explain that this population is not doing any management to the forests of Wisconsin, but trees do regrow on their own. Take five of the toothpicks from the cut forest pile and put them back in the growing forest pile to represent trees regrowing. Repeat this two times.

3. Next double the population. Explain that there are now 20 students who each will use one toothpick in each round. These students represent a population about the size of our population today. However, since we are not managing the forests in this round, still return only five toothpicks to the growing forest pile from the cut forest pile. This represents what would happen if population increased, but management of the forests and the efficiency of the use of forest resources did not improve. Repeat two times.

4. Add the rest of the class to the population to represent the population of the future. (If you do not have more than 20 students in your class, have several take two toothpicks to represent additional people.) Continue to play rounds until the toothpicks run out. Explain that this is what would happen if we did not improve our management and use of forests and continued to use the same amount per person.

5. Start over with all the toothpicks in the growing forest pile and 10 students. Tell the class that the population is back at the lower level, but this time we are going to manage using today's level of knowledge. Have each student remove one toothpick from the growing forest pile and put it in the cut forest pile. This time you will put 20 toothpicks back on the first table (all that were removed and 10 additional toothpicks). Repeat two times.

6. Double the population and have each of the 20 students remove one toothpick and place it on the other table. Since you are managing at today's level, 20 toothpicks should also go back to the first table. Repeat two times.

7. Add the rest of the class and continue with each student taking one and 20 being replaced. (If you do not have more than 20 students in your class, have several take two toothpicks to represent additional people.) Discuss what will happen at the higher population even when we are managing at today's levels. *(Resources will run out as soon as the population gets bigger than what we can replace in one round.)*

8. Ask what will need to happen if you were to play another round in order not to run out of toothpicks. *(More toothpicks would have to be put back after each round, or fewer would have to be taken.)* Discuss that the forest management we do today is actually allowing us to increase the amount of forestland in Wisconsin. There is more forestland today than there was 30 years ago. Even though we are doing a good job now, the population of the world is rapidly increasing. We will need to improve the management of forests and the efficiency of the way we make products out of forest resources.

CAREERS

The career profile in this lesson is about Tom Girolamo, Landscaper, Eco-Building & Forestry. Career Profile 4F.L is found on page 95. Use this profile to enhance the lesson and/or use it with the special careers lesson on page 148.

SUMMATIVE ASSESSMENT

Have students do an internet search about forest management in the Chequamegon-Nicolet National Forest, in county forests, in state forests, and in private forests. Some websites are listed in the Recommended Resources section. Ask them to answer the question, "How do managers for these forests hope to meet future demands?"

REFERENCES

Finan, A. S. (ed). (2000). Wisconsin's Forests at the Millennium: An Assessment. Madison, WI: Wisconsin Department of Natural Resources. PUB-FR-161

Helms, J. A. (1998). The Dictionary of Forestry. The Society of American Foresters.

Paper Makes Wisconsin Great! Neenah, WI: Wisconsin Paper Council.

RECOMMENDED RESOURCES

●●● WEBSITES ●●●

Six Billion and Beyond
www.pbs.org/sixbillion/
This website from the Public Broadcasting System has information on population from around the world. It allows you to read about population in several countries and includes information specifically about the environment. A world population counter is included.

U.S. Census Bureau Reports
www.census.gov/ipc/www/clock.html
This website has a running counter of the world population and the population of the United States.

The Chequamegon-Nicolet National Forest
www.fs.fed.us/r9/cnnf/
Find information about management plans in the Chequamegon-Nicolet National Forest.

Wisconsin Department of Natural Resources - Division of Forestry
www.dnr.state.wi.us/org/land/forestry/index.htm
Find information about statewide planning for forests.

Tom grows many types of plants to use in landscaping projects.

TOM, LANDSCAPER

Meet Tom Girolamo. Tom is the owner of Eco-Building & Forestry in Mosinee. Tom's customers call him when they want someone to design and put in landscaping on their property that is environmentally friendly and will last a long time. That property could be someone's yard or hundreds of acres! As the owner, Tom does things to manage the company and works as a forester. He makes the decisions that keep the company running, including managing the budget and the equipment. Tom's different duties mean that sometimes he has to dress in a suit and tie, and sometimes he wears work clothes and gets dirty.

Tom has a bachelor's degree in forestry – he studied urban forestry and forest management specifically. He has worked as a city arborist and for the Wisconsin Department of Natural Resources.

Tom says his favorite part of his job is, "Creating beautiful, permanent landscapes that are enjoyed."

If you are interested in a job like Tom's, he says you have to have a basic understanding of biology and science. He also says that there are many opportunities in sustainable landscaping for people who are interested in things other than growing plants. People with interest in art can design landscapes; people with management degrees can run the business end of a company; and there are even things for people interested in law to do.

WISCONSIN FOREST HISTORY

Cut on dotted lines and arrange events under the appropriate time period.

TIME PERIODS

1830 - 1870: THE BEGINNINGS – LOGGING GETS STARTED

1870 - 1900: WISCONSIN LEADS IN LUMBER – TREES ARE IMPORTANT FOR BUSINESS AND JOBS

1900 - 1950: THE RESULTS – WHAT WE LEARNED

EVENTS

First fleet of lumber rafts began to float down the Wisconsin River from Biron.

Cutover forestland sold for farmland. Soils and climate wrong for farming, many farms fail.

Smokey Bear introduced.

First laws passed permitting school districts and municipalities to own land for forestry programs.

Burning forests lead to Peshtigo fire.

Civilian Conservation Corps started during the Depression to give people jobs. Major accomplishments include reforestation and fire control.

First State Forester, Edward M. Griffith, appointed.

Wisconsin becomes a state.

Towns spring up around lumber businesses.

Lumberjack camps found all over northern Wisconsin.

WISCONSIN FOREST HISTORY KEY

1830 - 1870: THE BEGINNINGS – LOGGING GETS STARTED

- First fleet of lumber rafts began to float down the Wisconsin River from Biron. (1840)
- Wisconsin becomes a state. (1848)

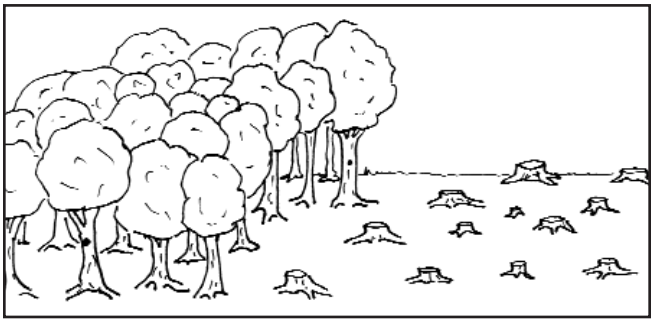
1870 - 1900: WISCONSIN LEADS IN LUMBER – TREES ARE IMPORTANT FOR BUSINESS AND JOBS

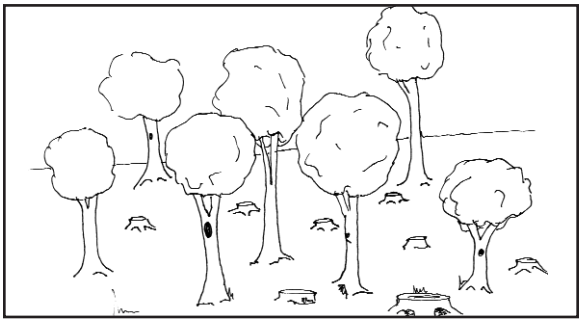
- Lumberjack camps found all over northern Wisconsin.
- Peshtigo fire. (1871)
- Towns spring up around lumber businesses.

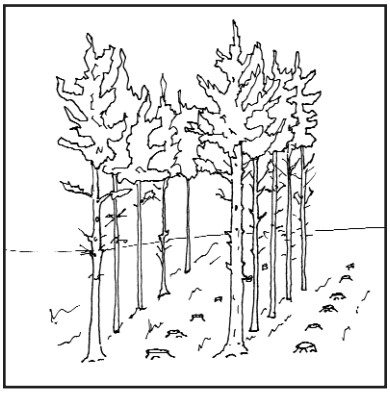
1900 - 1950: THE RESULTS – WHAT WE LEARNED

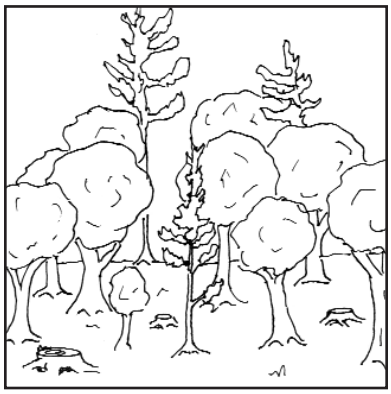
- Cutover forestland sold for farmland. Soils and climate wrong for farming, many farms fail.
- First State Forester, Edward M. Griffith, appointed. (1904)
- First laws passed permitting school districts to own land for forestry programs. (1927)
- Civilian Conservation Corps started during the Depression to give people jobs. Major accomplishments include reforestation and fire control. (1930s)
- Smokey Bear introduced. (1944)

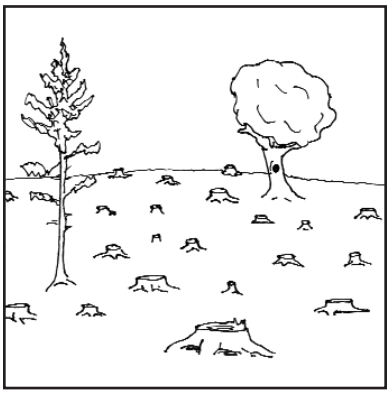
MANAGEMENT TECHNIQUES











MANAGEMENT TECHNIQUES DEFINITIONS

CLEARCUT: A management technique in which all the trees in an area are cut at the same time.

NATURAL REGENERATION: Allowing trees to grow on a site from seeds, sprouts, or suckering.

PLANTING: Putting young trees (seedlings) in the ground to grow. Planting can be done by hand or with machines.

PRESCRIBED BURN: A fire planned and executed to achieve management goals.

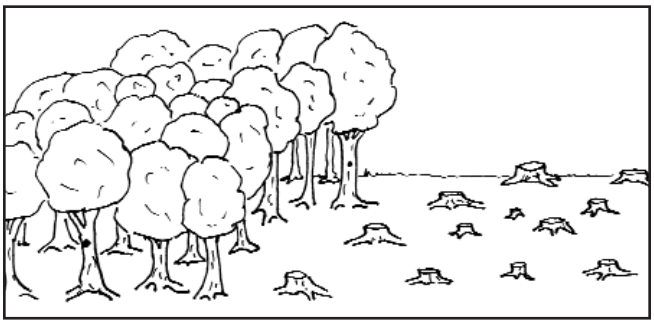
SEED-TREE: A management technique in which most of the trees in an area are harvested, but a few trees are left to provide a seed source.

SELECTION CUT: A management technique in which specific trees in an area are chosen and cut.

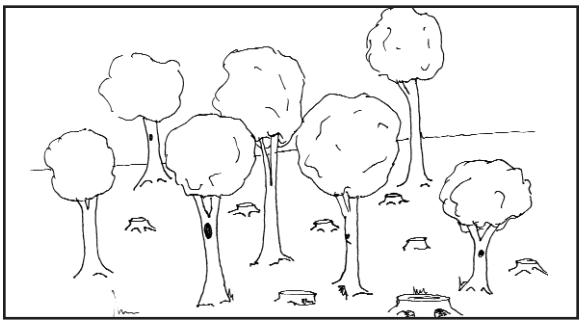
SHELTERWOOD CUT: A management technique in which some trees are left during harvest to encourage trees that need partial shade to regenerate.

THINNING: A management technique in which some trees are removed to make room for other trees to grow. If trees are planted in rows, sometimes every other row is removed.

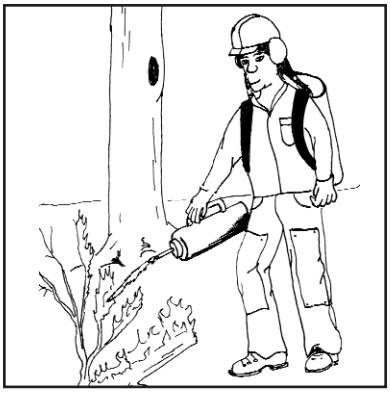
MANAGEMENT TECHNIQUES KEY



CLEARCUT: Clearcutting might be used if a landowner wants to create habitat for deer or grouse.

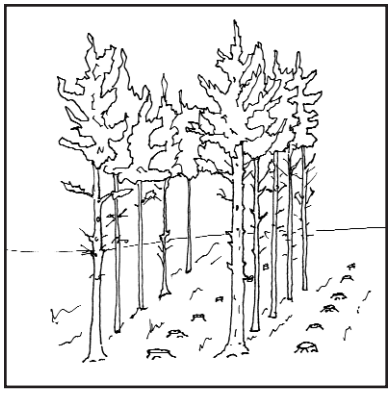


SHELTERWOOD CUT: Shelterwood cuts might be used if the trees the landowner wants to grow need some shade in order to grow.



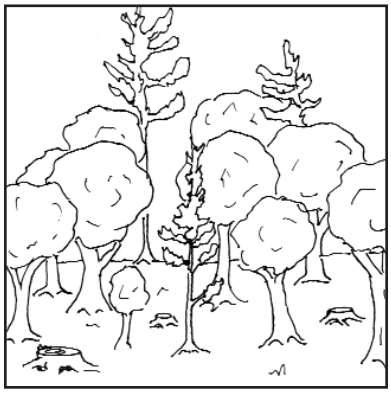
PRESCRIBED BURN: A prescribed burn might be used if the trees that the landowner wants to grow rely on fire to reproduce.

PLANTING: If the landowner wants the forest to grow back fast after it is cut, they may plant trees.

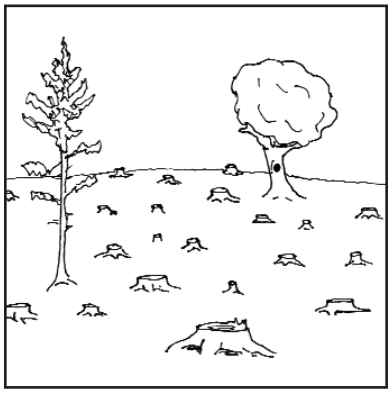


THINNING: Thinning is used to reduce competition.

NATURAL REGENERATION: If a landowner is concerned with keeping costs down, they may use natural regeneration.



SELECTION CUT: Select cutting might be used if a landowner wants to use the forest for timber production and hiking trails.



SEED-TREE: Seed-tree cuts might be done if the owner wants to grow oaks or birches which need to have trees that produce seeds nearby so new trees can grow.

FOREST MANAGEMENT VOCABULARY

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CONIFEROUS: A tree that bears cones and has needles.

DECIDUOUS: A tree that sheds all of its leaves annually.

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).

NATURAL REGENERATION: Allowing trees to grow on a site from seeds, sprouts, or suckering.

PRESCRIBED BURN: A fire planned and executed to achieve management goals.

PULP: Fibrous material prepared from wood that is used to make paper.

REFORESTATION: Planting or use of natural regeneration to grow forests on land that had forests removed.

SEED-TREE: A management technique in which most of the trees in an area are harvested, but a few trees are left to provide a seed source.

SELECTION CUT: A management technique in which specific trees in an area are chosen and cut.

SHADE-INTOLERANT: Describes a plant's ability to compete for survival under direct sunlight conditions.

SHADE-TOLERANT: Describes a plant's ability to compete for survival under shaded conditions.

SHELTERWOOD CUT: A management technique in which some trees are left during harvest to encourage trees that need partial shade to regenerate.

THINNING: A management technique in which some trees are removed to make room for other trees to grow.

4

CHOOSE THE MANAGEMENT RESULTS

Landowner

↓

Type of Forest

↓

Goals

↓

Management Choice 1

↓

Management Choice 2

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Goals Met?

Landowner

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Type of Forest

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Goals

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Management Choice 1

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Management Choice 2

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Goals Met?

Landowner

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Type of Forest

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Goals

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Management Choice 1

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Management Choice 2

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Goals Met?

Landowner

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Type of Forest

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Goals

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Management Choice 1

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Management Choice 2

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Goals Met?

CHOOSE THE MANAGEMENT STORY 1

There are four management stories. Each set of cards is designated by a different symbol in the lower left corner. Cut the cards along the dotted lines. Assemble the four sets of cards in order by number. Punch holes in the left side of the pages and use string or brass fasteners to put them together.

You are a forest manager. You are going to work with landowners to decide what management techniques should be used on their property to meet their goals. Choose a landowner to work with.

1. **Deer hunter** (Go to page 2)
2. **Retired couple** (Go to page 9)
3. **Hiker/snowshoer** (Go to page 16)

1

You are in a forest of aspen trees. The trees around you are 60 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner hunts deer and grouse every year and would like you to make management decisions that will create good deer and grouse habitat. You have thought of two. Choose one.

1. You decide to cut all the trees down in a **clearcut**. You'll sell the trees for pulp and encourage more sun-loving aspen to grow. (Go to page 3)
2. You decide not to cut any trees. You just want to **leave it alone**. (Go to page 4)

2

The cutting is done and you've sold the trees for a nice profit. You need to decide what to do to get new trees to grow.

1. Let **natural regeneration** take over. (Go to page 5)
2. **Plant** red pine seedlings in rows so they can be harvested later. (Go to page 6)

3

Since aspen in Wisconsin don't stay healthy much longer than 60 years, these trees are slowly dying. Since the trees are dying of old age and are often hollow, you can't sell the wood. The dying trees allow more shade-tolerant trees to come in. You decide to...

1. **Leave it alone**. Let nature take its course. (Go to page 7)
2. Remove all the rest of the old aspen in a **selection cut** and sell them. (Go to page 8)

4

CHOOSE THE MANAGEMENT STORY 1

6

The landowner is not happy with your decisions. Since there aren't many plants growing under the pine, there aren't places for deer or grouse to get food or shelter.

8

The landowner doesn't mind the money you made selling the rest of the aspen, and the habitat for deer is okay. The landowner isn't happy about what's left for the grouse though, and won't have much luck hunting for them.

5

Congratulations! The landowner is very happy with your decisions. Aspen is a favored food of both deer and grouse.

7

The landowner thinks your decisions are acceptable for deer hunting because maples are growing, but the grouse won't do well here. The landowner wants to know why you didn't decide to manage for aspen.

CHOOSE THE MANAGEMENT STORY 1

You are in a forest of aspen trees. The trees around you are 60 years old. You have been asked by the landowners to make management decisions about what to do to the forest. The landowners are a retired couple who enjoy spending time outside. They would like to harvest trees to earn money. They would also like you to make management decisions that will make the forest pleasant to walk in. You have thought of two options for your first decision. Choose one.

1. You decide to cut all the trees down in a **clearcut**. You'll sell the trees for pulp and encourage more sun-loving aspen to grow. (Go to page 10)
2. You decide to only cut and sell the oldest and biggest trees in a **selection cut** and leave the rest. (Go to page 11)

9

The cutting is done and you've sold the trees and made money. You need to decide what to do to get new trees to grow.

1. Let **natural regeneration** take over. (Go to page 12)
2. **Plant** red pine seedlings in rows so they can be harvested later. (Go to page 13)

10

With a few aspen still standing, trees that can grow in some shade came in. There wasn't enough sun for more aspen to grow.

1. You decide to **leave it alone**. (Go to page 14)
2. You decide to continue to **selection cut**. (Go to page 15)

11

The landowners are happy with the money they have made from their forest, but they have to cut trails through the thick trees in order to be able to take walks.

12

CHOOSE THE MANAGEMENT STORY 1

14

The landowners are unhappy with your decisions. They haven't made one dime on the forest since the first cutting. They want to know why you didn't continue to harvest trees.

16

You are in a forest of aspen trees. The trees around you are 60 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner enjoys hiking in the summer and snowshoeing in the winter. The landowner would like you to make management decisions that will make a nice place to hike and snowshoe where trails are easily maintained. The landowner also enjoy wildlife watching. You have thought of two options for your first decision. Choose one.

1. You decide not to cut any trees. You just want to **leave it alone**. (Go to page 17)
2. You decide to cut all the trees down in a **clearcut**. You'll sell the trees for pulp and encourage more sun-loving aspen to grow. (Go to page 18)

13

The landowners are delighted. They have made money from the forest. They can take walks very easily because there aren't very many plants growing under the trees to trip over.

15

Congratulations! The landowners like your decisions. You have created a steady source of money for them, and they can still enjoy being outside.

CHOOSE THE MANAGEMENT STORY 1

18

The cutting is done and you've sold the trees for a nice profit. You need to decide what to do to get new trees to grow.

1. Leave it alone and let **natural regeneration** take over. (Go to page 21)
2. **Plant** red pine seedlings in rows so they can be harvested later. (Go to page 22)

20

The landowner likes your decisions. Hiking is possible in the forest and there are different animals to see. The extra money from selling the trees was used to make a couple of trails.

17

Since aspen in Wisconsin don't stay healthy much longer than 60 years, these trees are slowly dying. Since the trees are dying of old age and are often hollow, you can't sell the wood. The dying trees allow more shade-tolerant trees to come in. You decide to…

1. **Leave it alone**. Let nature take its course. (Go to page 19)
2. Remove all the rest of the old aspen in a **selection cut** and sell them. (Go to page 20)

19

The landowner doesn't like your decisions. There are many maples growing in some places and it's hard to hike through the forest.

CHOOSE THE MANAGEMENT STORY 1 STORY 2

You are a forest manager. You are going to work with landowners to decide what management techniques should be used on their property to meet their goals. Choose a landowner to work with.

1. **Lumber company** (Go to page 2)
2. **Environmental group** (Go to 7)
3. **School forest** (Go to 12)

■ 1

You are in a forest of **white pine** trees. The trees around you are 50 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner is a company that uses trees for lumber and would like you to make management decisions that will create high quality logs. You have thought of two options for your first decision. Choose one.

1. Remove most of the trees in a **shelterwood cut**. The trees you removed are sold as high-quality logs. (Go to page 3)
2. **Leave it alone**. (Go to page 4)

■ 2

The landowner is very disappointed. The aspen are so close together that it is almost impossible to walk through them, and snowshoeing is definitely not possible.

● 21

The landowner likes the open space under the trees because hiking and snowshoeing are very easy, although there aren't many animals there to watch.

● 22

CHOOSE THE MANAGEMENT STORY 2

4

Twenty years later the forest doesn't look much different. The lumber company that owns the land went out of business because they had no income from selling trees. You have lost your job.

■

6

The landowners are not happy because the trees grew too close together. Because the trees are competing for space, sunlight, water, and nutrients, the trees didn't grow large enough to sell.

■

3

It's 20 years later and the young trees that were growing under the large trees you cut are doing very well. You have already removed the sheltering trees and now there are lots of young trees growing. You decide to...

1. **Thin** them and remove the smallest trees. (Go to page 5)
2. **Leave them alone**. (Go to page 6)

■

5

The landowners are happy because they have sold trees at both steps. Good job!

■

CHOOSE THE MANAGEMENT STORY 2

You are in a forest of **white pine** trees. The trees around you are 50 years old. You have been asked by the landowners to make management decisions about what to do to the forest. The landowner is an environmental group that wants you to make management decisions that would preserve the white pine forest. You have thought of two options for your first decision. Choose one.

1. Remove most of the trees in a **shelterwood cut**. The trees you removed are sold as high-quality logs. (Go to page 8)
2. Use a low intensity (not very hot) **prescribed burn** to control the undergrowth (young trees and shrubs on the forest floor). (Go to page 9)

7

The landowners are not happy because you cut most of the large trees. They wanted to preserve the old white pine forest. You have lost your job because you didn't listen to what the landowner wanted.

8

The older trees survived but the undergrowth was killed, including the young pines that were there.

1. You choose a **selection cut** where only the biggest trees are harvested. (Go to page 10)
2. You choose to **leave it alone**. (Go to page 11)

9

The landowners are not happy because the fire killed the young trees so when the old trees were harvested there is not much there to regrow.

10

CHOOSE THE MANAGEMENT STORY 2

The landowners are very happy that you have left the mature white pine. They want to let them grow.

11

You are in a forest of **white pine** trees. The trees around you are 50 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner is a local school district that would like you to make management decisions that will allow the forest to be used for educational purposes, yet also cut trees to sell for income to help support the school budget. You have thought of two options for your first decision. Choose one.

1. **Leave it alone**. (Go to page 13)
2. Use a low intensity (not very hot) **prescribed burn** to control the undergrowth. (Go to page 14)

12

Twenty years later the forest doesn't look much different. The pine have grown, but not much. There are maples and other shade-tolerant plants growing on the forest floor. You decide to...

1. Remove most of the trees in a **shelterwood cut**. The trees you removed are sold as high-quality logs. (Go to page 15)
2. **Leave it alone**. (Go to page 16)

13

The older trees survived but the undergrowth was killed, including the young pines that were there.

1. You choose a **selection cut** where only the biggest trees are harvested. (Go to page 17)
2. You choose to **leave it alone**. (Go to 18)

14

CHOOSE THE MANAGEMENT STORY 2

16

The landowners are not happy. Although they can still use the forest for education, they didn't get any money from it to help with the school budget.

18

The landowners are not happy that you did not provide any chance for them to make money to help with the school budget. They can still use it for education, however.

15

The landowners are not happy, but are satisfied. They would have liked it if you would have harvested sooner. They can still use it for education.

17

The landowners are happy about the educational opportunities they got from the fire and they still got trees to harvest and sell.

CHOOSE THE MANAGEMENT STORY 3

You are a forest manager. You are going to work with landowners to decide what management techniques should be used on their property to meet their goals. Choose a landowner to work with.

1. **Tree farmer** (Go to page 2)
2. **Homeowner** (Go to page 9)
3. **State Natural Area** (owned by Wisconsin) (Go to page 16)

▲ 1

You are in a forest of jack pine trees. The trees around you are 40 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner is a tree farmer who uses the property for additional income. The tree farmer would like you to make management decisions that will provide the best income possible. You have thought of two options for your first decision. Choose one.

1. Do a **prescribed burn**. (Go to page 3)
2. **Leave it alone**. (Go to page 4)

▲ 2

The fire worked great! Since jack pine cones shed their seeds best when there is fire, there are lots of new trees growing.

1. Remove the old trees to sell **(thin)**. (Go to page 5)
2. **Leave it alone**. (Go to page 6)

▲ 3

The jack pines continue to grow. You decide to...

1. Harvest in a **clearcut**. (Go to page 7)
2. **Leave it alone**. (Go to page 8)

▲ 4

CHOOSE THE MANAGEMENT STORY 3

6

The landowner is not happy. The trees that grew back after the burn are competing with each other so much that they aren't growing large enough to harvest. No money has been made.

8

The landowner is very unhappy. There was no money earned at all and now beetles have infested the trees and have killed them.

5

The landowner is very happy. You have harvested trees to sell and more will be ready to harvest later.

7

The landowner is happy because the clearcut has created good conditions for new jack pine to grow and there was a nice profit from the harvest too.

CHOOSE THE MANAGEMENT STORY 3

You are in a forest of **jack pine** trees. The trees around you are 40 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The landowners are a couple who live in a house they've built on their property. They enjoy spending time on their deck watching wildlife that comes close to their home. They would like you to make management decisions that would make good wildlife habitat. You have thought of two options for your first decision. Choose one.

1. Do a **prescribed burn**. (Go to page 10)
2. Do a **clearcut**. (Go to page 11)

9

The fire worked great! Since jack pine cones shed their seeds best when there is fire, there are lots of new trees growing.

1. Remove the old trees to sell **(thin)**. (Go to 12)
2. **Leave it alone**. (Go to 13)

10

You sold the trees you cut in the clearcut for pulp wood. Now you need to decide how to regenerate the forest. You choose...

1. Do a **prescribed burn**. (Go to page 14)
2. **Leave it alone**. (Go to page 15)

11

The landowner is happy because there are deer and turkey that like the young jack pine that are growing. Having a fire so near the house made the landowner a little nervous, though.

12

CHOOSE THE MANAGEMENT STORY 3

14

The landowner is happy. The burn you did was great for the trees. Many young jack pine are growing and some animals like to eat them.

16

You are in a forest of **jack pine** trees. The trees around you are 40 years old. You have been asked by the landowner to make management decisions about what to do to the forest. The land is owned by the State of Wisconsin and is a State Natural Area. Since these areas are set aside to preserve unique communities, you should make management decisions that help with that goal. You have thought of two options for your first decision. Choose one.

1. **Leave it alone**. (Go to page 17)
2. Do a **prescribed burn**. (Go to page 18)

13

The landowner is happy because the many young jack pine provide good wildlife habitat.

15

The landowner is not happy. It will be many years before the jack pine will begin to grow again and the landowner is impatient to see animals.

CHOOSE THE MANAGEMENT STORY 3

18

The fire worked great! Since jack pine cones shed their seeds best when there is fire, there are lots of new trees growing.

1. Remove the old trees to sell **(thin)**. (Go to page 21)
2. **Leave it alone**. (Go to page 22)

17

The jack pines continue to grow. You decide to...

1. Harvest in a **clearcut**. (Go to page 19)
2. **Leave it alone**. (Go to page 20)

20

The landowner is happy. State Natural Areas are left alone to follow succession without humans changing it when possible.

19

The landowner is not happy. State Natural Areas are supposed to have as little human impact as possible.

5P

CHOOSE THE MANAGEMENT

STORY 3

You are a forest manager. You are going to work with landowners to decide what management techniques should be used on their property to meet their goals. Choose a landowner to work with.

1. **Hunter** (Go to page 2)
2. **State park** (State of Wisconsin) (Go to page 9)
3. **Tree farmer** (Go to page 16)

1

The landowner is not happy. State Natural Areas are managed for the rare ecosystems that are there. Human actions such as timber harvest are avoided.

21

STORY 4

You are in a mixed forest of **deciduous** and **coniferous** trees. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner is an organization that hunts on the property and would like you to make management decisions that will create good habitat for a variety of animals. You have thought of two options for your first decision. Choose one.

1. **Leave it alone**. (Go to page 3)
2. Do a **shelterwood cut**. (Go to page 4)

2

The landowner is very happy. After the successful controlled burn, the number of wild lupine plants increased and now there are endangered Karner blue butterflies on the property.

22

CHOOSE THE MANAGEMENT STORY 4

4

Only a few large trees stand and many young, shade-tolerant trees are growing.

1. **Leave it alone**. (Go to page 7)
2. Do a **prescribed burn**. (Go to page 8)

6

The landowner is not happy. The more time that goes by, the more the forest floor is shaded. There isn't as much food for animals.

3

The forest continues to grow. There aren't as many plants growing on the forest floor now because there is more shade.

1. **Thin** the trees. (Go to page 5)
2. **Leave it alone**. (Go to page 6)

5

The landowner is happy. There are still big trees but some light is getting to the forest floor so more plants are growing there. Deer and other animals have more food and shelter.

CHOOSE THE MANAGEMENT STORY 4

7

The landowner is happy. There are still a variety of kinds of trees and they are different ages. That means there is a variety of habitat for animals, including the ones the landowner hunts.

8

The landowner is not happy. The fire removed the undergrowth and killed most of the trees. There is not much habitat for the animals the landowner hunts.

9

You are in a mixed forest of **coniferous** and **deciduous** trees. You have been asked by the landowner to make management decisions about what to do to the forest. The land is owned by the State of Wisconsin and is a state park. The park managers want you to make management decisions that would make the forest useful for hiking and camping. You have thought of two options for your first decision. Choose one.

1. **Leave it alone**. (Go to page 10)
2. Do a **clearcut**. (Go to page 11

10

The forest continues to grow. There aren't as many plants growing on the forest floor now because there is more shade.

1. **Thin** the trees. (Go to page 12)
2. **Leave it alone**. (Go to page 13)

CHOOSE THE MANAGEMENT STORY 4

12

The landowner is happy. The park was able to make some trail improvements with the money from selling the thinned trees. There are more plants growing along the trails for hikers to look at.

14

The landowner isn't happy. The park visitors have been complaining about the way the clearcut area looks. They have come to enjoy the beauty of the forest and don't think it looks very nice. At least the new trees you planted are making it look a bit better.

11

All of the trees were removed in a clearcut.

1. **Plant** seedlings. (Go to page 14)
2. **Leave it alone**. (Go to page 15)

13

The landowner is happy because they are going to put in a few new shaded campsites in the open area under the large trees.

CHOOSE THE MANAGEMENT STORY 4

You are in a mixed forest of **deciduous** and **coniferous** trees. You have been asked by the landowner to make management decisions about what to do to the forest. The landowner is a tree farmer and wants to harvest trees for additional income and would like you to make management decisions that will make the most money. You have thought of two options for your first decision. Choose one.

1. Do a **shelterwood cut**. (Go to page 17)
2. Do a **clearcut**. (Go to page18)

16

All of the trees were removed in the clearcut. There are no trees growing on the land now. You decide to...

1. **Plant** seedlings. (Go to page 21)
2. **Leave it alone**. (Go to page 22)

18

The landowner isn't happy. The park visitors have been complaining about the way the clearcut area looks. They have come to enjoy the beauty of the forest and don't think it looks very nice. Trees and shrubs are starting to grow back, but it is very slow.

15

Only a few large trees stand and many young, shade-tolerant trees are growing.

1. **Leave it alone**. (Go to page 19)
2. Do a **prescribed burn**. (Go to page 20)

17

CHOOSE THE MANAGEMENT STORY 4

20

The landowner isn't happy. The fire killed all of the young trees and now there will be none to cut and sell for many years.

22

The landowner is okay with the clearcut, but letting it grow back on its own will take too long.

19

The landowner is glad to have some income from the shelterwood cut, and new trees are growing without having to plant more.

21

The landowner is happy because the clearcut brought in a lot of money. The new trees you planted will be worth money when they are big enough too.