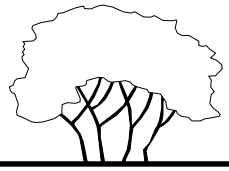
Sustainable Forestry: Urban or Wild?



Unit Overview

This unit focuses on forest resources as they relate to sustainable development. It is appropriate for Grades 6- 8. It is the goal of this unit to increase student understanding of: 1) the basic benefits of forest resources; 2) the costs and benefits of setting aside wilderness preservation areas; 3) the public policy decisions involved in the trade-offs; and 4) the challenge of supplying the demand for wood products while using sustainable forest management practices.

Unit Background

Students will read and discuss forest management, a topic critical to natural resources conservation and sustainable forests for the future. Some of the major benefits of forests to be discussed include outdoor recreation, wildlife habitat, watershed protection, and forest products.

In this unit, students will learn about three different case studies that address aspects of sustainable forest practices and management techniques. The three case studies are:

1) A challenge that a wood products company faces in meeting the demand for products from the forest while ensuring that America's forests are managed sustainably. Students will evaluate the problems of maintaining forest health, protecting wildlife and water quality, and harvesting the area properly.

2) Managing a forest for multiple use requires expertise and many productive resources, including human and capital. In this case, students will manage a 200-acre hardwood tree farm. The goal is to sell the timber for a profit while protecting wildlife habitats, the watershed, and the recreational areas that allow for activities such as camping, hunting, and hiking.

3) In this case study, students will decide if the government should designate more land as wilderness areas. This is a controversial issue where students will need to determine the trade-offs.

After the groups have developed their forest management plans, they will present them to the class and defend their decisions. The students will compare the different approaches and how their decision affects the future of forests in America. The students will also be asked to correlate their decisions in a sustainable development chart that assesses the economic, environmental and social consequences of their decisions.

Unit Context

In terms of our Soft vs Hard Green Framework (see Chapter 2), Soft Green enthusiasts advocate multiple-use management of forests, critical habitat preservation for biodiversity, and distrust of "free market" prices as adequate reflectors of the true (current and future) value of nature's many services. Hard Green enthusiasts advocate the use of state-of-the-art technology to harvest trees and drill for oil, while protecting wilderness for humans' aesthetic enjoyment. Both groups appreciate the ecological and human services provided by trees via evapotranspiration: helping keep the climate cool by removing carbon dioxide (a greenhouse gas), emitting oxygen for living creatures to breathe, and circulation of water in the hydrologic cycle. Hard Green advocates also emphasize that, for most species of trees, younger/growing trees have a higher rate of evapotranspiration than older/ decaying trees, thereby justifying harvesting trees with replanting.

Lesson 1:
Wood Products Case Study

Overview

The challenge of wood products companies is to meet the demand for forest products while managing America's forests in a manner that ensures sustainability. Whether we realize it or not, everyone uses wood products everyday. Products as common as soap, paint, film and thousands of others contain wood or wood extractives. Because of the vast array of products that contain wood in some form, many companies are dependent on the harvesting of our forests. The challenge a wood products company faces is finding the balance between meeting the world's demand for forest products while managing and maintaining sustainable forests to keep from going out of business.

There are many values of the forest such as air and water quality, recreation, aesthetics, wildlife habitat, and wood which is used to make paper, build homes, and provide us with many products we use each day. It is important to these companies to make sure forest health is maintained and improved and the practices they use protect the forests from diseases, pests, and other damages. Responsible wood products companies want to harvest areas properly and make sure they are reforested. They also want to protect water quality and wildlife habitat.

In this exercise, students will investigate the best options to balance the world's growing demand for forest products and meet the need to manage and maintain sustainable forests.

Grade Levels: Middle School (6-8)

SOL's: Science 6.11; Life Science 11, 12; Earth Science 7; Civics & Economics 7.6

Skills Taught: Defining, categorizing, comparing, planning, concluding

Key Terms/Concepts: Clear cutting, Forest products, Multiple use, Forest preservation, Reforestation

Objectives

Students will:

1) evaluate the problem of maintaining sustainable forests,
2) compare and contrast five management options, and
3) correlate their decisions on a sustainable development chart.

Getting Ready

Make copies of:

Forestry Background (SF 1)
Harvesting Methods (SF 2-3)
Forest Management Options (SF 4-5)
Forest Management Options Chart (SF 6)

Procedure

1. Have the students read the Forestry Background (SF 1) and Harvesting Methods (SF 2-3) handouts.

2. Explain to students that they will use this information to make a decision for a corporation that produces wood products. The objective is to select a sustainable forestry management option for the company's newly purchased land, and be able to defend their decision. Handout the Forest Management Options (SF 4-5). They can use one of these five options or a combination of them to devise a plan of their own.

3. Have students complete the work by discussing the consequences of their decision on the forests. In addition to discussing the environmental effects of their decision, ask students what were the economic implications. Have students relate the exercise to how timber companies make forest management decisions and the impact that decision has on the community. What are the social consequences of their decision? Have students complete the Forest Management Options Chart (SF 6).

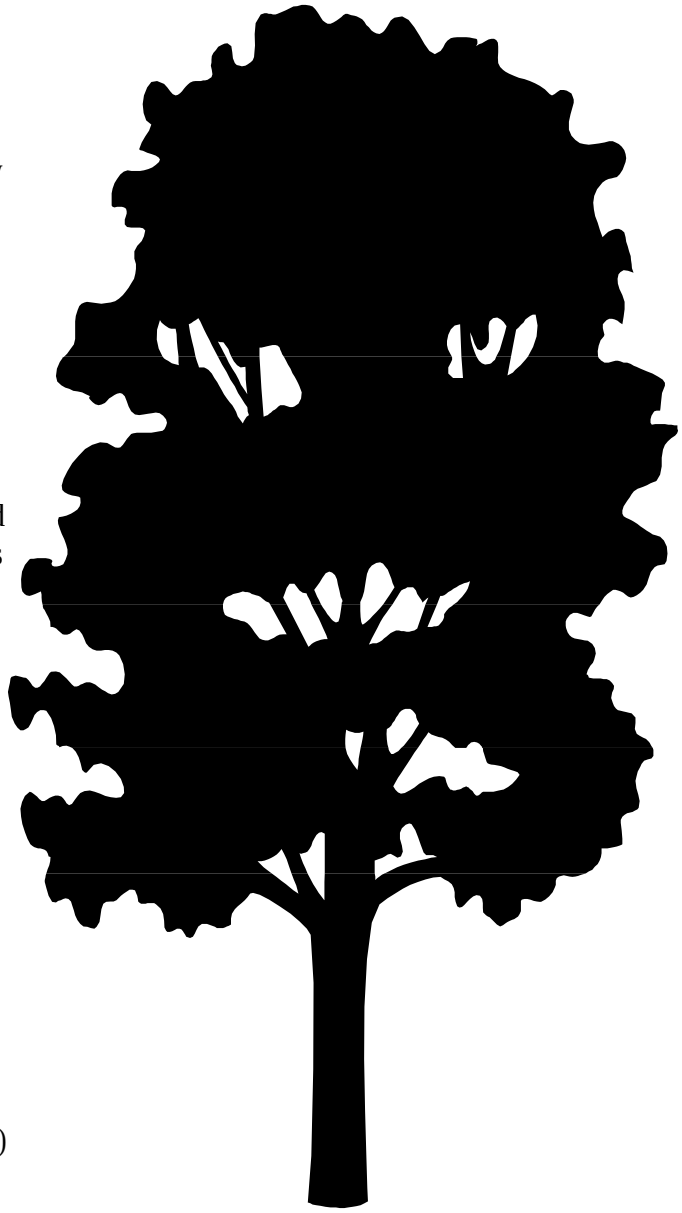
4. Have each of the groups present their decision, explain why they decided as they did, and defend their position to the class.

Evaluation

Assess student learning by how well they have compared the different methods and how well they defended their decision. Completing the Forest Management Options Chart (SF 6) requires independent thinking beyond the case content and is an opportunity for application of new information.

Enrichment

1. Have students develop the five options into a forest survey they can do outside of the classroom. Compare the survey results with those selected by the groups.
2. Ask a representative from a local wood products company to visit the class and discuss the forest benefits and conflicting goals of sustainable forestry management.
3. Have students select one of the options and debate the benefits and costs.



References

The Bugwood Network. *Sustainable Forestry Reforestation: Growing Tomorrow's Forests Today* : http://www.forestpests.org/misc/reforest/reforest.html

Owen, Oliver S., et al. *Natural Resource Conservation: Management for a Sustainable Future* (Upper Saddle River, N.J.: Prentice Hall) 1998.

Virginia Department of Forestry: http://www.state.vipnet.org/dof

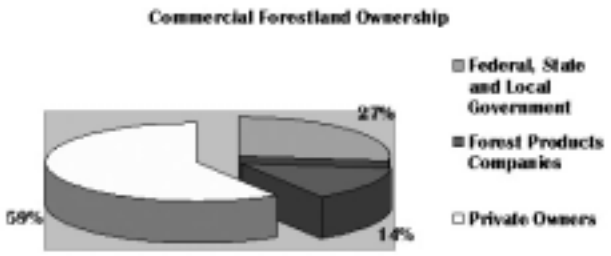
Virginia Resource-Use Education Council: http://www.vruec.htm

Wood Products Case Study:

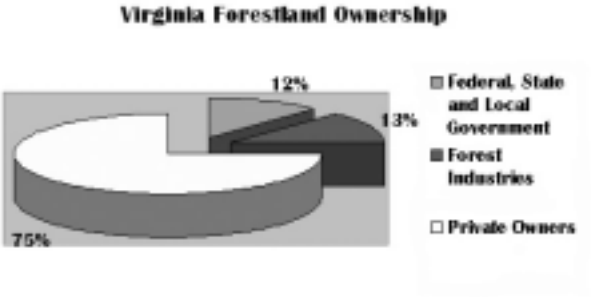
Forestry Background

With the world population increasing, there is a growing demand for wood as products and fuel. This demand is creating a critical need for a sustainable system of forestry that supplies a wide array of goods and services, while protecting the health and diversity of forest ecosystems. Forests need be managed to meet the social, economic, and ecological needs of current and future generations. Sustaining forests for the future requires changes in the way forestry is practiced so that forest quality is enhanced while biodiversity and ecological processes are maintained. The changes may require alterations of policy and pricing, reduction in waste and consumption, and recognition of the value of a healthy forest ecosystem (Abramovitz). To ensure that our needs and those of future generations are met, we must practice conservation and sustainable management, and rehabilitate degraded forests (Abramovitz).

There are about 737 million acres of forests covering about 30% of the total land in the United States. About half of the forested land (490 million acres) is used for commercial purposes producing wood products (American Forest & Paper Association). The majority of commercial forestland is privately owned (Sustainable Forests).



In Virginia, there are 16 million acres of forestland that is also mostly privately owned. The forest industry is the number one manufacturing industry in Virginia and forest resources contribute $7.4 billion annually to Virginia's economy (Virginia Resource-Use Education Council).



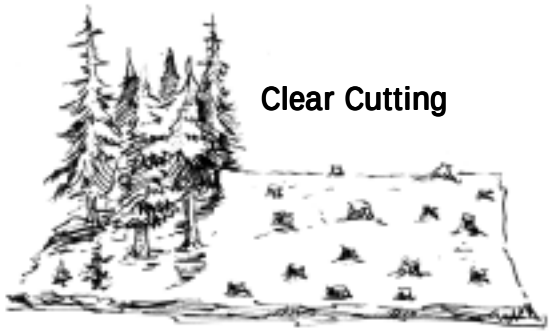
In the United States, forestland is converted to shopping centers, new subdivisions, roads and commercial centers because these uses have higher value or because forestry has become unprofitable as the result of regulations, urban sprawl, or environmental movements.

On a global scale, because the world does not function on the same economic level as the United States, the major cause of deforestation is not urban sprawl or development, but occurs because of the demand for agricultural land and firewood (American Forest & Paper Association). In countries such as Brazil, where there still remains a large amount of unclaimed forestland, people burn rainforest to created land to farm in order to provide for their families. Approximately 3 billion people worldwide use wood as their primary source of energy. They rely on it to heat their homes and cook their food. In comparison, only 10 percent of Americans heat their home with wood. The Food and Agriculture Organization of the United Nations estimates over one billion people are meeting their need for wood by depleting existing supplies, and are cutting trees faster than they can be replenished. There is a desperate need for education in sustainability, and what burning forest today means for future generations to come. However, it is imperative to realize that deforestation occurs often because people are struggling to meet their basic human needs.

Wood Products Case Study:

Harvesting Methods

Forest harvesting uses three basic methods: **clear cutting, selective cutting** and **shelter wood cutting**. The fastest and cheapest method to harvest trees is a **clear cutting** operation, where loggers remove all the commercial timber (usually trees larger than one inch in diameter) from a plot. The remaining loose bark,



Clear Cutting

branches, sawdust and broken logs can be left on the land or burned. In some operations, the leftovers are chipped, bundled and used for other wood products. Another option is burning, which adds nutrients to the soil, facilitates regrowth, and reduces the threat of forest fires. In hilly terrains where clear cutting results in extensive runoff and soil erosion, loggers use a method called strip cutting to harvest timber. Similar to strip cropping on farmland, strip cutting allows loggers to remove narrow strips of forest and leave the remaining forested strips to serve as erosion controls and seed sources.

Clear cutting destroys the scenic beauty of an area, alters habitats and diminishes the carrying capacity for some species in that area. It can accelerate soil erosion which reduces the quality of water resources and depletes the soil of nutrients. Despite these environmental impacts, clear cutting has its advantages. It is the quickest and simplest method of harvesting, and it is the only effective method to control some disease and insect infestations. Clear cut areas regenerate quickly as sun-loving shrubs and saplings become established providing habitat and food for a great variety of wildlife such as deer, grouse, turkey and songbirds.

Selective cutting removes a limited number of mature trees. Deformed and trash species called cull trees are removed to upgrade the forest. New trees begin growing in newly-created openings and in a few years become established under the existing canopy of older, larger trees. This uneven-aged management approach allows for continuous growth and harvest (Bugwood Network). Over time this process is repeated and cutting

Selective Cutting

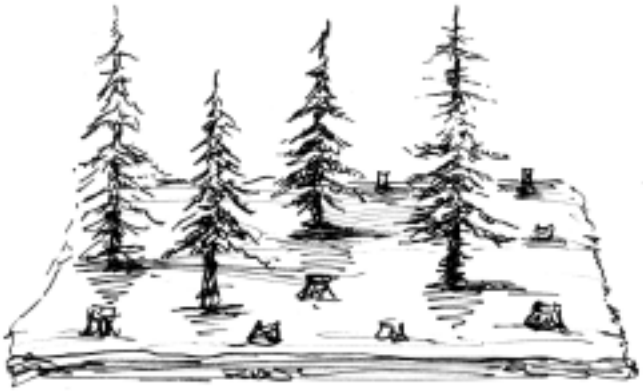
can occur as often as every five years or as infrequently as every 20 years. Selective cutting reduces soil erosion and wildlife habitat destruction and is viewed as a good alternative to clear cutting (Owen et al). However, an uneven-aged management system is more costly, requires more time to harvest all of the desirable trees, and is not suitable for trees that must grow in sunny locations. Because of these disadvantages, some forest experts do not view it as a replacement to clear cutting.

Wood Products Case Study:

Harvesting Methods

Shelter wood cutting is an intermediate form of tree harvesting between clear cutting and selective cutting that leaves a cover of large trees on a site to protect regeneration. In this technique forty to sixty percent of the trees are removed, allowing new trees to become established in the partial sunlight under the shelter of remaining older trees. Once seedlings become established, loggers remove a portion of the commercially valuable mature trees. When the seedlings become saplings, the remaining older trees are harvested. Although this harvesting technique has the advantages of minimized soil erosion, land that is constantly vegetated, and increased regeneration of the forest, it is more costly than both clear cutting and selective cutting. In areas where a local economy depends on tourism, selective cutting and shelter wood cutting can provide additional economic and aesthetic advantages (Owen et al).

Shelter Wood Cutting



In a sustainable forest, whenever timber is harvested, or fire, insects or natural disasters destroy the forested land, the area must be reforested to ensure sustainable yields in the future. Natural reseeding occurs as mature trees provide seeds that are scattered by the wind and dispersed by birds, rodents and runoff water. However, natural seeding does not usually allow for complete regeneration of a site because some varieties do not produce seeds every year, some seeds do not fall on fertile ground, and there is commonly a lack of adequate moisture or nutrients. Therefore, natural reseeding is often supplemented by aerial, hand or machine seeding, but the most successful method of reforestation is the planting young seedlings.

Wood Products Case Study:

Forest Management

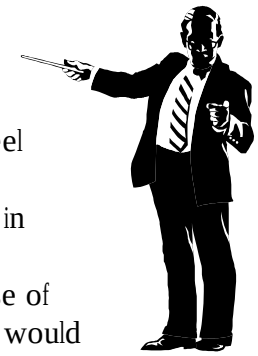
Five options for managing and maintaining a sustainable forest while meeting the demands for wood products might include the following:

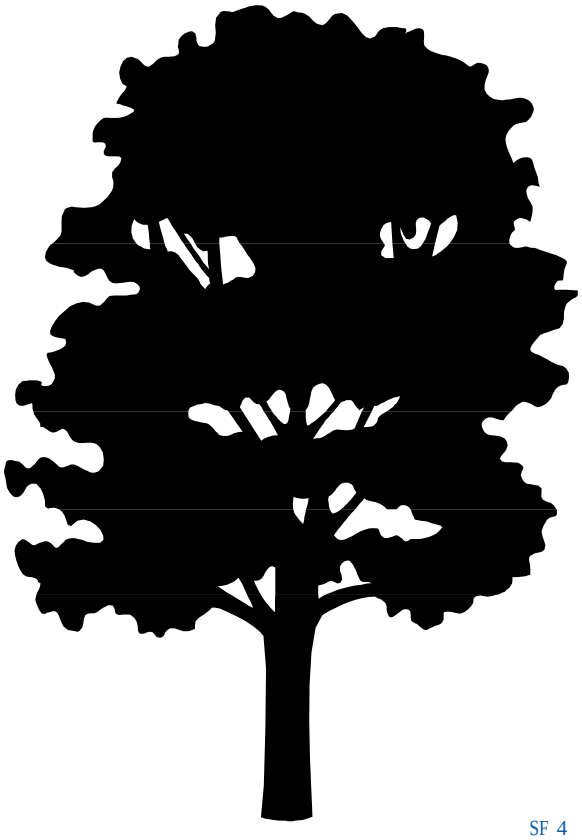
• **Option 1**: **Ban clear cutting** as a means of harvesting trees, thereby forcing landowners to choose other options. For some businesses, this approach would make it easier to deal with the public and do business. The ban would also prevent unscrupulous companies from poor management practices that result in erosion, impaired water quality, or habitat destruction. However, banning clear cutting would raise the cost of timber by reducing the supply, increase harvesting costs, limit the productivity of working forests, and leave forests unmanaged in case of disease or insect infestation.

• **Option 2: Have states develop their own forest standards** for harvesting and management because forests are different

across the country and standards are not the same in all states. State officials can be closer to the issues, public opinion, and the type of trees in their area. They also know more about the forests' health and demand for trees. However, leaving issues like forestry to individual states has many potential problems. If neighboring states have drastically different standards, the forest health of one could affect the adjacent lands in the other state. Similarly, industries like paper mills in one state might use wood from surrounding states, putting disproportionate pressure on the other forests. In addition, some states many not share the same level of concern for the sustainability of the forests.

• **Option 3**: **Institute educational programs** to make the public aware of forest issues and the value of forests. Media coverage of environmental issues rarely addresses forestry issues. Many Americans are unaware of timber supply concerns. Some feel that if more people understood what goes on in the forests and how much society depends on the use of forest products, the public would demand the practice of sustainable forestry. However, others think that a public education program is not enough to ensure that the job gets done. The public can be fickle—one day they are excited and interested in an issue and the next day they have forgotten it.





Wood Products Case Study:

Forest Management

• **Option 4: Allow industry to manage the natural resource** in a sustainable manner because they depend on a supply of wood to stay in business and survive. The American Forest and Paper Association, a trade organization, has created the Sustainable Forestry Initiative that requires companies to adhere to a set of principles designed to manage today's forests for future generations, or they lose their membership. Some companies require that their loggers complete education seminars and training workshops. More than one-third of the United States is forested. Timber companies in the U.S. point out that there are more acres of forests today than there were 100 years ago, proving that they can manage this renewable resource in a responsible and sustainable way.

However, many people are skeptical about the industry's claims of improving the environment, pointing out the environmental destruction that some companies have done to the nation's forests. They wonder if the industry can achieve a genuine change in America's commercial forestry practices that will have a positive effect on the future of America's forests.

• **Option 5: Come up with your own idea** on how to manage and maintain a sustainable forest while meeting the demands society has for wood products.

Each option has its benefits, costs and social consequences.

SF 5

Wood Products Case Study:

Forest Management Options

Discuss within your group the various positive and negative consequences of the five actions:

Options	Environmental Effects		Social Effects		Economic Effects	
	Positive	Negative	Positive	Negative	Positive	Negative
Ban Clear Cutting						
States develop individual forest plans						
Educational Programs						
Industry Manages Forests						
Alternative Idea						

Lesson 2:

Sustainable Hardwood Tree Farm

A Case Study

Overview

Nearly sixty percent of all forestland in the U.S. is managed by private non-industrial landowners. There are 70,000 certified Tree Farms in the 48 continental states, accounting for 85 million acres of forestland and a majority of the watershed that surrounds our nation's lakes, rivers, and wetlands. These private landowners include both people who own only a few acres around their hunting cabin and larger landowners who have 10,000 acre forest plantations. Many of these landowners depend on the timber values of their forestland to pay basic expenses, including taxes. Students will examine management options and profit incentives for tree farmers and determine how they can make a profit while still protecting wildlife habitats, the watershed, and recreational activities such as camping, hunting and hiking.

Objectives

Students will 1) list the types of production resources needed to manage a tree farm; 2) define market price, supply and demand as it relates to a tree farm; and 3) devise a profitable management plan for the tree farm.

Grade Levels: Middle School (6-8)

SOL's: Science 6.11; Life Science 11, 12; Earth Science 7; Civics & Economics 7.6

Skills Taught: Defining, categorizing, comparing, planning, concluding

Key Terms/Concepts: Clear cutting, Forest products, Multiple use, Forest preservation, Reforestation, supply and demand

Getting Ready

Make copies of:

- Harvesting Methods (SF 2-3)
- Forestry Background (SF 7-8)
- Tree Farm Worksheet (SF 10-11)
- Hardwood Tree Farm Description (SF 12)
- Hardwood Tree Farm Management Evaluations Chart (SF 13)

Note: You may wish to make one set of copies for each group rather than one set for each student.

Make an overhead transparency of:

- Harvesting Methods (SF 9)

Procedure

1. Begin the lesson by summarizing or having students read the background information on Sustainable Hardwood Tree Farms (SF 7-8). Explain that they will be using this information to help them with their case study.

2. Using the overhead transparency of each of the Harvesting Methods (SF 9), recap clear cutting, selective cutting, and shelter wood cutting, using information contained within the Harvesting Methods Sheet (SF 2-3) of the previous lesson. Point out the advantages and the disadvantages of each method.

3. Ask students to rank the merits of each method as a sustainability forest management approach.

4. Have students complete the Tree Farm Worksheet (SF 10-11). Discuss each question paying special attention to productive resources and market price topics.

5. Using the Tree Farm Description (SF 12), have the groups design a management plan for the hardwood tree farm. The goal is not only to sell the timber for profit, but also to protect the wildlife habitats and watershed and to preserve recreational activities. Some possible ideas include hiking and biking trails, primitive camping sites, a catch and release fishing pond, harvest festivals, photography and bird watching events, and other money-making activities. Tell students that they can develop a land management plan that includes one or multiple uses, but that the plans must be compatible with one another. All plans must consider present and future tree farm operations. At least 25 percent of the land must remain for tree farming.

6. Have students complete the Hardwood Tree Farm Management Evaluations Chart (SF 13) that assesses economic, environmental, and social consequences of their decisions.

7. Have each group present to the class their forest management plans and the Evaluations Chart. Compare the different approaches and discuss how their decisions will affect the future of the tree farm.

Evaluation

Assess student learning by how well they have developed their forest management plans and how well they defended their decision. Determine application of new information by how well they completed the Hardwood Tree Farm Management Evaluations Chart.

Enrichment

1. Visit a tree farm or invite a tree farmer to come to class to discuss the management practices used to improve productivity and make farms sustainable.

2. Debate the question "Can clear cutting be beneficial to forests?"

3. Prepare a report on the differences between a tree farm and a hardwood tree farm in terms of types of trees grown, years from seedlings until harvest, and types of sustainable management techniques.

4. Research how the timber industry has changed in the past 50 years and illustrate the changes with graphs.

References

The Bugwood Network. *Sustainable Forestry Reforestation: Growing Tomorrow's Forests Today,* http://www.forestpests.org/misc/reforest/reforest.html

Owen, Oliver S., et al. *Natural Resource Conservation: Management for a Sustainable Future* (Upper Saddle River, N.J.: Prentice Hall) 1998.

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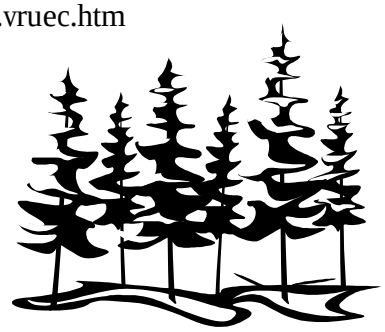


Hardwood Tree Farm Case Study:

Forestry Background

In Virginia, there are 16 million acres of forest land. 300,000 private landowners own almost three-quarters of the forestland. State and federal governments own 12 percent of the forestland. Forest industries own 13 percent of the forestland. The number one manufacturing industry in Virginia is the forest industry. One out of every seven manufacturing jobs is forest-related. Each year over 60 million pine seedlings are planted in Virginia to reforest the land. Forest resources contribute $7.4 billion annually to Virginia's economy (Virginia Resource-Use Education Council).

An acre of working forests must be cared for by its owner for 25 to 50 years before it can be used for timber. During that time the forest provides many others things humans value, such as clean air, water, wildlife habitat, recreation and natural beauty. However, if after 25 to 50 years the trees become diseased, damaged or die and are no longer valuable as timber, landowners might have to find more profitable uses of their property. Many farms are being converted to non-forest use, such as developments, recreational areas, and shopping centers. It is important that landowners know the benefits of managing their own land and practice sustainable forestry. Private forest owners have economic incentive to manage their forests effectively. Trees are a highly profitable commercial crop. Poorly managed land tends to lose value. If properly managed, even small forests can help supply today's world with wood-based products and recreational opportunities, while meeting the same needs of future generations. Managing a forest for multiple use requires expertise and productive resources.

Marketing

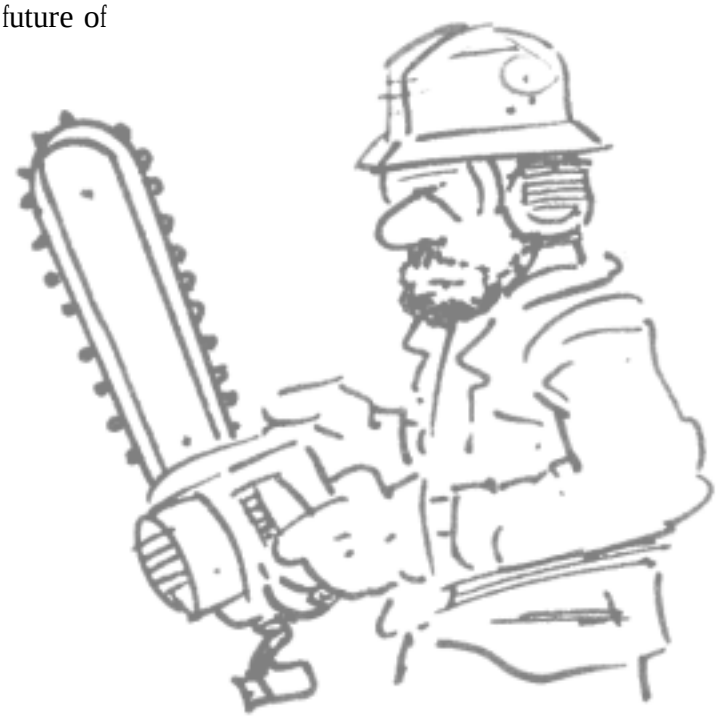
The market price of wood is determined by supply and demand. If the market price is low, then wood producers know there is more supply (wood available for sale) than demand (people wanting to buy the wood). In this type of market, the tree farmer would put fewer productive resources into wood production. A high market price for wood tells producers that wood is scarce in relationship to demand. In other words, there is not enough wood for sale to meet the demand for all those needing to buy it at the time. In this type of market, consumers want more productive resources devoted to wood production. Timber producers cannot set the price; they must accept the price that is determined by the market.

Tree farmers try to lower their unit costs in order to increase profits. If the market price goes up, profits usually will too. Farmers can also

increase profits with cost-effective production methods. However, if production costs increase and market price decreases, profits will be reduced.

Management

Managing a tree farm requires expertise and many productive resources (natural, human and capital). Managing a tree farm for the timber value and maintaining opportunities for recreation are part of protecting the ecosystem's structure and function. For example, when a tree farmer chooses to cut down trees to clear an area to provide an opening to benefit wildlife, it means that some birds and plants that live in the existing forest environments will be affected. Each management choice favors some species and enhances some processes at the expense of others. Responsible forest management includes managing an ecosystem in which the future of every element in the system depends on carefully considering the future of every other element.



Hardwood Tree Farm Case Study:

Harvesting Methods

Clear Cutting

Selective Cutting

Shelter Wood Cutting

Tree Farm Worksheet - Teacher's Master

1. Managing a tree farm for timber and other multiple uses like wildlife habitat, recreation, scenic landscapes, and watershed protection requires many productive resources. It takes a combination of natural, human and capital resources. For example, a productive, healthy tree farm requires adequate money (capital) and knowledgeable managers (human). Complete the chart below by listing five productive resources in each category.

Natural Resources (Environmental)	**Human Resources (Social)**	**Capital Resources (Economic)**
Trees, Cleanwater,	Logger, Truck Driver	Adequate Funding, Equipment
Wildlife, Scenic landscapes,	Forester, Tree Planter	*(tree planting equipment,*
Air, Minerals, Sunlight	Biologist, Financial Manager	*trucks, chainsaws, hard hats*
	such as chain saws,	*climbing equipment*)

2. The price of hardwood timber is not fixed. It changes every day based on factors such as how much wood is for sale and how many people are willing to buy it. These changes in the price derive from supply and demand and affect whether the market price will go up or down. In the chart below, circle your decision about whether the market price will go up or down for each situation.

Situation	Market Price	
1. The demand for wood stays the same, but the supply of wood decreases	**Increase**	Decrease
2. The supply of wood stays the same, but demand increases	**Increase**	Decrease
3. The demand for wood stays the same, but the supply increases	Increase	**Decrease**
4. The supply of wood stays the same, but demand decreases	Increase	**Decrease**
5. The supply increases, and the demand increases	Increase	**Not enough Info**
6. The supply decreases, and the demand increases	**Increase**	Decrease

3. In each of the six situations what will happen to the tree farmer's profits if he must sell at that time?

Situation	Profit		Reason
#1	**Increase**	Decrease	Higher price but same production costs
#2	**Increase**	Decrease	Higher price but lower production costs
#3	Increase	**Decrease**	Same production costs but lower price because of more sellers
#4	Increase	**Decrease**	Same production costs but lower price because of fewer buyers
#5	Increase	**Not enough info**	Don't know proportions of increase in relation to each other
#6	**Increase**	Decrease	Higher price with lower production costs and more buyers

4. You have reached a point in the management of your tree farm where you have to make some difficult decisions. You have no more trees ready to be harvested. The market price for your timber is frozen and you cannot get a higher price. Profit is the amount of money left from sales revenues after all of the costs of production have been paid. In this situation, what is the only way to increase your profits and what are some of the ways you can achieve this? How might you use the land that has only small seedlings on it? How do you plan to preserve recreational activities such as hiking, camping, hunting, or mountain biking? Develop a plan for how you will manage the 600 acres of your tree farm so that you can meet all of these goals.

ANSWERS WILL VARY

Tree Farm Student Worksheet

1. Managing a tree farm for timber and other multiple uses like wildlife habitat, recreation, scenic landscapes, and watershed protection requires many productive resources. It takes a combination of natural, human and capital resources. For example, a productive, healthy tree farm requires adequate money (capital) and knowledgeable managers (human). Complete the chart below by listing five productive resources in each category.

Natural Resources (Environmental)	Human Resources (Social)	Capital Resources (Economic)
1	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

2. The price of hardwood timber is not fixed. It changes every day based on factors such as how much wood is for sale and how many people are willing to buy it. These changes in the price derive from supply and demand and affect whether the market price will go up or down. In the chart below, circle your decision about whether the market price will go up or down for each situation.

Situation	Market Price	
1. The demand for wood stays the same, but the supply of wood decreases	Increase	Decrease
2. The supply of wood stays the same, but demand increases	Increase	Decrease
3. The demand for wood stays the same, but the supply increases	Increase	Decrease
4. The supply of wood stays the same, but demand decreases	Increase	Decrease
5. The supply increases, and the demand increases	Increase	Not Enough Info
6. The supply decreases, and the demand increases	Increase	Decrease

Tree Farm Student Worksheet (cont.)

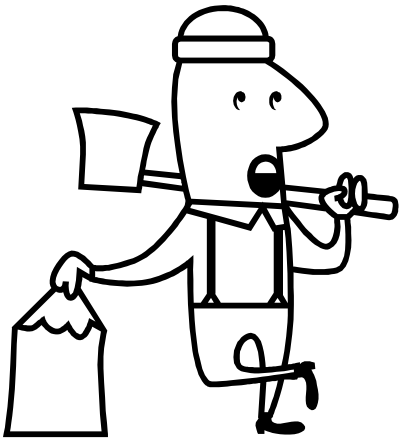
3. In each of the six situations what will happen to the tree farmer's profits if he must sell at that time? Circle your decision and give a reason for your decision.

Situation	Profit		Reason
#1	Increase	Decrease	
#2	Increase	Decrease	
#3	Increase	Decrease	
#4	Increase	Decrease	
#5	Increase	Not Enough Info	
#6	Increase	Decrease	

4. You have reached a point in the management of your tree farm where you have to make some difficult decisions. You have no more trees ready to be harvested. The market price for your timber is frozen and you cannot get a higher price. Profit is the amount of money left from sales revenues after all of the costs of production have been paid. In this situation, what is the only way to increase your profits and what are some of the ways you can achieve this? How might you use the land that has only small seedlings? How do you plan to preserve recreational activities such as hiking, camping, hunting, or mountain biking? Develop a plan for how you will manage the 600 acres of your tree farm so that you can meet all of these goals.

Hardwood Tree Farm

Description



You have just inherited 100 acres of forestland. You must create a management plan for the property, harvesting for profit but also protecting wildlife habitats (including the watershed) and preserving recreational activities. The land is flat in some areas and hilly in others, although none of it is so steep that it is unsuitable for harvesting timber. There is a large pond in the northeast corner of the property.

The land is forested by mostly Yellow Poplar – a light and easily worked wood. It is commonly used as lumber for interior and exterior trim, veneers, turnery and furniture. Yellow Poplar reproduces quickly and is profitable. It comprises 85% of the trees on your land.

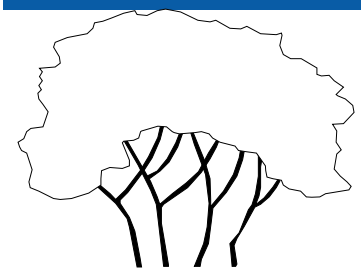
White Oak trees make up about 5% of the trees. A heavy, strong, and tough close-grained wood, it is often used for construction, furniture, interior finish, flooring and fuel. White Oak is valuable but is very slow growing.

Another 5% of the trees are Black Walnut. Heavy, strong and hard, this dark brown colored wood is of superior quality and high value. Black Walnut is highly sought after because it does not warp; it is used for furniture, cabinetwork, gunstocks and airplane propellers. Small younger trees are not as useful because they are not as durable and lack the dark color. Black Walnut reproduces relatively well, provided the soil is hearty. The remaining 5% of trees on your farm are a mix of hardwood and softwood trees.

Your management plan may be a one use plan or multiple uses plan, however, if you chose multiple uses, these uses must be compatible with one another. Some suggestions include (but are not limited to): hiking and biking trails, primitive camping sites, a catch and release fishing pond, harvest festivals, photography, bird watching events and other moneymaking events. The only restriction you have is that **at least** 25 percent of the land **must** be used for tree farming. Remember that management plans must consider the present and future needs of the tree farm operation. After drafting your management plan, complete the Hardwood Tree Farm Evaluations Chart, assessing the economic, environmental and social consequences of your decisions.

Hardwood Tree Farm

Management Evaluations



Discuss the effects of your management decisions for the Hardwood Tree Farm. What are the consequences of the management techniques you chose?

	Positive	Negative
Environmental Effects		
Social Effects		
Economic Effects		

Lesson 3:

Sustaining Wilderness Areas

Case Study

Overview

One-third of the United States (about 731 million acres) is forestland. Approximately 95 million acres is part of the National Wilderness System. Under the Wilderness Act of 1964, these wilderness lands may or may not be forested, but they must have no roads, power lines, or settlements. About 35 million acres of these protected lands have commercially valuable timber, but under the current law cannot be harvested.

Today, most of the wilderness areas are in Alaska; however, many Americans feel that more land should be set aside as wilderness areas. The decision is left to Congress who must consider the economic costs and benefits. Every public policy has its trade-offs. Setting aside more wilderness areas means less wood is harvested, making the price of wood and wood products higher. Not setting aside preservation areas means timber harvesting, oil exploration and mining might occur in beautiful, untouched areas.

In this case study, students will represent the various views of members of Congress. They will present their case to the class who will vote on the proposals.

Grade Levels: Middle School (6-8)

SOL's: Science 6.11; Life Science 11, 12; Earth Science 7; Civics & Economics 7.6

Skills Taught: Defining, categorizing, comparing, planning, concluding

Key Terms/Concepts: Clear cutting, Forest products, Multiple use, Forest preservation, Reforestation

Objectives

Students will:
1) identify the costs and benefits of setting aside land as a wilderness area;
2) analyze the tradeoffs of such a policy; and
3) defend their recommendations.

Getting Ready

Make copies of:
- Political profiles (SF 14-16)
- Congressional Decision Evaluation (SF 17)
- Class ballots (optional)

Procedure

1. Read students the following scenario about an up-coming debate in the House of Representatives:

Scenario:

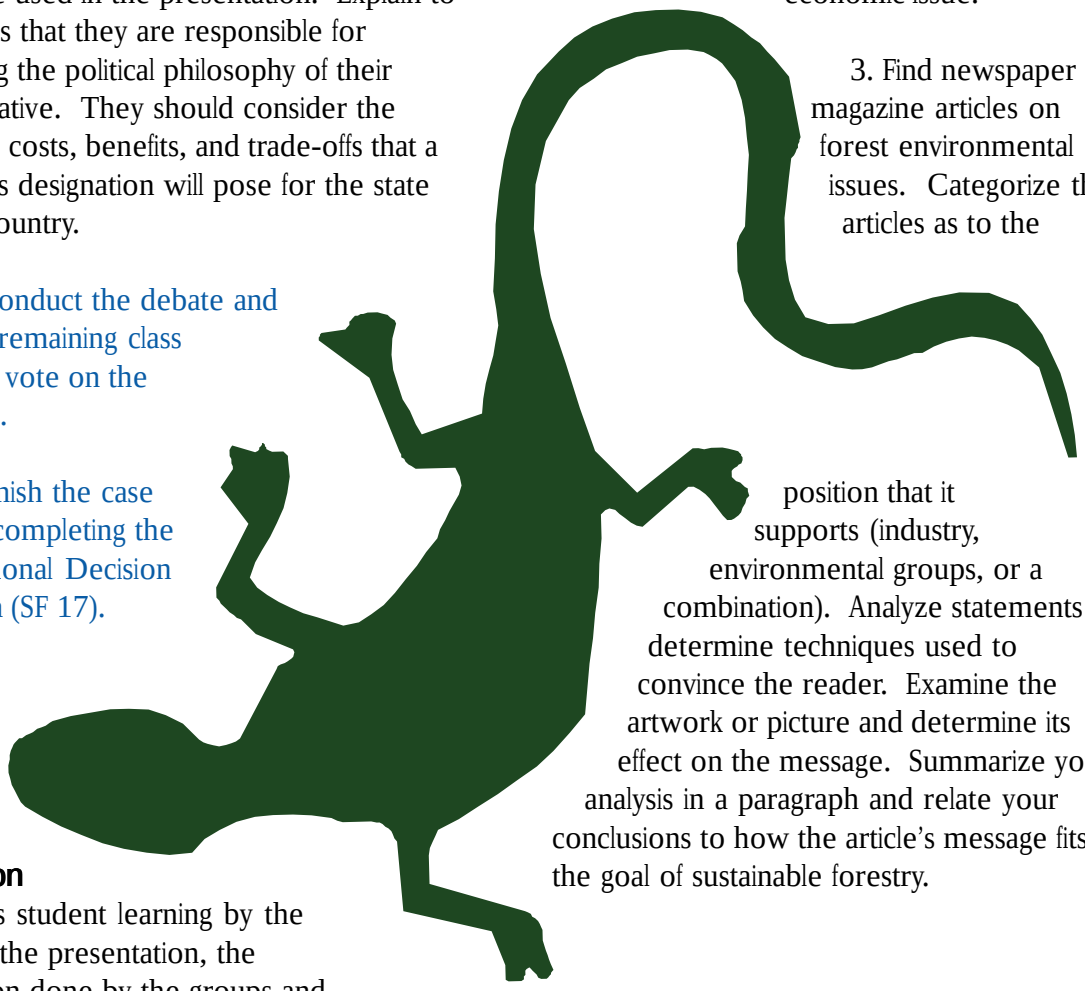
The House of Representatives is considering a controversial bill that would set aside, under the 1964 Wilderness Act, 340,000 acres of undeveloped land in Alaska as a new wilderness area. All of the land will remain in its natural state and cannot be used for any commercial use. Many environmental organizations would like to see the bill pass. However, many of the representatives are concerned about the economic value of the land and the loss of timber and oil resources. The bill has come up for debate. Three representatives are ready to share their view points. Once they have completed their presentation, the House of Representatives will vote.

2. Select or have students volunteer to be the three representatives who will debate the topic. Pass out the Political Profiles (SF 14-16) to the volunteer representatives.

3. Divide the remaining students into three work groups to assist the student "representative." Their job is to help prepare facts to be used in the presentation. Explain to the groups that they are responsible for supporting the political philosophy of their representative. They should consider the economic costs, benefits, and trade-offs that a wilderness designation will pose for the state and the country.

4. Conduct the debate and have the remaining class members vote on the legislation.

5. Finish the case study by completing the Congressional Decision Evaluation (SF 17).



Evaluation

Assess student learning by the quality of the presentation, the preparation done by the groups and how well they defended their view. Determine if students can address the tradeoffs with each viewpoint and examine how well they can complete the Congressional Decision Evaluation.

Enrichment

1. Research the Wilderness Act of 1964 and describe the areas that have been designated as wilderness areas in the United States.

2. Debate the statement: "Wilderness areas and the environment are a moral, not an economic issue."

3. Find newspaper or magazine articles on forest environmental issues. Categorize the articles as to the position that it supports (industry, environmental groups, or a combination). Analyze statements to determine techniques used to convince the reader. Examine the artwork or picture and determine its effect on the message. Summarize your analysis in a paragraph and relate your conclusions to how the article's message fits the goal of sustainable forestry.

References

ECONorthwest, "Seeing the Forests for their Green", www.sierraclub.org/forests/report00/

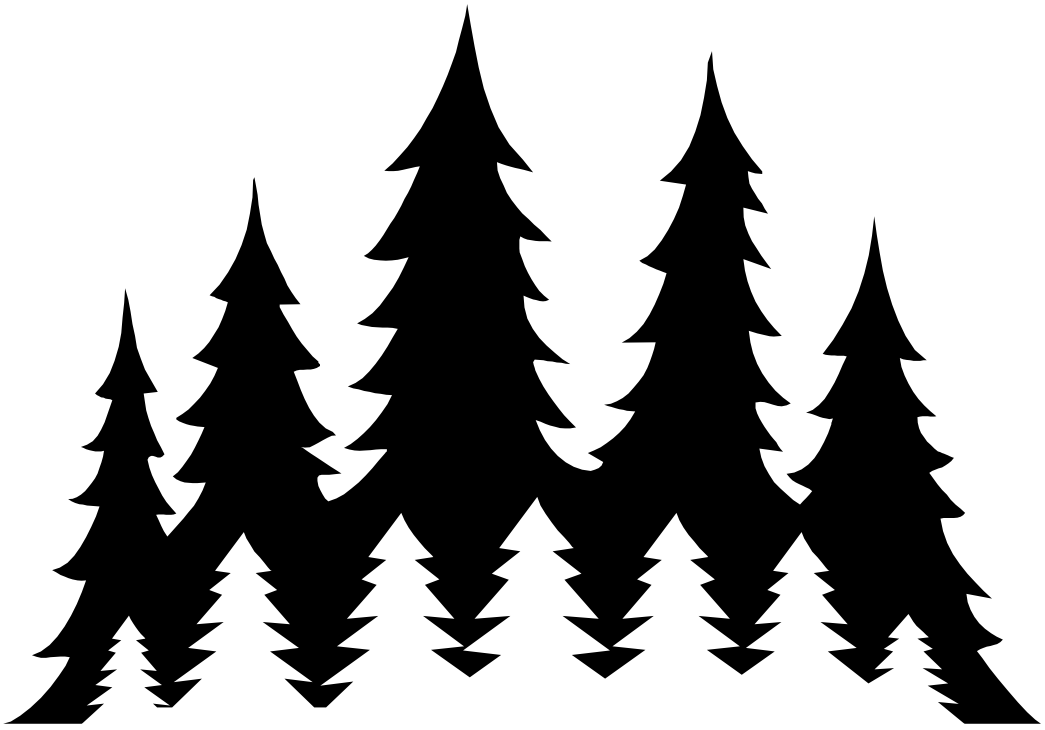
Political Profile:

Wilma Saveit

Representative from New Mexico

Forestry

Wilma Saveit, an environmentalist, is the bill's sponsor and feels it is critical to set aside more public lands for protection from economic development. She says that landscape beauty, wildlife habitat, and protected watersheds are important to the country and to future generations. If all of the wild lands in the country are mined or logged there will not be undisturbed lands for the future. Unspoiled wilderness areas are the only way to manage these lands sustainably. She does not support the compromise proposal that would restrict timber operations, but allow for natural resource exploration such as mining and oil drilling. Such an approach would allow development. The land, she says, needs total protection and to be preserved completely.

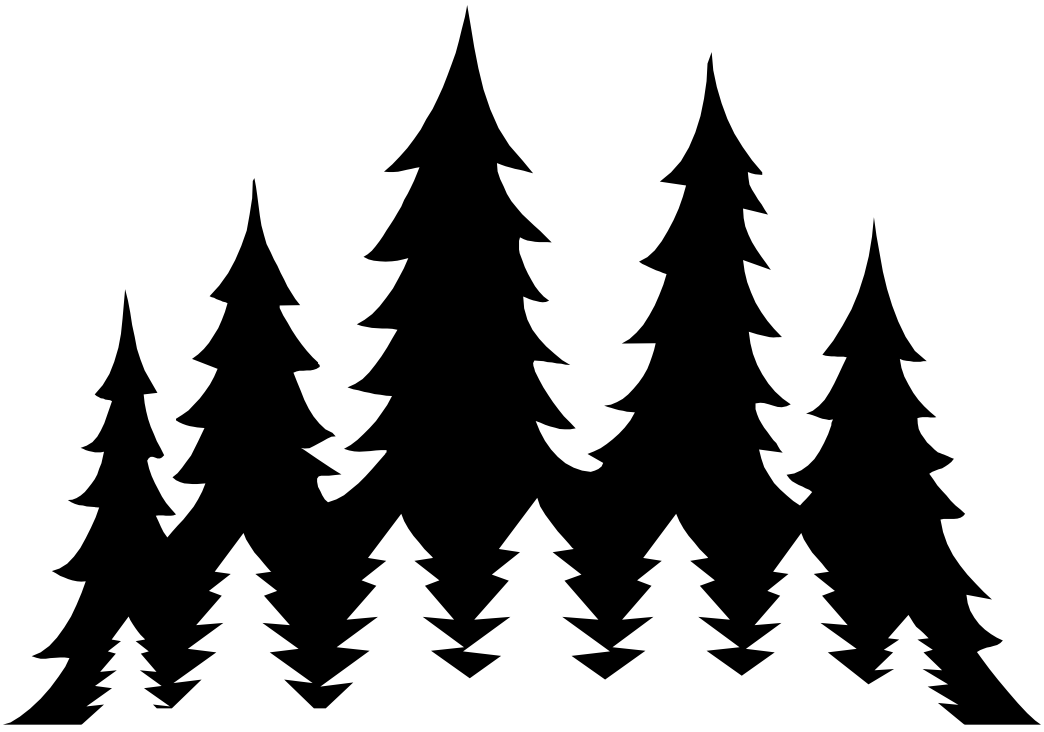


Political Profile:

Mark Sellers

Representative from New Hampshire

Mark Sellers is sensitive to the need for protected set-aside lands, but he feels that there is much economic value in 340,000 acres - including minerals and future oil reserves. The country recently experienced a very high rise in gasoline and home heating oil. Many of the voters in his district want him to work to get their fuel bills down. Exploring for oil in this remote area could be a possible solution to the need for more domestic reserves of oil. Representative Sellers thinks the environmental impact would not be any greater than the Alaska Pipeline built many decades ago. He thinks there will be economic loss for the people of the area if the oil companies cannot drill for oil.



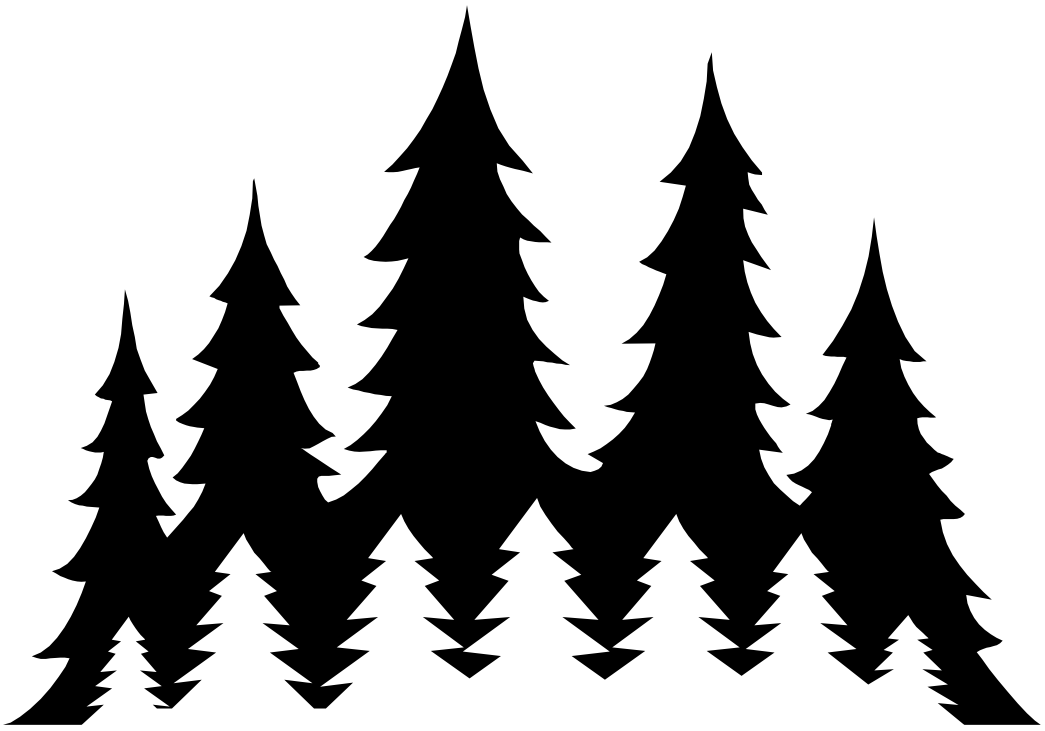
Political Profile:

Sylvia Culture

Representative from Oregon

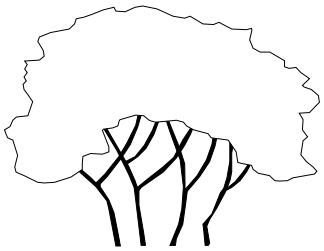
Forestry

Sylvia Culture knows how important timber jobs in her district are to the economy of the area she represents. This land in Alaska is producing valuable timber and providing jobs for many families in small rural towns. Representative Culture has seen what happens to the sawmills, and then to the small towns and communities that they are located in when timber operations are halted. If the bill passes, she thinks that people will lose their jobs and the price of timber will rise, affecting all Americans. Such a rise in timber prices will affect the citizens with lower incomes the most. She says that the land must be kept open as a multiple use area for the future of the country.



Congressional Decision

Evaluation



Discuss the effects of your congressional decisions pertaining to the undeveloped land in Alaska. What are the consequences of the legislation passed?

	Positive	Negative
Environmental Effects		
Social Effects		
Economic Effects		

NOTES