

Forest Management

- Overview:** Student will be able to evaluate the benefits and drawbacks of forest management strategies.
- Keywords:** Fire regime, mechanical thinning, treated forest, untreated forest, fuel loads
- Age / Grade Range:** 5th-6th Grade students
- Background:** Fire suppression has been the main forest management strategy since 1930 and only within the last 20 years (as of 2014) have strategies began to change. Years of fire suppression has allowed litter to build up fuel loads in forested areas. High fuel loads led to increases in fire intensity in wildfires that did break out in the forest¹.

During the era of fire suppress public opinion was that forests should be carefully monitored for fire to prevent the fires forming similar to the one that burned through three million acres in 1910.² However, forest ecosystem have fire regimes, a frequency of wildfire in a time period. High frequency fire regimes might occur every 20 years while low frequency would be every 100+ years. The higher the frequency of fire, the lower the fire intensity, conversely the lower the frequency of fire the higher the intensity. Ecosystems adapted for high frequency fires are impacted more by fire suppression. The greater the fire intensity is the more impact it does to the environment; seed banks can be destroyed and the soil can be sterilized³.

Methods to reduce fuel loads have been used such as prescribed burning and mechanical thinning. In areas that are close to residential or have are affected by long term fire suppression, mechanical thinning followed by prescribed burning can simulate wildfire. However for plants and animals adapted for fire, thinning only is not an adequate replacement. It costs five times as much to put out a wildfire than it does to do preventative measures such as burns and thinning⁴.

Certain Native American tribes used fire to clear underbrush which attracted

¹ <http://www.foresthistory.org/ASPNET/Policy/Fire/Suppression/Suppression.aspx>

² <http://www.foresthistory.org/ASPNET/Policy/Fire/FamousFires/1910Fires.aspx>

³ <http://oregonexplorer.info/wildfire/WildfireRisk/FireRegimeDefinition>,
http://www.fs.fed.us/database/feis/fire_regime_table/PNVG_fire_regime_table.html

⁴ <http://blogs.usda.gov/2014/08/20/secretarys-column-skyrocketing-fire-costs/>

elk and deer. They were managing the forest with hunting as the focus. Different areas of focus, such as tourism, forestry, or wildlife, can affect the strategies used for forest management⁵.

**Next Generation
Science Standards**

5-ESS2-1: Develop a model using an example to describe ways to geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Common Core:

RI.5.9: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

MP.2: Reason abstractly and quantitatively

Goals:

Students will participate in an activity that models how different forest management strategies can affect forest health and wildfires.

Guiding Questions:

Do forests need to be managed?

Should all wildfires be suppressed?

Objectives:

Students will understand that strategy of forest management depends on the management goal.

Students will understand that removing trees from ecosystems can benefit ecosystems.

Materials:

Matches

Sand

Firebox

Forest ecosystem cards

Dice (optional)

Set up:

Make sure there are enough matches

Classroom Time:

15-35

⁵ <http://www.srs.fs.usda.gov/sustain/report/fire/fire-06.htm>

Overview:

1. Split students into groups of 2-3.
2. Give each group a small fire box and a forest ecology card.
3. Have students recreate their forest in the box based on a section of their card.
 - a. Set up a box yourself to demonstrate the forest setup and a wildfire.
4. Once students are finished demonstrate what would happen using your box.
5. Have students engage in a strategy for preventing the spread of wildfire by removing trees in a 10 second window.
 - a. The goal is to save at least 50% of the their forest.
6. Have groups explain their strategy and randomly select a section in the forest and have a lightening strike.
7. Debrief the consequences for certain strategies that students use.

Introduction (Engage):

Note: Text in "quotations" signifies suggested dialogue to engage students in and is not intended to be a script. Use your best judgment when delivering these lessons.

"How do you think we should take care our forests? What people would care about the health of forests, say the one we're next to, Payette National Forest? Should we leave forests alone, let nature take care of them? What about fire? Or if animals can't find enough food?" (Field answers)

Activity (Explore):

"Let's find out! You will group up and I will give you a forest to manage. We'll see what happens to different forested areas when wildfires happen! First pick a section of forest to recreate form the forest ecosystem card. Trees will be represented by matches. " (Group your students up and pass out matches, firebox and ecosystem card)

"Check out your forest! If a wildfire went through your forest now what do you think would happen? Write down how you think your forest would burn, draw a diagram if you want. Anyone want to share what they wrote?" (field answers)

"Now that we have recreated sections of Ponderosa State Park, what would you do to prevent the fire from spreading. Talk amongst your group and come up with a method you think would work to prevent a wildfire from spreading in your section of the forest. The goal is manage your forest so that over 50% survives the fire. There is enough money to pay for 10 seconds worth of forest modification for two members of your group to work in the forest. I will randomly pick a section of forest to ignite so keep that in mind when planning your strategy."

(Allow students time to think and prepare their forests for wildfire

management. 10 seconds is the time limit to illustrate that there is a fixed budget that firefighters and land managers work with. Instead of limiting money you are limiting their time)

"Now that you have a plan, write it down before you get to do it. Did you pick your forest workers? Ok your 10 seconds begins now!" (Give students 10 seconds to remove trees)

"Alright let's see the results of your work. Before we have the lightning strike tell us which portion of the forest did you recreate and what did you do to manage your forest for fire?" (After each group explains what they did randomly select a location to start the fire and observe what happens. Go through all groups before debriefing)

Explanation

"What happened to the forests? What was successful? What are some consequences to the forest and environment from the wildfires in your forests? (Field answers)

"One major consequence is all the carbon dioxide and ash being released into the atmosphere. Carbon dioxide can contribute to the greenhouse effect and the ash particulates being released can cause damage to our lungs if in high enough quantities. "

"Who chose to remove trees from the forest? How did you do it?" (field answers)

"If you created a 'road' or a break in the forest you employed what firefighters and land managers call a fire break. This removes any fuel that forest might use thus preventing the spread of fire. If you removed trees that were too close to each other you employed what land managers call mechanical thinning. Mechanical thinning removes fuel that is dense which reduces the amount the fire can spread. Who used a fire break? Who used mechanical thinning? Did any group use another method?" (field answers)

"From this activity, do you think it's best to leave the forest alone? When would removing trees cause harm to a forest? Benefit to a forest? "

Elaboration/Content Tie-in: This activity can be used with Value of a tree and Greenhouse Gases.

Value of a tree:

If forest management includes mechanical thinning, what could be done with the slash piles? Should they be burned? What happens if they are burned?

The Greenhouse Effect:

What is released if slash piles are burned? What consequences might there be if slash piles are burned? If slash piles are left behind?

Evaluation: Write what you think a forest management strategy should be for Ponderosa State Park. Why would you use the methods you propose?

Additional resources:

See Appendix F for materials