Name _____

Forest Health

Evaluating Forest Health Indicators

There are many indicators of forest health. The table below outlines some of those indicators.

Mark out a 5 – 10 ft square sample plot of a local forest to examine.

Rate each indicator as poor (1 point), fair (2 points), or good (3 points).

Health Indicator	Description	Observation of Sample Area	Rating
Damage & Disease	For a tree to count as diseased or damaged, 10% or more of the tree should show signs of damage. **Signs:** dead or discolored leaves, damaged or deformed leaves, dead or dying portions of the tree, splits or holes in wood, or fungus **Poor:** >50% of trees have damage **Fair:** 25–50% of trees have damage **Good:** <25% of trees have damage		
Tree Species	Examine the features of the trees in your sample area. Look closely at the bark, leaves, and other features to determine the tree's species. You can use a guidebook to help you determine the exact species of trees if you wish. **Poor:** One species present **Fair:** Two species present **Good:** Three or more species present		
Woody Debris	Count the number of logs and fallen branches greater than 4 in. in diameter and greater than 39 in. in length in your plot. Divide that by the number of live trees in your plot. **Poor:** <0.05 **Fair:** 0.05 – 0.15 **Good:** >0.15		

Forest Health

Evaluating Forest Health Indicators, *continued*

Health Indicator	Description	Observation of Sample Area	Rating
Dead Trees	Calculate the percent of standing trees that are dead in your plot. **Poor:** <5% **Fair:** 5–10% **Good:** 10–15%		
Tree Sizes	Measure the diameter of each tree in your plot at 4.5 feet off the ground. See how many of the following size trees are represented in your plot. • **Saplings:** 4–9 in. (10–24 cm) • **Small:** 10–14 in. (25–37 cm) • **Medium:** 15–19 in. (38–49 cm) • **Large:** 20–29 in. (50–75 cm) • **Giant:** ≥30 in. (75+ cm) **Poor:** 1 size **Fair:** 2 sizes **Good:** ≥3 sizes		
New Growth	Divide your plot into 9 equal segments. Look in each segment to see if there is at least one healthy seedling without any damage that is at least 12 inches tall if it is a conifer, or at least 39 inches tall if it is a deciduous tree. **Poor:** <33% of segments have a healthy seedling **Fair:** 33 – 66% of segments have a healthy seedling **Good:** >66% of segments have a healthy seedling		

Forest Health

Evaluating Forest Health Indicators, *continued*

Health Indicator	Description	Observation of Sample Area	Rating
Forest Layers	Examine your plot to determine how many of the following layers of forest are present. • **Overstory** Tree canopy in full sun • **Understory** Trees in the shade of other trees • **Tall Shrub** Woody plant with several stems arising from a base greater than 6 ft • **Short Shrub** Shrub less than 6 ft • **Forb** Plants such as ferns, wildflowers, and grasses • **Leaf Litter** Dead and decaying leaves and other matter on forest floor **Poor:** One or two layers present **Fair:** Three or four layers present **Good:** Five or six layers present		
Soil pH	Take a soil sample from your plot. Add a few drops of water to it. In 3 to 5 minutes, place a pH strip on the soil sample. **Poor:** pH ≤ 4.0 or >8.5 **Fair:** pH of $4.0 - 5.5$ or $7.2 - 8.5$ **Good:** pH of $5.51 - 7.2$		

Forest Health

Evaluating Forest Health Indicators, *continued*

Health Indicator	Description	Observation of Sample Area	Rating
Soil Type	Examine a small amount of the soil to determine its type. • **Sand –** gritty, cannot hold ball shape • **Silt –** can be molded into ball that loses shape easily, does not feel gritty, silky • **Clay –** sticky, easily forms long thin rod • **Sandy Loam –** can be molded into a ball that breaks easily • **Loam –** can be molded into ball that can be handled without breaking • **Clay Loam –** can be formed into long thin rod that will break easily **Poor:** Sand **Fair:** Silt or clay **Good:** Sandy loam, loam, or clay loam		
Soil Organisms	Examine a soil sample for the presence of living organisms such as insects and fungi (microscopic cells that grow in long strands in the soil). **Poor:** No soil organisms **Fair:** One or two types of soil organisms **Good:** Three or more types of soil organisms		

Forest Health

Evaluating Forest Health Indicators, *continued*

Health Indicator	Description	Observation of Sample Area	Rating
Wildlife	In your plot, look in the trees, on the ground, and under shrubs for animals or signs of animals from the following classes. **Classes:** mammals, birds, reptiles, amphibians, spiders, or insects **Poor:** Signs or sightings of 0 – 1 classes of animals **Fair:** Signs or sightings of 2 – 3 classes of animals **Good:** Signs or sightings of ≥4 classes of animals		
Average Rating			

Overall Rating of Forest Health
Give your overall rating of the forest health based on your examination of your plot and explain the reasoning for your overall rating.

Name _____

Forest Health

Problems Facing Our Forests

Consider the problems facing our forests.
If you are struggling with your research, use the following questions to get started.

- How does a(n) decrease/increase of a species or an introduction of a new species impact a forest?
- How does human activity affect forests?
- How do natural disasters affect forests?
- How does climate change affect forests?

Problem	Impact on Forest	Suggestions to Minimize Impact

Name _____

Forest Health

Tree Height

To determine the heights of trees, scientists use a tool called a clinometer.

Research	What is a clinometer? How does it work?
Design	What does a clinometer look like? How can you create your own?
Test	Create and test your design on a building or other object of a known height. Adjust your device if necessary to achieve accurate measurements.
Use	Use your device to measure the heights of 3 different trees.

Tree 1	Tree 2	Tree 3