

Quick Facts

for Informal Educators



Why should I observe land cover? How does land cover affect my life?

Nearly every aspect of our lives is fundamentally tied to the land on which we live. The homes that shelter us are resting on the land. Cities offer locations that bring people together; farms feed us; forests help to keep us cool, provide us with oxygen, building materials, and the joys of recreation; rivers and lakes yield fresh water to drink; and different kinds of land cover provide habitats for a diversity of wildlife. When land covers change, our health and well-being, economies, and environments are all affected.

Citizens using GLOBE Observer can observe land cover in much greater detail and more frequently than scientists can using satellite data alone. Furthermore, some types of land cover such as crops or some kinds of urban areas can be difficult to define based on satellite data alone, and citizen scientists' observations can help.

GLOBE Observer data aren't just for scientists. Everyone can have access to this data to understand land cover change. Furthermore, since GLOBE Observer is a global community with ties in education, citizens who make observations help to strengthen education in Earth science around the world.

How does land cover affect my community's vulnerability to different disasters?

Fires

Land cover plays a big role in a community's vulnerability to wildfire. Homes and businesses built in landscapes that have a lot of fuel for fire are at risk of being destroyed by fire. Fire agencies recommend fire buffer zones with land cover that is not highly flammable.

Floods

In general land cover influences the way water flows across the land. When cement or even packed soil replaces a forest or wetland, water flows across the surface as run off instead of being absorbed. This change can alter the flow of rivers and/or trigger flash-flooding.

Landslides

Land cover is a factor in making a given slope prone to landslides. In particular, trees anchor soil, so a hill that has been cleared has a higher risk of slipping than one that has not. Bare ground, especially recently burned ground, is also more prone to erosion, which can lead to landslides.

Water Quality

Water that flows over certain land cover types can pick up pollutants that impact a community's water quality. Water running over cultivated land such as lawns or farms, carries fertilizers to rivers and streams. Water run-off over cement, roads, and industrial areas picks up oil, fuel, and other chemicals. Chemicals in run-off can build up in water bodies, leading to algal blooms and associated low-oxygen dead zones and generally poor water quality. Nonagricultural vegetated land cover can contribute to cleaner water, as it allows water to percolate slowly through soils, cleansing it.

Disease

Land covered with seasonal ponds may harbor disease-bearing mosquitoes.

Coastal Storms

Vegetation such as mangroves absorbs the damaging power of high waves during storms.

Do I have to do all the steps in the Land Cover protocol?

You do not have to do all the steps in the Land Cover protocol. You can simply take photos with your smartphone, submit them, and be done if you like. If you want to take a step further, you can classify the landscape shown in your photos, and if you want to beyond that, you can match your classification with satellite data.

Why do scientists study land cover?

Scientists and land managers must have accurate pictures of the land and how it's changing in order to understand and manage the land. Land cover data gathered by satellites and other means helps provides a big-picture, long-term view. Comparing land cover data from one year to the next helps people evaluate how a community's past land management efforts are working and can provide valuable information on trends to help in planning for the future.

Land cover is part of Earth systems that work together like cogs in an engine.

- Plants covering the land are a critical component of the carbon cycle.
- Land cover influences the water cycle.
- Land cover influences heating and cooling.
- Carbon, water, and energy are part of Earth's climate system. Changes in land cover can contribute to climate change and climate change results in changes to land cover.

What do scientists do with my observations?

Scientists compare citizens' observations with the data from remote sensing satellites. This way scientists and others can improve the accuracy of their assessments and improve maps of current conditions and past changes. The data also helps to project conditions of the land in the future.

How do scientists use satellites to study land cover?

Land cover studies are part of a broad program by NASA to monitor Earth's vital signs from land, air and space using an array of satellites and instruments on the International Space Station to better understand our home planet. The agency tackles some of the biggest challenges facing our planet today and in the future, including natural disasters, the availability of natural resources, rising sea levels and climate change. NASA's planetary perspective means that we study the systems that work together to sustain life on Earth.

NASA's Terra and Aqua satellites carry an instrument called the Moderate Resolution Imaging Spectroradiometer (MODIS) that images the whole Earth every day. Scientists have produced a global land cover map using MODIS data. Each map pixel has a resolution of 500 meters, which means that land cover is defined for each square area of land measuring 500 meters by 500 meters, or 1/3 of a mile by 1/3 of a mile. Each of the USGS/NASA Landsat satellites covers the same place on Earth every eight days with a resolution of 30 meters.

Are there different ways of classifying land cover?

Land cover types are simply categories of landscapes that scientists are trying to map for different kinds of studies. Because the scientific questions being asked are different from one another, the ways scientists categorize landscapes are different from one another; they can vary from study to study and map to map. For example, for flood maps there may be only two categories—dry land and wet land—while a standard global land cover map may have seventeen categories including closed shrub lands, savannas, evergreen needle leaf forest, urban areas, and ice/snow. The only requirement for any land cover category is that it have a distinct spectral signature that a satellite can record.

The several classes of land cover in GLOBE Observer were chosen to work well for most needs of scientists' who work with the land cover data collected by [Landsat instruments](#) and by NASA's [Moderate Resolution Imaging Spectrometer](#) (MODIS). They also align with land cover classes used in [The GLOBE Program](#).

What's the difference between land cover and land use?

The two terms land cover and land use are often used interchangeably, but in fact land cover refers to what covers the surface of the Earth, whether it is vegetation (such as grasses, shrubs, forests, agricultural crops), pavement, buildings, or bare ground. Land use refers to how the land is being

used—whether for agricultural, recreational, residential, commercial, or industrial purposes. The same types of cover can be managed or used very differently.

How do I know how far 50 meters is?

One way to learn about 50 meters is to find your average pace (two normal steps) in meters, divide that number into 50, and then to take that number of paces on flat ground. (See the Land Cover Toolkit activity, “Find Your Pace.”) Another way to learn about 50 meters is to measure that length with a tape measure if you have one long enough! 50 meters is equal to 54.7 yards, or about 164 feet.

Do I need to see 50 meters to take an observation?

If you are taking a land cover observation of a forest, urban area, or other place with tall vegetation, you may not be able to see 50 meters. Just report as far as you can see. That observation is still valuable. You can add to the field notes that the view is not clear for a full 50 meters.

