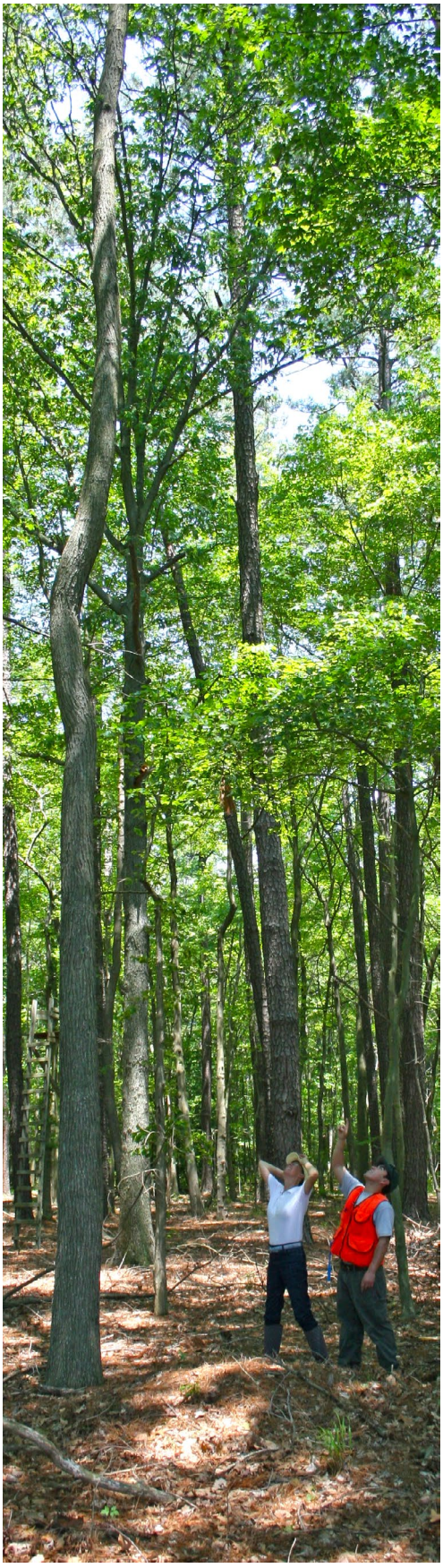
# Helping your woodland adapt to a changing climate



## cut something

## plant something

## do nothing

Your woods are always changing and adapting as they grow and mature, or regrow after a disturbance. Events like storms, droughts, insect and disease outbreaks, or other stressors can damage trees or slow their growth. A changing climate may make your woods more susceptible to the problems these events can cause.

Within the last 100 years Maryland has experienced changes in temperature, coastal sea level rise, and rainfall patterns that can have future environmental and economic impacts on woodlands. Taking care of your land for the long term while ensuring that it is available for future generations is known as woodland stewardship and will help you adapt to a changing climate. For more information, read the full report: http://ian.umces.edu/link/forestguidance

### Key actions

**Manage for a healthy density.** Keep trees vigorous to better resist pests and survive in the face of disturbances. Practices like thinning or timber stand improvement reduce stress and keep forests at reasonable densities for a mix of species and age classes.

**Diversify species.** If planting, consider species likely to be successful decades into the future. For example, loblolly pine is predicted to expand its range further north.

**Choose drought resistant species** when planting in areas prone to drought. Climate change may bring more frequent or longer summer droughts even if annual rainfall increases. Techniques like using root gels or watering newly planted seedlings during a dry summer can help improve survival.

**Diversify stand ages and structure.** Stands of different ages and species will not all be susceptible to the same damage. Timber stand improvement, thinning, harvesting, and planting all provide opportunities to create diversity.

**Build connectivity.** Connected woodland parcels allow tree species and wildlife to migrate more easily, which encourages greater diversity and adaptability.

**Learn how to control invasive species.** The species, season, and desired control method all matter if you want to avoid wasting time and money.

**Control invasive vines.** All invasive plants compete for light, water, and nutrients, but vines bring special problems, affecting forests of all ages.

**Manage deer.** Too many deer usually means too few young trees and the loss of the understory in the woods. If you don't hunt, consider a hunt club or hunting lease on your property to control deer populations.

**Design for wind.** Reduce risk of wind-thrown trees by having gradual transitions from short to tall vegetation at the edges of woodland stands.

**Plan fuel breaks.** Wildfire is always unexpected, but having fuel breaks like well-maintained roads or a thinned area can make it more difficult for fires to spread.

**Assess conditions quickly** after a storm or fire, and act wisely; some actions are only possible or cost-effective soon after the damage. Contact a forester first.

**Monitor for disease and insects.** A small problem is easier and less expensive to control.

**Consider future flooding** when investing in management or land purchases on the coast or along rivers.

**Consider storm surges and sea level rise.** Plan for species with higher flooding and salt tolerances in flood-prone tidal and non-tidal areas.

**Ask your forester** about programs to help pay for needed management.

# What you can do

| | Climate change impact | Management option |
|---|---|---|
| **Shifting species distribution** | Trees have been slowly migrating northward in the U.S. This trend will continue as temperatures warm, bringing some southern species to your property and creating poor conditions for northern species. | Consider current and future conditions; Diversify stand ages and structure; Plant diverse tree species; Build connectivity; Identify and maintain species at southern extent of their range; Choose drought resistant species; Increase monitoring; Control invasive species |
| **Sea level rise and coastal flooding** | Over the last one hundred years, sea levels have risen by one foot in Maryland and recent estimates suggest it will rise another 2-5 feet by 2100. Woodlands will be impacted by erosion, higher soil salinity, saturated soils, and wind and wave impacts from storms. | Monitor high-water line marks and salinity levels; Plant red cedar and honey locust where salty soils are a problem; Plant a diversity of flood tolerant vegetation; Plant flood tolerant species at higher elevations; Create living shorelines and use natural stabilization techniques; Increase the width of forest buffers |
| **Increased temperatures, drought, and fire** | Rising temperatures and longer summer droughts increase the risk of forest fire. Woodlands will also be more stressed and more susceptible to disease and invasive species, contributing to the spread of any fire. | Remove unhealthy trees and reduce overcrowding; Increase tree species diversity; Interplant species tolerant of drier, warmer conditions; Avoid planting in severe drought or plant in the fall when soil is moister; Reduce loss of soil moisture; Use vented planting tubes; Plan fuel breaks; Practice Firewise landscaping around your house |
| **Invasive species, pests, and disease** | Longer growing seasons and warmer winters, rising carbon dioxide, and shifting species distributions associated with a changing climate allow invasive species, pests, and disease to impact your woodland more severely than they do today. | Monitor and remove invasive plants; Remove or kill unwanted, invasive vegetation before planting seedlings or harvesting; Clean your equipment and clothing; Reduce deer populations to healthy levels; Monitor for disease and insects; Diversify stand ages and structure; Remove unhealthy trees and reduce overcrowding |

## Manage your woods

*Step 1: Learn more about your woods*

http://extension.umd.edu/woodland

http://dnr.maryland.gov/climatechange

http://dnr.maryland.gov/forests

http://landserver.org

*Step 2: Find a forester:*

http://extension.umd.edu/woodland/your-woodland/find-forester

http://dnr.state.md.us/forests/forester.asp

*Step 3: Identify your goals & objectives*

*Step 4: Develop and implement a forest stewardship plan*

## Storing carbon in woodlands and wetlands

Forests naturally capture carbon dioxide from the atmosphere which is then stored as carbon in live trees, woody debris such as fallen branches and leaves on the forest floor, and the soil. Some actions to take are:

- Work with your forester to evaluate carbon storage potential and sustainable forestry practices;
- Keep forests as forests;
- Plan for longer intervals between harvesting;
- Harvest wood and store carbon within wood products; Identify locations for reforestation and afforestation; Reduce overcrowding of trees;
- Protect existing salt marsh and wetlands on your property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