



REDUCING GREENHOUSE GAS EMISSIONS: MUNICIPAL SOLUTIONS



FACT SHEET #2: TREES AND OPEN SPACE

What is Climate Change?

Our global climate is always changing, but now the rate of change is accelerating much faster than ever before. The Earth's average temperature has increased by 1°F over the past 100 years. Although the change seems small, it has happened very quickly—a mere speck on the Earth's long lifetime. Rapid climate change can have major impacts on many aspects of the environment, such as water quality, agriculture, coastal erosion, and sea level.

Temperature changes naturally as a result of the Earth's CO₂ (carbon dioxide) cycle. Animals and other living things release CO₂ into the air, while other organisms, such as plankton, absorb CO₂ through the ocean. For millions of years, carbon dioxide and the other greenhouse gases (such as methane) were balanced by the Earth's delicate atmosphere. Since the Industrial Age, human activities, such as fossil fuel burning and de-forestation, have disturbed this balance.

CO₂ emissions are now so high that they cannot be completely absorbed naturally. As a result, CO₂ is building up in the atmosphere and the Earth is warming (see adjacent figure).

Evidence of climate change is all around us. Severe weather is becoming more common. Not only is the Earth's temperature rising, but the world's oceans are also rising. Signs of high sea levels and beach erosion become more obvious every year. These environmental impacts will become more serious as CO₂ continues to build up.

What We Can Do: Sequester Carbon in Plants

There are many ways to deal with the challenge of climate change. Some programs work to reduce carbon emissions, while others help communities adapt to environmental changes. The Waquoit Bay National Estuarine Research Reserve has identified several priority measures that communities can implement in order to lower the amount of carbon emissions they produce. This fact sheet focuses on planting trees and open space preservation to sequester carbon in plants.

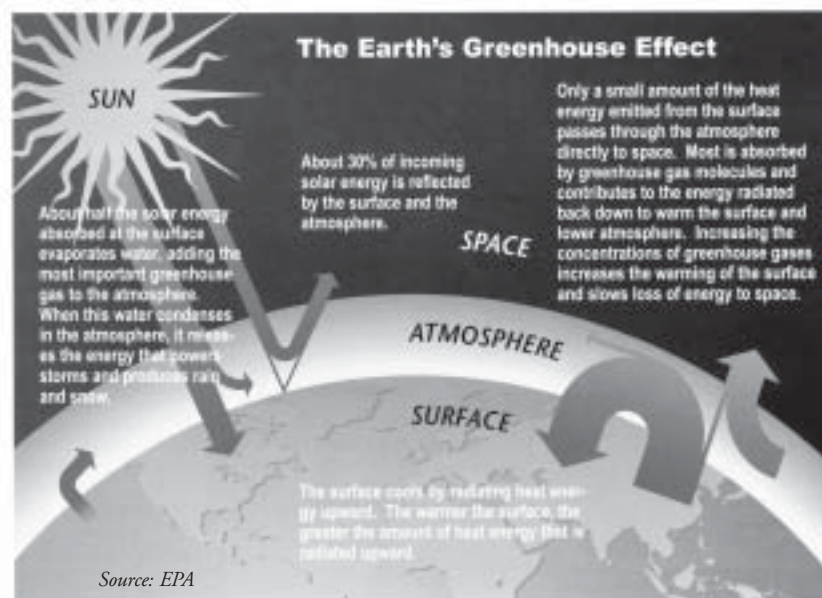
Why Plant Trees and Save Open Space?

Increasing tree cover is an excellent way to reduce greenhouse gases and save money. Trees sequester, or store, CO₂ during photosynthesis. Absorbing CO₂ from the atmosphere, one tree can store 50 pounds of the gas each year. Trees also provide

shade for buildings and streets, reducing the amount of energy needed to cool buildings during warm-weather months. Reducing energy needs saves money for towns and citizens and lessens dependency on fossil fuels.

Preserving open space not only prevents the removal of a lot of trees, but also maintains other habitats such as grasslands which also

act as "sinks" for carbon. Open spaces such as parks can also reduce the extra heating that many cities experience due to the presence of dark roofs on buildings and paved roads (the "urban heat island effect").



Case Study: Braintree, MA

In 1992, the Braintree, Mass. Electric Light Department joined Tree Power, a tree-planting program sponsored by the American Public Power Association (APPA). Tree Power is an award-winning, nationwide effort by public power utilities to plant trees as a sign of their commitment to energy conservation and the environment. The utility company offers two free trees to customers to promote energy savings. The Electric Light Department contracts out to a nursery, and gives away one red maple tree and one green maple tree, both eight feet tall. Customers are instructed to plant on the south and west facing sides of their homes during the spring. The trees are guaranteed for one year. In 1992, the cost saved in utilities was \$47 per tree. In 2002, the cost saved has risen to \$65 per tree. To date, customers in Braintree have planted 2480 trees, sequestering about 124,000 pounds of CO₂ each year.

Case Study: Cape Cod Land Bank

Between the years of 1951 and 1990 Cape Cod lost a third of its wooded land (equal to 100 square miles) to residential and commercial growth. This loss of trees equates to an increase in atmospheric carbon of 166,400 tons per year.

In 1998, the Massachusetts Legislature enacted, and the 15 towns approved, the Cape Cod Open Space Land Acquisition Program. This Act created the Cape Cod Land Bank, a program designed to purchase and protect open space and conservation lands. The Land Bank is funded by a 3% surcharge on real estate property tax bills, a \$15 million state match, and independent donations. Volunteer open space committees in each town advise which lands should be acquired with these funds; by the end of 1999, 800 acres were approved for purchase totaling close to \$20 million.

Land Bank property is managed by the towns themselves, with the provision that it be retained in a "natural, scenic or open condition", a condition that is enforced by a permanent deed restriction. However, it is clear that improvements may be made on the property for passive recreational purposes, as long as they are consistent with the reasons for acquiring the land.

Case Study: The Mashpee National Wildlife Refuge

The Mashpee National Wildlife Refuge was established in 1995 thanks to collaboration among federal, state, and local environmental agencies, as well as private nonprofit conservation organizations. This ground breaking partnership now serves as a national model for collaborative land protection.

The Refuge spans 5,871 acres, with 4,653 acres falling in Mashpee and the other 1,128 acres in Falmouth. In total, the cost of protecting this land since 1995 has been \$15 million. The Refuge partners have been successful thus far in that they have protected more land than has been lost to development, but challenges lie ahead. The pace of development in Mashpee and Falmouth has skyrocketed in the past couple years, and the cost of land acquisition has increased 40 percent in the year 2000 alone.

Sources:

Waquoit Bay National Estuarine Research Reserve, "Global Climate Change: What Communities Can Expect and What They Can Do", Science and Policy Bulletin Number 7, July 2001.

Benefits of Trees in Urban Areas - <http://www.coloradotrees.org/benefits.htm>

Cape Cod Land Bank - <http://www.vsa.cape.com/~cccom/landbank/QA.htm>

Mashpee National Wildlife Refuge, fact sheet, March 2002

Tree Power - <http://www.appanet.org/programs/index.cfm>

Woods Hole Research Center, "Losing Cape Cod" - <http://www.whrc.org/ccatlas/ccatlas.htm>