DOCUMENTS BUTTERFLIES
Biodiversity Projects

From The Biodiversity Project's Getting on Message: Making the Biodiversity-Sprawl Connection; for more information, see www.biodiversityproject.org.

BIODIVERSITY IS...

Biodiversity is the grand diversity of life on Earth and all the interconnections that support these myriad forms of life. Scientifically, biodiversity is expressed through the:

· genetic variability within a species (e.g. the differences in body size, the colors of roses, the heat of different chili peppers);
· diversity of populations of a species – in both the number of individuals within a local group and the distribution of their geographic range (e.g., the size of the loon population in northern Wisconsin and the presence of loon populations from Alaska to Maine);
· diversity of species within a natural community, (e.g., the abundance of fish, coral, and other species around the Great Barrier Reef); and
· wide array of natural communities and ecosystems throughout the world (e.g., tropical rainforests, tall grass prairies, or the boreal forest).

Today, scientists estimate that there are between 15 and 100 million species. (The larger figure accounts for the unexplored diversity of microscopic life forms.) This astonishing diversity supports our own existence, directly through the products we need on a daily basis, and indirectly through the ecological processes that maintain our environment.

But biodiversity, along with the benefits and services it provides, is diminishing. Intact wilderness areas are rapidly becoming islands of natural habitat within developed and ecologically degraded landscapes. …

BIODIVERSITY IS IMPORTANT

Ecosystem Services -- What Nature Does for Us Every Day

The word ecosystem is derived from the Greek oikos for "home," coupled with the concept of a system. Our "home systems" indeed make Earth hospitable for human life. At the global level, these life support systems include the:

· transfer of energy from sunlight to plants and its distribution throughout food webs;
· storage, release, and distribution of carbon – an essential building block of all life forms – by forests, oceans, and the atmosphere;

· cycling of nutrients, such as nitrogen and phosphorus, between air, water, soil, and living
organisms;
· water cycle, which purifies and distributes Earth's fresh water; and
· oxygen cycle, through which plants and animals exchange carbon dioxide and oxygen.

These cycles shape the climate, providing us with a survivable temperature range and an atmosphere in which we can breathe. Along with these cycles, ecosystems also provide more subtle, but equally essential, services. For example, they decompose and biodegrade our waste and generate and renew the soils that produce our food crops. Within ecosystems, species play particular roles that enhance our survival and quality of life. For example, pollinators, from bees to bats, are the ecological magicians that make it possible for most of our crops to reproduce.

Other species, such as ladybugs and dragonflies, are hard-working natural controls for pests….

Aesthetics

For most people, the natural world is beautiful and valued for its aesthetic appeal. From a red cardinal wing to a spectacular mountain vista, nature brings pleasure to our lives and enriches the human experience. When describing "quality of life," many people mention access to nature and to open space. Biodiversity is the full tapestry of nature, from the perfection of a seashell's design to the rich variety of life that makes a forest more than a crop of trees. Loss of biodiversity diminishes the tapestry and impoverishes our world of natural beauty and wonder, both for ourselves and for the generations that follow us.

THREATS TO BIODIVERSITY

Human Population Growth and Consumption

With six billion people living on Earth, and more arriving every day, basic human needs for fresh water and fuel are making unprecedented demands on our global and local ecosystems. Beyond the necessities of survival, there is increasing demand throughout the globe for more material goods and services. Americans consume more resources per capita than people in any other nation on Earth. As other nations strive to increase material wealth and the comforts and conveniences we take for granted, the strain on natural resources and biodiversity will only increase.

What We Can Do:

· Plan our families with the planet in mind.
· Purchase sustainably produced goods and limit the volume of "stuff" we buy.

Habitat Conversion and Sprawl

The single greatest threat to biodiversity in the U.S. and around the globe is the loss of natural communities to development and agriculture. Between 1992 and 1997 in the U.S., 16 million acres of forest, cropland, and open space were converted to urban and other uses. Since the European settlement of North America, 27 different types of natural communities have declined by 98% or more in size. The destruction of previously intact ecosystems results in a loss of habitat for multitudes of species and breaks down an ecosystem's ability to function.

Sprawled development is a leading cause of habitat loss and thus biodiversity loss. Sprawl also exacerbates air and water pollution, both of which degrade environments and further reduce biodiversity. New construction often increases erosion of land cleared for development. This in turn increases stream siltation. As the land area for natural ecosystems shrinks, there is less natural capacity to filter pollutants and detoxify waters and less capacity to cycle nutrients and compost organic wastes. Thus, as sprawl increases, species and ecosystem services decrease.

What We Can Do:

- Live in established communities instead of new developments.
- Grow "backyard" habitats.
- Promote smart growth initiatives.

Exotic Species Invasions

Plants and animals that are not native to an ecosystem can wreak havoc on the naturally occurring species within that system. Exotics often out-compete native species for resources and occupy much of the available habitat. Purple loosestrife and kudzu are good examples. Other exotics prey on native species or usurp or destroy their habitats. For example, brown snakes have eradicated virtually all bird life on Guam, and zebra mussels prey on and replace native mussel beds. The impact of exotics on agriculture, fisheries, and other aspects of our economy is estimated in the billions of dollars each year; the impact on biodiversity is immeasurable.

What We Can Do:

- Buy locally made or locally produced goods.
- Learn about exotics – don't landscape with non-natives or invasive speicies such as honeysuckle.
- Make sure that boats and trailers are absolutely clean when leaving a body of water – don't provide a ride to shore for hitchhiking aquatic invaders.

Overhunting/Exploitation

Over-hunting, over-fishing, and industrial-scale “mining” of natural resources have placed many species in peril. Over-harvesting of regional fisheries has driven several fish species to the brink of extinction-- from the once-fabled cod fisheries of Georges Banks to the abalone stocks in California-- and reduced the overall diversity of marine life. Industrial-scale logging, for wood products and timber, destroys millions of acres of forests each year, along with their oxygenreplenishing, erosion control, and runoff prevention services. Over-hunting and illegal trade in endangered species are a prime threat to their survival. For instance, box turtles in the U.S. are illegally collected and exported as pets, and, they die in the tens of thousands each year. These species are very slow to reproduce, and, in some populations, poaching has resulted in too few
hatchlings surviving to offset adult mortality.

What We Can Do:
· Buy only sustainably harvested, certified timber products.
· Avoid over-fished species, such as swordfish.
· Avoid buying goods produced from illegally traded or rare species.

Environmental Degradation
Humans aren’t the only species that suffer the ill effects of pollution. Pollutants are pervasive; even in remote lakes in the Arctic, high levels of DDT are found in marine mammals, affecting their ability to reproduce. Ozone pollution from the Ohio Valley is damaging trees in the
southern Appalachian Mountains, while acid rain (and now “mercury rain”) continues to plague the lakes and forests of the upper Midwest, the Adirondacks, Ontario, and New England.
Weakened immune systems and failure to reproduce are common effects of toxic pollution on a wide array of species. In some cases, a polluted ecosystem prevents the survival of many species inhabiting lakes and streams that are choked with silt and nutrients, while in other cases physical barriers, such as dams, prevent native fish species from reproducing.
What We Can Do:
· Conserve energy: walk, bike, or use public transit.
· Conserve water, avoid lawn chemicals, and use environmentally safe household cleaning products.
· Insist on enforcement of EPA regulations, Clean Air, and Clean Water acts.
Our very survival depends on the grand and infinitely complex community of plants,
animals, and other living organisms that share the Earth with us. We must act individually and collectively to prevent the continued destruction of species, habitats, and ecosystems.

RESOURCES

"39 Things You Can Do for Our Planet." Audubon Nov/Dec 1999. Vol 101, No. 6.
Biodiversity. Washington, D.C.: Ecological Society of America. www.esa.sdsc.edu
Bryant, P. Biodiversity and Conservation: A Hypertext Book. www.darwin.bio.uci.edu/~sustain/bio65/
Daily, G., ed. Nature's Services: Societal Dependence on Natural Ecosystems. Washington, D.C.: Island Press, 1997.
Invasion. Washington, D.C.: Ecological Society of America. www.esa.sdsc.edu
Janetos, A. "Do We Still Need Nature? The Importance of Biodiversity." Consequences Vol 1 No. 3. 1997.
Naeem, S., et. al. "Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes." Issues in Ecology No. 4. Washington, D.C.: Environmental Society of America.
Wilson, E.O., ed. Biodiversity. Washington, D.C.: National Academy Press, 1988.
Wilson, E.O., and Perlman, D. Conserving Earth's Biodiversity CD-ROM. Washington, D.C.: Island Press, 2000.

From The Biodiversity Project's Getting on Message: Making the Biodiversity-Sprawl Connection; for more information, see www.biodiversityproject.org.