

Fact sheet from Bringing Nature Home presentation by Doug Tallamy

We are losing the plants and animals that we share this planet with because we have done a poor job of sharing.

Biodiversity losses are a clear signal that humanity's life support systems are failing.

We need biodiversity because biodiversity runs the ecosystem on which we depend. The more diverse an ecosystem is, the more services (oxygen, watershed protection, water purification, soil building and stabilization, moderation of weather systems, carbon dioxide sequestration, garbage recycling, pollination services, etc.) it will provide for us.

With ever-growing human populations, we need more ecosystem services. But as we kill off our biodiversity, we are getting fewer and fewer services from our ecosystems.

We are modifying nearly all of our land for our own purposes.

We have paved 4 million miles of roads in the U.S. (Hayden 2004), an area equivalent to 37,879 sq miles, or nearly five times the size of New Jersey.

We have converted 62,500 sq miles to suburban lawn in the U.S. (45.6 million acres). This is over 8 times the size of New Jersey dedicated to an alien plant.

Our remaining undeveloped land is overrun with invasive non-native plants. 85% of our nation's invasive woody plants are ornamental species that have escaped from our gardens (Kaufman & Kaufman 2008).

Habitat loss is taking its toll.

State Natural heritage programs estimate that as many as 33,000 species of plants and animals are "imperiled" in the U.S., no longer common enough to perform their function in ecosystems. 1/3 of North American bird species are now considered endangered (<http://www.stateofthebirds.org/>).

Because 54% of the U.S. is now in a matrix of cities, suburbs, or fragmented habitat too small to sustain wildlife, and 41% is in agriculture, biodiversity will have to survive in those areas if it is going to survive at all. Truly natural areas are gone nearly everywhere.

Our parks and preserves are not large enough to sustain biodiversity

Why can't biodiversity survive in our parks and preserves? Because we have changed large habitats into small habitats that can only support tiny plant and animal populations. and tiny populations are vulnerable to local extinction (Rosenzweig 2005).

Biodiversity is not optional, and yet we are forcing it to extinction.

This doesn't have to happen!

We can prevent many or most extinctions if we redesign our cities and suburbs so that other species can share those spaces with us. If we also redesign our agricultural land, we can prevent even more. Today, our neighborhoods support very little biodiversity. Our challenge is to redesign our gardens and their surrounding landscapes so that they become functioning ecosystems once again.

How do we increase diversity?

Animal diversity starts with plant diversity. All energy is captured by plants and all animals get their food from plants. Therefore, the amount of vegetation in a given area determines the carrying capacity of that area (i.e. the amount of life that can be supported indefinitely in that area).

Insects are key!

Insects are the most important group of animals that transfer energy captured by plants to other animals. If you remove insects from a food web it will collapse because so many other creatures depend on insects for food. For example, 96% of all terrestrial birds rear their young on insects. No insects; no baby birds.

90% of all native insect that eat plants require native plants to complete their development (Bernays & Graham 1987). Plants protect their leaves with toxic chemicals. Insects can survive after eating those chemicals only after they have evolved physiological mechanisms for detoxifying them. This requires a long shared evolutionary history between insects and their host plants. Native insects only have such histories with native plants. They have not been exposed to plants that evolved in Europe or Asia long enough to be able to develop the adaptations needed to use them as host plants.

Every time we plant an introduced plant, we are reducing the local insect population and thus depriving the birds and wildlife of the food they need to survive and reproduce.

Studies have shown that areas overrun with alien plants produce 22 times fewer caterpillars, the most popular insect food with birds. Introduced plants used in the ornamental trade support 18 times fewer species of caterpillars than native ornamental plants (Tallamy & Shropshire 2009).

Generalist insects will not be able to compensate for the loss of specialist herbivores. Although they are better able to eat a variety of plants, the chemical differences between most alien plants and our native species are too great even for generalist to overcome (Tallamy et al. 2010).

To share suburbia with wildlife, we need to: 1 create corridors connecting natural areas; 2) reduce the area now in lawn; and 3) begin the transition from alien ornamentals to native ornamentals.

Homeowners can do this by flipping the age-old landscaping paradigm on its head. Instead of designing where your flowerbeds will go in a sea of lawn, design where you need lawn for walking spaces and plant the rest of your property with native ornamentals.

Studies have shown that even modest increases in the native plant cover on suburban properties increases the number and species of breeding birds, including birds of conservation concern (Burghardt et al. 2008).

As gardeners and stewards of our land, we have never been so empowered to help save biodiversity from extinction, and the need to do so has never been so great. All we need to do is plant native plants!

For further reading

Tallamy, D.W. 2007. Bringing Nature Home: How Native plants Sustain Wildlife in Our Gardens. Timber Press. Portland, Oregon.

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Burghardt, K. T., D. W. Tallamy, C. Philips, and K. J. Shropshire. 2010. Non-native plants reduce abundance, richness, and host specialization in lepidopteran communities. *Ecosphere* 1(5): art11. doi:10.1890/ES10-00032.1

Tallamy, D.W., J.Bruck, S. Walker, K. Pippins, S. Shpak, and A Lucey. Submitted. The abundance, diversity and geographic origin of suburban landscape plantings. *Arboriculture and Urban Forestry*.

Burghardt, K. T. and D. W. Tallamy. 2013. Plant origin asymmetrically impact feeding guilds and drive community structure of herbivorous arthropods. *Diversity and distributions*. In press.