



**Turning a New Leaf** Conference  
Shepherdstown, West Virginia  
November 16, 2013

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Keynote Address

Your Role in Building Biological Corridors: Networks for Life

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Networks for Life: Your role in stitching together the natural world

Only 5% of land in the lower 48 states have anything close to pristine natural state. Most land is affected by human actions resulting in fragmentation, overgrazing, development, air pollution, climate change, and invasive species impacts. In the past people had to fight against nature to avoid freezing, starvation, or attack from other animals, but because there were relatively few people, our actions didn't result in ecosystem collapse. People are not inherently evil, but we are products of our past. Now that we are numerous, our actions are resulting in the 6<sup>th</sup> great extinction event.

Our parks and natural areas are not large enough to sustain biodiversity. As an example, box turtles populations in a University of Delaware 100 acre woodlot have declined from 91 turtles in 1968 to 12 turtles in 2010. It is likely that this population will undergo a local extinction soon.

How many species do we need for good function locally? Studies by Reich et al., 2012, Maestre et al., 2012 and Naeem et al., 2012 all show that ecosystem function increases as the number of species increases. So we need all of the species in our ecosystems - biodiversity runs our ecosystems. Biodiversity increases ecosystem stability, improves biogeochemical processes, increases productivity and decreases susceptibility to biological invasions. Species are rivets holding the ecosystem together and those ecosystems sustain us. The 2005 Millennium Ecosystem Assessment found that 60% of the Earth's ecosystems have been degraded. These services include providing clean air and water, topsoil, flood prevention, seed dispersal, carbon storage, recycling, pest control and pollination.

Fragmentation has reduced our natural capital. For example, 127 species of neotropical migrant birds are declining in number and there are 50% fewer birds species than there were 40 years ago. Birds serve as biological indicators of ecosystem health. We need to create biological corridors to reduce isolation among fragments, increase population sizes of species, and lessen local extinction.

Opportunities for corridors already exist. Mountain ridges are often undeveloped and can link areas. There are 300,000 km of power lines that could provide scrub habitat. The 4 million miles of roads in the US could be made into corridors with less mowing (although roads could be traps for species due to cars, so roadway corridors need further study). Rangelands cover 770 million acres in the US and could provide grassland habitat if we avoid overgrazing (and switch from cattle to buffalo).



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We don't always have convenient opportunities to put corridors where we need them though, so we need to restore managed landscapes as well. We can save nature only if we learn to live with it. The plant communities we restore don't have to be perfect replicas, but some plants support more wildlife than others. For example autumn olive has been here for 120 years, but it still supports very few insect species compared to black cherry. In a study of hedgerows of native plants versus invasive plants, native hedgerows supported 22x more caterpillars than invasive hedgerows. Many insects are specialists eating only a few species of plants (90% of phytophagous insect species eat plants in 3 or fewer families (Bernays and Graham, 1998). We need to reconstruct food webs and the more complex the food web, the more stable it is. We cannot build effective corridors without ignoring specialist insects because so many animals eat insects. Fish, amphibians, rodents, even larger animals (25% of foxes diet is insects). 96% of terrestrial birds feed insects to their young.

How many insects are needed? Lots. For example, a pair of chickadees collect 390-570 caterpillars/day; 6000-9000 caterpillars to rear a clutch of chicks.

The typical suburban landscape is 92% lawn and contains 74% alien species. It has 10% of the tree biomass of a woodlot. Most people see plants only as decorations and have forgotten their ecological function. Think of a crepe myrtle as a statue in the landscape, because they are essentially biologically inert. We need to start designing landscapes so that we put lawn only where we really need it and plant everything else heavily. If we turn ½ of the area now in lawn to functional corridors we would have 20 million acres of connected habitats. Call it Homegrown National Park and it would be bigger than all our largest national parks combined.

Plantings can introduce surprise, anticipation and entertainment into our landscapes, and they have health benefits. We are entering the "ecocene" era where we have the ethical and ecological will to sustain life.

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Q. How often to mow roadsides?

A. Preferably mow on a 3 year cycle, mowing 1/3 of area each year in early spring.

Q. Are there examples of riparian corridor restorations?

A. Nashville, TN doing restoration.