

Pollinator Habitat for Managers of Large Land Areas **Including roadsides, rights-of-way, restoration of disturbed sites and conservation areas**

Roadside and utility rights-of-way have the potential to be excellent habitats for pollinators and also for many other wildlife species that need early successional habitat (open land with grasses and herbaceous plants rather than trees and shrubs [1,2,3]). Rights-of-way have both negative and positive effects on pollinators and other wildlife (1). Depending on the specific biology of the species involved, they can have negative effects from habitat fragmentation, pollution, and spread of invasive species or habitat generalists into new areas, but they also have the potential to provide a huge resource of stable, early successional habitat to bees, butterflies, moths, flies, and other wildlife (1,2). The area under powerlines covers between 5 and 8 million acres in the continental US (2), and national roadway rights-of-way cover nearly 10 million acres (1). In one study in Maryland, a powerline right-of-way, managed every 4-5 years with selective basal herbicide spraying of tall-growing trees, removal of all trees and topping of all shrubs greater than 3 m, had dense growth of shrubs favorable to pollinators, and had higher species richness of bees and more rare species than nearby annually mowed fields (2). Another study of a powerline corridor running from central Connecticut north to southern New Hampshire found significantly greater plant diversity in the right-of-way than in adjacent woodland areas, including host plants for many specialist bees and rare moths and butterflies (4).

In managing land on a large scale, a systematic, comprehensive approach is needed, and a level of expertise in ecological restoration and the specific constraints and opportunities of a particular use and site that are beyond the scope of this guide. There are detailed manuals specific to roadsides (5-8), utility rights-of-way (9,10), and conservation areas (11,12).

While pollinator habitats on farms often have goals of increasing and stabilizing pollination of specific crops, the goals for increasing or improving pollinator habitat on other lands can be broader. Crop pollinators are a limited subset of wild pollinators (13). Pollinator plantings that are not directly tied to agricultural goals have the opportunity support a broader range of pollinators and other native wildlife, and to make connections with the surrounding native ecosystem. These goals are best accomplished by encouraging the growth of native plants, either through management practices or by deliberate planting of seeds or other plant materials. Well-planned native plantings can also serve other goals of land management by creating locally- adapted functional plant communities for the long term that will reduce maintenance after establishment (11). Native species are generally in ecological balance with their associates and competitors, and have pest, predators, and diseases that limit their abundance, unlike many non-natives, which can dominate habitats and eliminate native plants and animals from the area.

What is a native plant? A useful definition, adopted by the Federal Native Plant Conservation Committee is: “a plant species that occurs naturally in a particular region, state, ecosystem, and habitat without direct or indirect human actions” (14). Note that “native” refers to an area of interest. Many plants recommended in lists of pollinator plants or in pollinator seed mixes are native to the US, but not necessarily to Connecticut. A recognized source for determining if a plant species is native to Connecticut and to other New England states is the book, *Flora Novae Angliae* (15), with additional information, including county-level maps, available from the website Go Botany (18). Metzler & Barrett (16) classified the different plant communities and the plants

species belonging to each for Connecticut, describing the extent of each vegetation type and general location, along with specific examples.

Before altering the environment to improve pollinator habitat, it is best to start with an inventory of existing conditions, including native plant communities, nesting habitats for pollinators, and site conditions. The Xerces Society has created a pollinator habitat assessment tool for natural areas and rangelands (17) and guides for site analysis are also included in manuals for roadsides (5,6,7).

Where native plant communities are already present, it is both more economical and more ecologically sound to manage them by removing any undesirable plants and, in heavily mowed areas, reducing mowing, rather than planting new plant communities. Undesirable plants (invasive plants or strongly competitive non-native plants) can be removed using spot treatment with herbicides, flame guns for spot weeding, or physical removal, followed by replanting with native species (5,7). Delaying mowing until late fall allows native warm season grasses and late blooming wildflowers to mature and disperse seed (5).

When bringing in seed mixes, plugs, or other plant material, it is very important not to plant any plant species that are native but of conservation concern (endangered, threatened or species of special concern) in Connecticut. There are several reasons for not planting these rare plants: 1. By bringing in seed from other states where the plant may be common, or from commercial sources, the genetics of a small, locally-adapted population may be swamped, 2. Planting rare plants in new sites may create confusion about which populations are naturally occurring and which are the result of intervention. 3. If the rare plant is legally protected, the new site will come under legal restrictions as well (7). The list of endangered, threatened and species of special concern for Connecticut is here (19).

A very good practice for identifying plants for new or improved pollinator habitats is to find reference sites nearby - undisturbed areas with native plants and pollinator activity and with similar sun exposure, soil type, water, and slope to the target site to be improved (5,7). This will show you what native plants grow well together under similar circumstances and can act as a model for the new site.

Many native trees and shrubs are important resources for pollinators, particularly in spring when few wildflowers are in bloom. Lists of trees and shrubs native to Connecticut and which have the potential to perform well in landscapes are here (20, 21). Managing trees and shrubs along roadsides and utility rights-of-way both as valuable resources (for shade, water and soil health, and clean air, as well as for their benefits for pollinators and other wildlife) and for safety requires knowledge and planning in order to create a mix of canopy trees, understory trees, and shrubs that is healthy, stable, and attractive. The State Vegetation Task Force report (10) provided guidance on planning and maintaining the roadside forest for these goals.

Meadows with a mix of native grasses and native herbaceous plants can be excellent habitats for pollinators because of they are sunny, open environments favored by many bees (and butterflies), and provide diverse sources of nectar and pollen. Establishing new meadows of native plants requires specific knowledge about plant choices, extensive site preparation, appropriate equipment

for seeding, and follow-up to remove weeds in order to have good establishment, and also requires periodic mowing at intervals of 1-3 years in order to prevent woody plants from coming in (7).

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