



Frosted Elfin (*Callophrys irus irus*)

Landowner Guide

IDENTIFICATION

The frosted elfin (*Callophrys irus irus*) is a gossamer-wing butterfly with brown forewings and frosted gray, tailed hindwings that have a dark spot and an irregular dark line on their underside. Caterpillars are pale green and covered with short white hairs. Historically, frosted elfin were found in the Great Lakes and East Coast states, but the loss of specific food plants and vital habitats over the past 30 years has reduced the species' range and abundance. Frosted elfin now occur only as local colonies in remnant habitats along the East Coast and Great Lakes.

This species is considered critically imperiled, with only a few known populations scattered among three main locations in the eastern half of Pennsylvania.

LIFE HISTORY

Although frosted elfin butterflies have four life history stages—eggs, two larval stages, and adults—their entire lifecycle is completed within 12 months. Frosted elfin do not migrate, and often spend their entire life within a mile of their hatch site.

Adults emerge in late April, then mate and complete egg-laying by mid- to late June. Females lay their eggs on yellow wild indigo (*Baptisia tinctoria*) and wild lupine (*Lupinus perennis*) in dry wooded areas.



Eggs may hatch in as little as one week and begin feeding on the wild indigo host plant. Larvae pupate by late July then hibernate in cocoons on or near the host plants, in plant litter or just beneath the soil surface, until they emerge as adults the following April.

HABITAT

Frosted elfin require dry, open woods, forest edges, and scrub areas with multiple patches of their hostplants. Historically, these early-successional habitats were maintained through periodic disturbances like natural fires.

As these habitats have been lost, frosted elfin have become increasingly reliant on man-made, “managed” areas like utility rights-of-way, railroad corridors, and recreational trails.

Frosted elfin survival depends on the ongoing availability of large patches of suitable habitat, since long-distance movement to find new habitats is unlikely.

LARVAL HOSTPLANTS

Frosted elfin hostplants are primarily yellow wild indigo and wild lupine, and possibly blue wild indigo (*Baptisia australis*). However, all known frosted elfin populations in Pennsylvania are associated with wild yellow indigo; in fact, most adults are found within 50 feet of a larval hostplant.

Eggs and larvae are most commonly found on large indigo plants (> 6.5 ft²), especially those that occur in patches with other indigo plants.

ADULT NECTAR PLANTS

Adult frosted elfin feed on nectar from various flowering plants, like wild lupines, violets, mountainmints, blueberries and huckleberries, pin cherries and berry brambles (*Rubus* spp.). Adults also feed on moist sand and the fringes of mud puddles, presumably for salts and minerals.

However, because adults spend most of their lives near larval hostplants, nectar sources must also occur in the same area as larval hostplants.

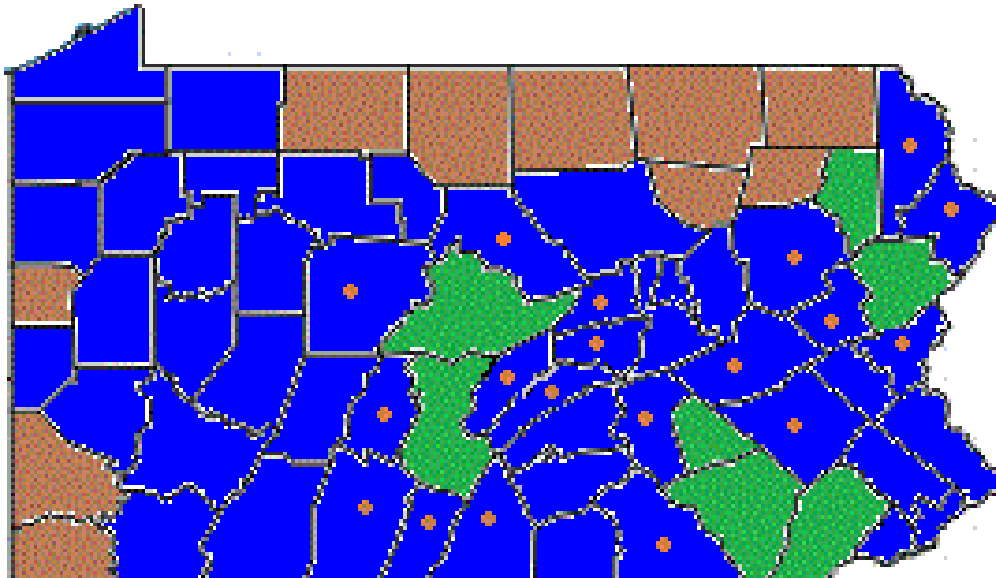


Figure 1. Historic (blue) distribution and priority areas (green) of frosted elfin in Pennsylvania. Counties with orange markers are targeted expansion areas. Counties not known to support hostplants (brown) are lowest priority.

HABITAT RESTORATION RECOMMENDATIONS

Priority areas in Pennsylvania are dry, open wooded areas, preferably near utility line corridors. Forests should be open (6 – 50% canopy cover) and contain a mosaic of vegetation types including thickets, open glades, forest patches, and many herbaceous/forb clumps. Habitat areas should generally be at least 6 acres in size, but can be smaller if wild indigo and wild lupine are especially dense. Methods to achieve frosted elfin habitat include:

- 1) Converting ag land adjacent to a forested edge
 - Herbicide: one application in late summer/early fall to control weeds
 - Seed: dry meadow wildflower seed mix for nectar areas
 - In fall, seed with cover crop of winter rye; in spring, no cover crop needed
 - Include wild lupine and blue wild indigo as secondary hostplants
 - Plant: at least 2 acres of yellow wild indigo, as seed (fall or spring) or plugs (spring only) in indigo-only patches, for larval areas. Seed at 2 lbs/ac; plant plugs on 3-foot spacing (approximately 4,000 plugs/ac)

- 2) Converting dry forest to open habitat
 - Thin Forest: herbicide application via stump/stem treatment or cut and grub trees, in spring or fall, to create openings of 5-6 acres
 - Seed: dry meadow wildflower seed mix, as above
 - Plant: at least 2 acres of yellow wild indigo, as above

- 3) Enhance native meadows or native warm season grass plantings with > 6% canopy
 - Mow: areas in spring, to create openings of 5-6 acres, total
 - Plant: forb plugs for nectar areas
 - to create or supplement adult feeding habitat
 - include wild lupine and blue wild indigo as secondary hostplants
 - Plant: at least 2 acres of yellow wild indigo, as above

LONG-TERM MAINTENANCE

- 1) Existing Frosted Elfin Habitat
 - Mow less than ¼ of the existing habitat in any one year, to create a mosaic of patches at different stages of re-growth. Set mower 6-8 inches off the ground, to protect overwintering pupae.
 - Where existing frosted elfin populations occur without fire, do not introduce fire. If site is currently burned, burn less than ¼ of the existing habitat on a 4- to 6-year rotation, to create a mosaic of patches at different stages of regrowth.
 - Apply herbicides as spot-treatments or stump-treatments, to prevent loss of nectar and larval plants. Limit or prevent drift from nearby cropfields as much as possible.
 - If spraying adjacent forest for gypsy moth control, spray before April (before adults emerge) or after July (after larvae have pupated).

- 2) Restored/Created Frosted Elfin Habitat
 - Mow as described for existing habitat above, as winter mowing (September 16 – March 31). Use machinery with the smallest footprint possible, to avoid crushing pupae.
 - Apply herbicides as spot-treatments or stump-treatments, to prevent loss of nectar and larval plants. Limit or prevent drift from nearby cropfields as much as possible.
 - Manage/Replant nectar and larval plants as needed to maintain dense patches of each close to one another.
 - Maintain/Replant nectar and larval plants as needed to connect frosted elfin colonies within one mile of another colony, to improve long-term persistence of local populations and connect remnant habitats.

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