

# PLANNING FOR

## The New England Plant Conservation and Research Plan Project

**T**he New England Wild Flower Society, the oldest organization in the United States dedicated to plant conservation, has been protecting plants for over 100 years through education, research, horticulture, habitat preservation and advocacy. With over 400 species listed as rare in one or more New England state, we have our work cut out for us.

First, a bit of background on the region. New England encompasses the six north-eastern US states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island. This is a varied but mostly gentle landscape of rolling hills and coastal plains; our tallest mountain, Mt Washington, is just under 6300 feet. Pleistocene glaciation has left its mark in coastal moraines, kettle ponds, rounded hilltops, talus slopes, sandplains, and rich but often rocky soils. Bedrock types range from calcareous marbles in the west to acidic granites in the east. The flora reflects this diversity of

▼ Spring plant combinations in bloom at Garden in the Woods, the botanical garden of the New England Wild Flower Society.



Hal Horwitz



Frank Bramley

landform and climate, ranging from the boreal species characteristic of Canadian taiga to more southerly denizens of the mid-Atlantic states.

This region has the longest history of colonial settlement in the US, but long before the pilgrims arrived, Native Americans had used the land, burning in places, practicing agriculture, hunting and gathering. Colonial farmers and ore miners cleared the landscape in the 1700s and 1800s, but in the past century, forests have rebounded from only 20% to nearly 80% of the land cover. These forests are dominated by deciduous trees at the lower latitudes (yielding New England's famous spectacular fall colours), with a transition to conifers (particularly spruce and balsam fir) in the

▲ Typical fall colours of Henry David Thoreau's haunts in Concord, Massachusetts. A surprising number of rare plants still find homes along semi-rural roads and forest edges in New England.

north and at high elevation. Peer beneath the forest cloak, however, and you will see that suburbs occupy the wooded dells; Massachusetts, Connecticut and Rhode Island are among the most populous states in the US. The colder northern states of Maine, Vermont and New Hampshire are less densely settled and retain some of their rural,

► *Liatris scariosa* var. *novae-angliae* (Northern blazing star) was once known from over 200 sites throughout New England; now, less than half those populations remain and many are small and precarious. Researchers from Brown University are studying its seed dispersal, genetics and habitat requirements. Populations are being managed using fire and removal of competing vegetation, and have begun to rebound. Photo: William Larkin



# PLANTS

BY ELIZABETH FARNSWORTH



Ellyn Meyers

▲ Over 400 Plant Conservation Volunteers help the New England Wild Flower Society achieve conservation by monitoring rare plant populations, searching for new occurrences, and performing on-site management. Here, volunteers are being trained to recognize rare plants in the field.

even wilderness feel. But agriculture and extractive industries including large-scale timber harvesting prevail in these states, and increasing numbers of second-home buyers are purchasing land and developing it. All this changing land use has

dramatically altered the available habitat for plants, many of which may have been favoured by more frequent fire regimes, open farm fields, and less pavement. Conservation planning for these species takes place in a context of intensifying land use in the region.

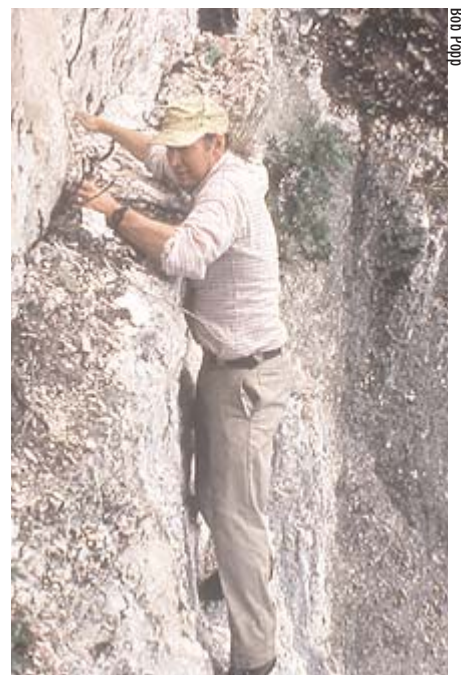
A critical prerequisite to conservation is systematic planning for individual species. The New England Wild Flower Society is completing an exciting new set of over 100 Conservation and Research Plans for plant taxa that are rare throughout New England. These plans are available in abridged, electronic format to the global conservation community. We hope they can serve as a model of planning for organizations throughout the world.

Groundwork for this project began over a decade ago. In 1991, with a flagship grant from the Jesse B. Cox Charitable Trust, the New England Wild Flower Society founded the New England Plant Conservation Program (NEPCoP), a voluntary association of 65 organizations working to prevent the extinction of our region's endangered plants and to promote their recovery. In 1996, members of NEPCoP published *Flora Conservanda: New England*, a review of all state- and globally-listed plant species

in New England, comprising approximately 20% of the region's flora. It quickly became apparent that to conserve these taxa we would need to prioritize the species and develop a systematic and rigorous set of planning tools. In 1999, an anonymous, far-sighted donor funded the nascent Conservation and Research Plan project for five years at \$500,000.

How do we go about all this planning? The New England Wild Flower Society employs a comparatively small but very dedicated staff of less than 40 full-time people working throughout the region. Thus, partnerships are critical to our work. We pursue this work through a diverse and dedicated network of professional botanists who write and review the plans, our Plant Conservation Volunteer

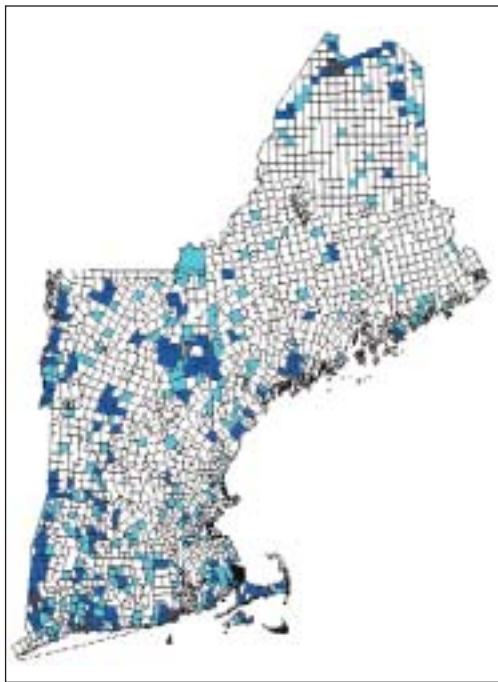
▼ The New England Wild Flower Society maintains the largest bank of native seeds in the northeastern US, including *ex-situ* collections of rare species. Here, Conservation Director Bill Brumback collects seeds from a rather remote population.



Bob Papp



▲ *Asclepias purpurascens* (purple milkweed) is rare throughout North America. Only four populations are known in New England. One has doubled in size due to painstaking management efforts to remove competing invasive species.



▲ The town boundaries for the six New England states. Darkness of shading corresponds to the number of rare plant populations in each town. Note clusters of populations on the southern shore, western boundary (defined by the Housatonic River and Champlain Valley drainages that border New York state), the White Mountains of north-central New Hampshire, the Connecticut River valley of west-central Massachusetts and Connecticut, and the St. John River watershed of northern Maine.

Corps (PCVs), our volunteer Task Forces, the Natural Heritage Programs in each New England state, academic partners who have undertaken research on the plants, and a staff that never sleeps. The US Fish and Wildlife Service and the US Forest Service have also contributed matching funds to help us exceed our original goal of 100 plans by 10%, addressing 110 taxa in 42 families. We hired 54 authors to write the plans, including professional botanists, students, professors and environmental consultants with expertise in conservation and familiarity with the species.

These peer-reviewed, comprehensive plans review the taxonomy, ecology, biogeography and conservation status of every known New England population of each rare taxon, and synthesize the state of our knowledge about each taxon throughout its entire range. Each plan then outlines a set of quantitative, prioritized objectives designed to ensure the taxon's viability in New England throughout the next 20 years, based on its current and historical status, its

apparent habitat requirements, and the feasibility of protecting populations at extant and new localities. Each plan stipulates specific actions for all known populations that will meet the stated objectives; many of these actions are already being implemented by a host of conservation partners. To date, 80 such plans have been published and 30 more are assigned and underway. The project will be completed in October 2004.

The format of the conservation plans is based on that of the US Fish and Wildlife Service's recovery plans for federally-listed species, and do not reinvent the wheel for species already covered by those plans. Our plans are distinct from other, similar efforts by virtue of voluntary collaboration; that is, they are non-governmental and non-regulatory documents. Unlike recovery plans, our Conservation and Research Plans can be developed for species that are rare mainly within New England. Thus, they can proactively address species that are undergoing gradual or regional rather than precipitous or global decline. The aim of many of these plans may be to retain the species' current status or define unacceptable levels of loss, rather than focusing solely on strategies to halt or reverse cataclysmic losses.

More than 120 individuals from all over North America have given their time to review the plans rigorously, making meticulous suggestions for improvement and adding their insights and experience. Following the first round of peer review, each plan then undergoes final peer review for effectiveness, logic, internal consistency, accuracy and completeness by our Regional Advisory Council, a group of professional plant conservationists. Only when they have passed muster with this expert panel are they approved for publication.

The plans are put into action as soon as they are published. Each conservation and management action recommended by a plan is assigned a priority and a timeline for completion; many, such as *de novo* searches of promising sites for the plants, careful monitoring of existing populations, or seed collection for the *ex situ* bank, are assigned to an enthusiastic army of over 700 amateur and professional Plant Conservation Volunteers and NEPCoP Task Force members. Natural

Heritage Programs and partners in other conservation organizations also receive the plans, which guide their management and protection activities.

Each plan tells a unique and detailed story about each species. But a body of dozens of these plans makes a significant contribution to conservation biology. Looking across the substantial quantity of data in these plans, we begin to discern patterns among the species: in their distribution, their ecological behaviours and requirements, and the common threats that face them.

What are we learning? We can identify 'hotspots' or clusters of rare species along major features of the New England landscape like the Connecticut River, the White Mountains, the marble belt from the northwestern Connecticut to northern Vermont, the St. John River in Maine (see map left). Perusing the records from herbaria documented in these plans, we can pinpoint promising places to search for long-lost populations of plants known only from historical specimens. We can also characterize "guilds" of plants that share ecological features. For example, there are the "split-personality" species that inhabit unusual habitats in New England which are unlike their traditional haunts in the rest of their range. Does this reflect new evolution or marginalization at the edge of a plant's range? This is but one of many questions to fuel a

▼ *Solidago rigida* (Stiff goldenrod) is another 'prairie remnant' of the New England flora; once more common when the landscape was covered with grassy fields and farms, the species has declined as forest cover and land development have increased.



Lawrence Newcomb

# PLANNING FOR PLANTS

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Elizabeth Fansworth

▲ Lilly Pond Bog, western Massachusetts, is a gem-like example of the many wetlands that dot the New England landscape.

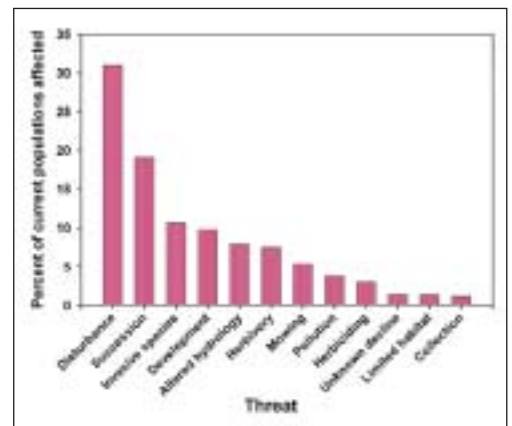


Bill Larkin

▲ *Polymnia canadensis* is easily overlooked in the mesic woodlands in which it occurs; plans call for more targeted *de novo* searches to gain a better understanding of its true distribution in the region.

dozen doctoral dissertations. We can devise management strategies that address the needs of rare plants that share particular rare habitats such as calcareous fens, alpine zones, and coastal plain ponds, fostering recovery of multiple rare species at once. We can also enumerate the most serious threats that confront rare plants; these include disturbances such as logging and trampling, succession and canopy closure that shade out plants, and encroachment by invasive exotic plants (see chart, right). All this cumulative information will inform both theory and practice in conservation generally.

These plans have identified many lacunae in our understanding of the species biology, life history, demography and interspecific interactions of these individual taxa. We especially lack field data on the impacts of mutualisms (e.g. pollination syndromes, mycorrhizal symbioses and seed dispersers) and competition (especially with invasive species) on the viability of rare species on the landscape. Much useful data on these interspecific interaction can be gathered through relatively simple and non-invasive field studies, but funding for such basic work is scarce. Research questions proposed by the plans are widely publicized among the academic community (see <http://www.newfs.org/conserve/planres1.htm> for examples).



▲ Populations of rare plants in New England face many threats, as shown in data above compiled from 80 species. Anthropogenic disturbance (particularly unsound logging practices) threatens over 30% of rare plant populations. Since many rare taxa are denizens of areas that were formerly more open in post-glacial times, the reversion of the New England landscape to mid-successional forest may eventually exclude them. Exotic invasive species are recorded as threats to 10% of rare plant populations.

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Hal Horwitz



Dorothy Long

▲ *Trollius laxus* (spreading globeflower) is a showy member of the buttercup family that inhabits rich forested wetlands of western Connecticut. Student projects supported by New England Wild Flower Society/National Science Foundation fellowships are revealing the impacts of canopy thinning and herbivory on reproduction by this rare plant.

▼ Elizabeth Farnsworth is one of many botanists who teach field workshops for members of the New England Wild Flower Society.



Jeff Carmichael

▲ *Triphora trianthophora* is an orchid that can form carpets of diminutive white plants, usually under forests of beech (*Fagus grandifolia*). Its relationships with these trees or their mycorrhizae remain a mystery.

In 2001, this project spawned a National Science Foundation-funded student research fellowship programme at NEWFS, which is sponsoring six new studies on rare species from Maine to Michigan. Students are locating previously unknown populations, developing and testing management tools to promote population viability, and uncovering pollination mechanisms and other symbioses important to the plants. Talented students are charting new career paths in conservation science.

Most important, the Conservation and Research Plans are helping plants. Healthy populations of rare species, once thought lost, have been relocated and new populations have been discovered during field work for the plans. Management to remove invasive species is helping a population of purple milkweed (*Asclepias purpurascens*) to rebound at one site in Connecticut, and with increased involvement of botanists in searching for it, two new populations have been found in the past few months. Canopy thinning is promoting reproduction in the Devil's bit lily, *Chamaelirium luteum* and the northern blazing star, *Liatris scariosa* var.



William Larkin

▲ *Lythrum salicaria* (purple loosestrife) is one invasive plant that threaten rare plant populations in New England. Conservationists need more information on the impacts of invasive plants and the measures to control them.

*novae-angliae*. We hope that, in time, these 110 species and many others will enjoy similar success stories.

The huge number of rare plant species in need of protection presents a daunting task for any conservation organization, especially in times of shrinking budgets. Our model demonstrates how partnerships can develop to share the burden of management and monitoring, volunteers can contribute tremendously to conservation efforts in the field, and academic scientists can provide much-needed basic information on the ecology and habitat needs of plants.

*Abridged versions of these plans are available at the New England Wild Flower Society website ([www.newfs.org/conserves/plans.htm](http://www.newfs.org/conserves/plans.htm)). To preserve site and landowner confidentiality, the abridged versions do not contain the specific site-by-site descriptions and actions described in the full plans. However, these PDF publications do provide extensive background on the biology and distribution of the species, which can stimulate research and inform conservation efforts for a great range of plants. Such background can provide a starting point for conservation planning in other regions for similar or related species of plants.*

**Dr Elizabeth Farnsworth is Senior Research Ecologist at the New England Wild Flower Society, based in Framingham, Massachusetts.**