

PCP's Year In Review

2017

Cheryl Gregory, PCP Administrator, 919.707.3760, cheryl.gregory@ncagr.gov
Lesley Starke, Plant Ecologist, 919.707.3758, lesley.starke@ncagr.gov
Jenny Stanley, Research Specialist, 919.707.3746, jennifer.stanley@ncagr.gov
Nancy Stewart, Information Tech, 919.707.3755, nancy.stewart@ncagr.gov





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NC Department of Agriculture & Consumer Services

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Plant Industry Division

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Plant Pest Administrator

Plant Protection Section

The North Carolina Plant Conservation Program was established by the Plant Protection and Conservation Act of the North Carolina Legislature in 1979. The Program is part of the Plant Industry Division of the North Carolina Department of Agriculture and Consumer Services.

The mission of the Plant Conservation Program is *to conserve North Carolina's native plants in their natural habitats, now and for future generations.*

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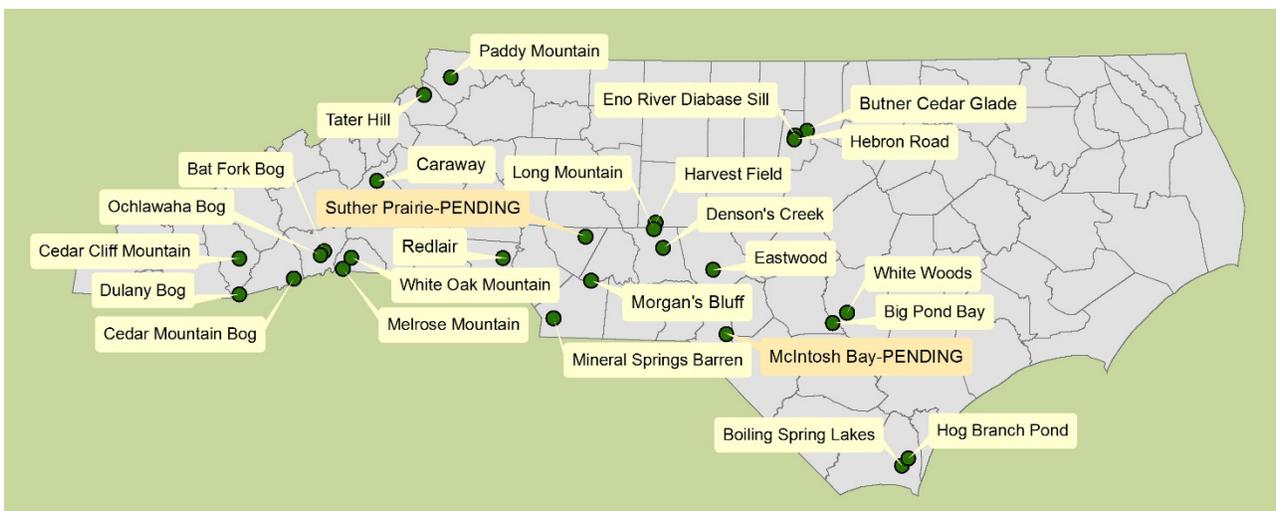
Protection Priorities

PCP’s conservation goal is to ensure protection of the two best natural populations of each imperiled plant species within each of the state’s 22 ecoregions in which they naturally occur. PCP maintains a list of priority sites available to distribute to partners in both spreadsheet and GIS shapefile formats. Send info requests to lesley.starke@ncagr.gov. We will be working with our partners to alert them to any changes in our priority lands portfolio that are in their working area. Given possible changes to the total protected species list as well as new population discoveries, loss of populations to various causes, and updates regarding the viability of known locations, the PCP staff anticipates the need to reassess which are the two best sites per ecoregion periodically. We remind all of our conservation partners to help us do this by submitting your data and observations of rare plants and communities to the NC Natural Heritage Program whose databases greatly inform our prioritizations.

Conservation Targets: Plant Conservation Preserves are the only public lands in North Carolina established and managed specifically to protect imperiled plant species. To help accomplish PCP's mission of conserving North Carolina’s native plant species *in their natural habitats*, each of our 24 preserves is specifically designed with a focal species; yet in most cases, multiple species are protected at a given site. As of December 2017, the Plant Conservation Program’s preserve system protects 73 extant threatened, endangered, or vulnerable species (11 of which are federally protected species; see page 12).

Property Acquisition Updates

Although no new plant conservation preserves were added in 2017, 180 additional acres were added to the Tater Hill Preserve in Watauga County. These added acres provide additional protected plant habitat and important natural communities to the preserve system making the conservation value of this preserve more robust. Ten acres were added to the western part of the preserve from the Pardue Tract. The larger 170-acre acquisition was Phase I of a two phase project to protect Harmon Knob, adjacent to the Rich Mountain Bald and Tater Hill Seeps and Bogs which the preserve currently projects. In October 2017, the Clean Water Management Trust Fund awarded funding to the Blue Ridge Conservancy to acquire 199 acres for Phase II of this project to expand the Tater Hill Preserve.

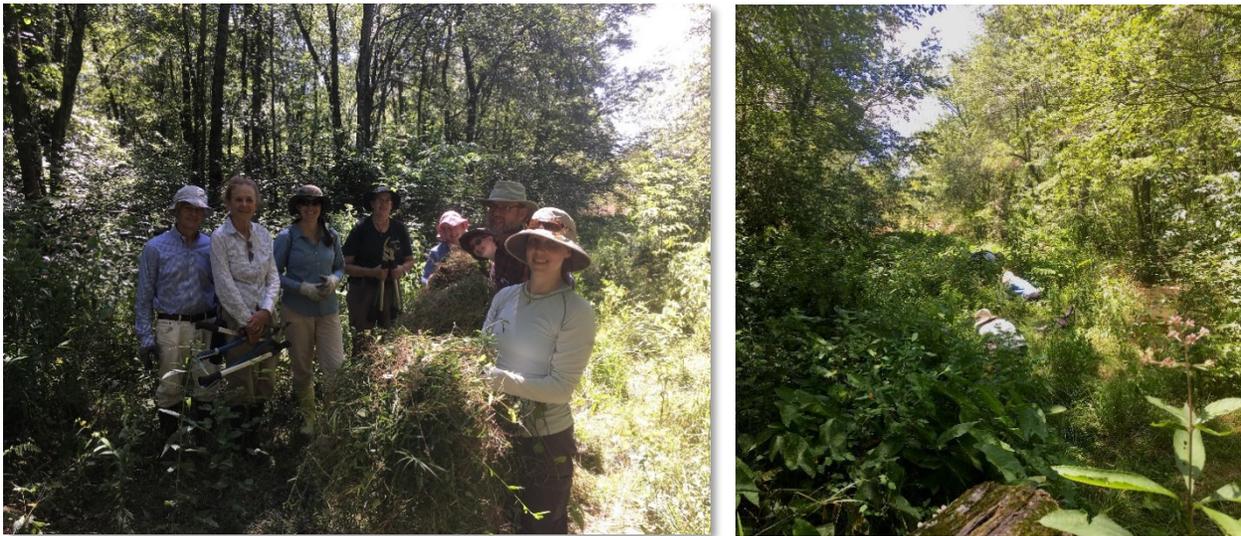


The PCP Preserve system includes 24 preserves, in 18 counties across the state, totaling >13,900 acres.

Two new properties (Suther Prairie and McIntosh Bays) are pending acquisition into the Preserve System (see map above). The former is a project being undertaken by the Cabarrus County Soil and Water Conservation District with the plan to transfer the property to PCP for permanent protection. This site contains a wet meadow with two protected plant species, the red Canada lily (*Lilium canadense* ssp. *editorum*) and small sundrops (*Oenothera perennis*). The latter is a collaborative project between The Nature Conservancy (TNC) and PCP whereby TNC has purchased the property from the private land owner and is in the process of conducting restoration activities before selling the property to PCP to become new preserves. This site is home to eight protected plant species plus an extirpated record of federally endangered Canby's dropwort (*Oxypolis canbyi*). Both projects are expected to close in 2018.

Volunteers Really Help!

In addition to staff time, PCP's stewards and other **volunteers logged 3,371 person hours** across 14 preserves in 2017!! Their time and efforts included hundreds of stewardship site visits, volunteer workdays, and time spent on augmentation projects. Tasks included invasive species control, brush cutting and piling, monitoring, and much more. There is more to do. If you or someone you know who would like to help, please contact us.



Volunteers pulling Japanese stilt-grass (*Microstegium vimineum*) at Bat Fork Bog Preserve as part of International Bog Day in July. This work was done carefully by hand to avoid impacting imperiled plant species growing in the vicinity. Photo credit: PCP Staff.

Field Trips

PCP staff scheduled preserve tours in 2017 and responded to various requests for tours and public presentations. Guided tours were conducted at White Woods, Caraway, Butner Cedar Glade, Redlair, Eno River Diabase Sill, Bat Fork Bog, Paddy Mountain, and the pending McIntosh Bay preserve, reaching citizens across the state of North Carolina. An additional scheduled preserve tour was unfortunately cancelled due to bad weather at Cedar Cliff Mountain Preserve. PCP's field trips are open to the public and free for Friends of Plant Conservation members (www.ncplantfriends.org). Each trip provided the opportunity to observe rare plants, while also learning more about land management and ecological stewardship. Our goal is to host such site visits approximately once per month from March through October. Check out our website, www.ncplant.com, for a current field trip schedule.

Controlled Burning Program

Controlled burns are one of the most important management and restoration activities needed across the PCP preserves and for North Carolina’s rare plants in general. Fire suppression is the second greatest threat to plant species in our state (following habitat destruction by development), meaning many species benefit from controlled burns. PCP, in close collaboration with the NC Forest Service, conducted prescribed burns at four Preserves in 2017: Boiling Spring Lakes and Hog Branch Ponds Preserves in Brunswick County and Eno River Diabase Sill and Hebron Road Preserves in Durham County. Burns in these two counties highlight some of the differences between Piedmont and Coastal Plain burns. Fires in the southeast generally occur in larger fire compartments and among highly flammable vegetation. Burns in the Piedmont are usually smaller but tend to present logistical challenges due to the urban interface, high forest density, and persistently moist leaf litter during the otherwise optimal burning season. No matter the size or location, all controlled burns require careful consideration of weather and site conditions as well as considerable preparation of fire breaks and other safety measures.



PCP staff worked hard to catch up on out-of-date burn units at our preserves in Brunswick County. The thick waxy-leaved vegetation in these sites can be particularly explosive when burned, especially when allowed to grow and build for several years between controlled burns.

Not only does top-killing the shrubs reduce the flammable fuel load, it also reduces competition for many herbaceous plants. Although not the same unit, the photos below provide a pseudo before and after burn comparison, at least in the midstory.



Of note, PCP and NCFS Staff conducted a first burn at one of the interior areas of the Hebron Road Preserve. The primary focus for restoration and management at this preserve has been along the roadside and adjacent uplands where rare species had persisted, primarily under a powerline right-of-way. However, PCP has been attempting to restore additional acreage at this site, with initial steps being the most difficult. In October, we were able to burn 3 acres of very young forest, growing in mafic soils which we expect will allow for persisting rare plants (i.e. prairie dock, Earle’s blazing star, and wild glade quinine) to expand in, while eventually providing additional habitat for the imperiled species relegated to the roadside as well.



Prescribed fire in interior of Hebron Road Preserve, a first burn for PCP. Photo credit: PCP Staff.



Restoring the “grand savanna”—burning at the Eno River Diabase Sill PCP Preserve. Photo credit: PCP Staff.

Habitat Restoration

Sometimes restoration brings about surprises! This year we had such a surprise at the Eno River Diabase Sill Preserve in Durham County, where we are protecting not only federally endangered smooth coneflower (*Echinacea laevigata*), but also a population of federally endangered dwarf sumac (*Rhus michauxii*), as well as several state-listed plant species. Since discovering the *Rhus* population in 2014, PCP staff and stewards have annually examined the flowers and except for a few perfect flowers, only male plants had been observed. However, this year, Preserve Stewards Herb and Pat Amyx found five plants in fruit! Mature fruits were collected and sent to the NC Botanical Garden for propagation and eventual population augmentation. Although PCP is managing this population, the plants are growing in the right-of-way of a defunct railroad, not within the property boundary of the PCP preserve. PCP Staff are hopeful that this population will expand into the protected property where we can better manage them and their habitat. Given that very few Piedmont populations of dwarf sumac have both male and female plants, the possibility of having some natural regeneration at this protected site is especially encouraging.



Fruiting dwarf sumac (*Rhus michauxii*) at the Eno River Diabase Sill Preserve. Photo credit: PCP Staff.

Species Monitoring

Understanding the current status and trends of the populations we protect is very important. To that end, we have been collecting flowering data on several species across the state. In 2017, census and/or population monitoring work was conducted for the following species:

- Bunched arrowhead (*Sagittaria fasciculata*) and swamp pink (*Helonias bullata*)—Henderson County
- Schweinitz's sunflower (*Helianthus schweinitzii*)—Randolph, Montgomery, Union, and Gaston Counties
- Smooth coneflower (*Echinacea laevigata*)—Durham and Granville Counties
- Mountain sweet pitcher plant (*Sarracenia purpurea* var. *montana*) and montane purple pitcher plant (*Sarracenia jonesii*)—Transylvania County
- White irisette (*Sisyrinchium dichotomum*)—Polk County
- Heller's blazing star (*Liatris helleri*)—Ashe County
- Gray's lily (*Lilium grayi*), wood lily (*L. philadelphicum*), and tall larkspur (*Delphinium exaltatum*)—Watauga County

Controlling Invasive Species

Ongoing control measures are occurring at several preserves, such as *Lespedeza* species, Japanese stilt grass, (*Microstegium vimineum*), privet (*Ligustrum sinense* and *L. japonicum*), wisteria (*Wisteria sinensis*), heavenly bamboo (*Nandina domestica*), and Queen Anne's lace (*Daucus carota*). We use a combination of staff and volunteer time on these management projects.

Bat Fork Bog

PCP staff tackled a larger project this year at the Bat Fork Bog, dealing with the invasive reed canary grass (*Phalaris arundinacea*) which occupies nearly half of the preserve. In previous years, PCP staff used herbicide spray treatments to begin to control this monoculture; however, we were unsuccessful in obtaining lasting results. In 2017, PCP staff teamed up with Dr. Bridgett Lassiter, Weed Specialist with NCDA&CS Plant Industry Division, to create a new treatment plan. We examined new research and changed our strategy to include different herbicides and multiple treatments in the same year. We have been encouraged to see quick results from our initial treatment in June, with no *Phalaris* resprouting throughout 2017. Our second treatment in July focused on areas unreachable during the first treatment, resulting in approximately 75% of the total infested area being treated in 2017.



Cheryl Gregory spraying *Phalaris* at the Bat Fork Bog in June. Photo credit: NCDA&CS staff.

PCP will monitor resprouts in the spring of 2018 and plan additional treatments. We were particularly encouraged that our herbicide treatments did not seem to harm the few trees in the meadow, mainly willows, which we worked hard to avoid impacting. Part of our long-term goal for this preserve is to restore the artificial meadow to a swamp forest like the adjacent areas of the preserve and to restore habitat for the existing and extirpated protected plant species known to this site.



Photo from September of *Phalaris* field at the Bat Fork Bog. The grass is top-killed but the trees remain green. Photo credit: PCP staff.

Laurel Wilt Disease and impacts to imperiled species

The redbay ambrosia beetle (*Xyleborus glabratus*) is an invasive exotic species which bores into plants in the Laurel family to lay eggs, carries with it the fungal pathogen *Raffaella lauricola*. First detected in North Carolina in 2011, laurel wilt disease is causing the death of *Persea* species throughout the southeast, but is capable of also impacting related species such as federally endangered pondberry (*Lindera melissifolia*) and state threatened pondspice (*Litsea aestivalis*). Infected plants show signs of distress with yellowing wilting leaves; however, in many cases, by the time symptoms are visible, the plant is doomed to death. Mortality is extremely high with this species and treatments after infection are typically ineffective. Laboratory and greenhouse experiments have identified an effective fungicide for pre-treating susceptible avocado plants; however, this chemical has not been used in natural landscapes, nor on small-diameter species such as pondberry. PCP has developed a three-prong plan moving forward to address concerns regarding this spreading disease and imperiled species: (1) conduct additional monitoring by trapping for beetles in areas near pondberry and pondspice populations, (2) remove/topkill large diameter swamp bays (*Persea palustris*) to limit the availability of suitable hosts for the beetles, and (3) field test the use of an approved fungicide on imperiled species. Removal/top-killing of swamp bay plants will be done with a combination of prescribed fire and mechanical treatments.



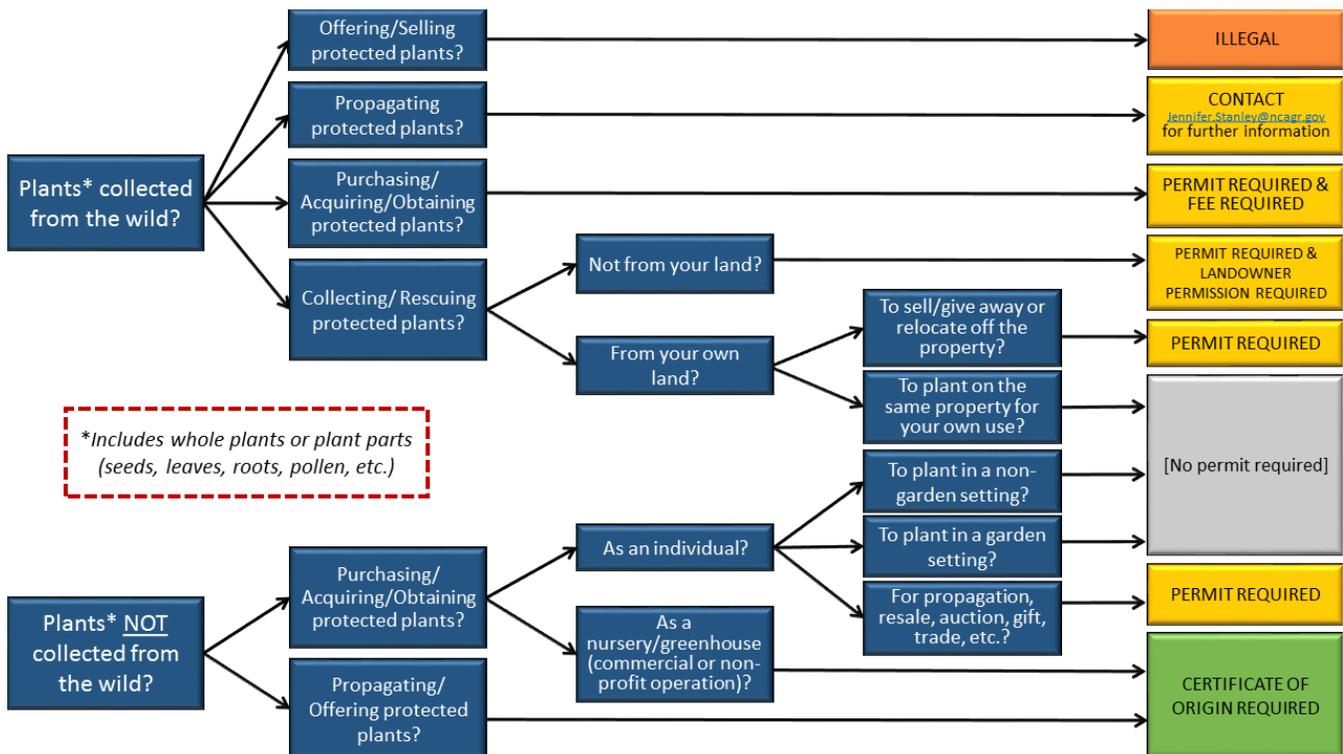
Redbay ambrosia beetle (*Xyleborus glabratus*). Total body length is less than 2 mm.



Dead redbay (*Persea palustris*), infected with laurel wilt disease.

Permits & Regulations

In North Carolina, a protected plant permit is required to (a) remove from the wild, (b) to propagate or offer for sale/donation/gift, or (c) to plant or reintroduce any protected plants or plant parts into a non-garden environment. Exempt activities include: purchase of propagated protected plant species from nurseries or dealers with necessary permits, activities allowed under existing state laws and regulations, collection or removal from one's own land, or propagation or sale covered by a current certificate of origin. The flowchart below can be used to determine which activities regarding protected plant species require a permit. See 02 NCAC 38F.0407 for more information. PCP staff share all project details as well as copies of permits with partners at the NC Natural Heritage Program and US Fish and Wildlife Service for their records. Most permits require a final report be sent to PCP. We maintain a copy of all findings and reports in an effort to collate available knowledge on the protected plants of North Carolina and their habitats.



Ginseng

PCP regulates the sale of American ginseng (*Panax quinquefolius*) in North Carolina by issuing licenses to dealers and tracking all exports out of the state. All international exports require additional USFWS Convention on International Trade in Endangered Species (CITES) export certification. Before being exported out of state, all ginseng, both wild and cultivated, must be certified by NCD&CS staff and reported to PCP. PCP Staff work directly with the licensed dealers to obtain as much data as possible regarding the locations and weights of harvested wild ginseng to monitor the health of the state's population. With these data, staff tally the total pounds of wild ginseng roots that are harvested per county which allows an estimate of the number of harvested plants per year. These data also inform us to the size of the plants being harvested and changes in the number of roots per pound, allowing staff to infer the availability of mature ginseng plants.

NCDA&CS issued a total of 50 ginseng dealer licenses for the 2016-2017 season. These licensed dealers certified over 5,700 pounds of wild collected ginseng for export, a notable drop compared to the 2015-2016 season (>8,400 pounds).

PCP Staff participated in the 2017 annual Ginseng Marking Blitz in the Great Smoky Mountains National Park, a collaborative effort between NCDA&CS and the National Park. Removal of plants is illegal in US National Parks without a permit. Each year thousands of wild American ginseng plants in National Parks and other lands are marked with a permanent dye so that if the plants are poached and attempted to be sold for export, it is possible to identify the roots as illegally poached from the park. PCP has begun using this same method to mark ginseng within PCP Preserves. This year 2,327 plants were marked over three days, helping to protect these native plants. To date, this program has marked >62,500 plants!



The Ginseng Marking Blitz Crew of 2017. Photo credit: PCP Staff.



American ginseng with unripe fruits. Photo credit: PCP Staff.

Imperiled Plant Species Currently Documented on North Carolina Plant Conservation Preserves

Federally listed species are in bold. PCP staff is working toward verifying/updating each of these records.

- | | | |
|---|---|--|
| <ol style="list-style-type: none">1. <i>Acmispon helleri</i>2. <i>Agalinis virgata</i>3. <i>Amorpha georgiana</i>
var. <i>confusa</i>4. <i>Anemone berlandieri</i>5. <i>Arethusa bulbosa</i>6. <i>Asclepias pedicellata</i>7. <i>Astragalus michauxii</i>8. <i>Baptisia alba</i>9. <i>Baptisia australis</i> var.
<i>aberrans</i>10. <i>Berberis canadensis</i>11. <i>Boechera</i>
<i>missouriensis</i>12. <i>Carex buxbaumii</i>13. <i>Carex radfordii</i>14. <i>Carex trisperma</i>15. <i>Celastrus scandens</i>16. <i>Chelone cuthbertii</i>17. <i>Cirsium lecontei</i>18. <i>Coeloglossum viride</i>
var. <i>virescens</i>19. <i>Cyperus granitophilus</i>20. <i>Dalibarda repens</i>21. <i>Delphinium exaltatum</i>22. <i>Dichanthelium</i>
<i>aciculare</i> ssp.
<i>neuranthum</i>23. <i>Dionaea muscipula</i>24. <i>Echinacea laevigata</i>25. <i>Eleocharis elongata</i>26. <i>Fleishmania incarnata</i>27. <i>Geum geniculatum</i>28. <i>Helianthus</i>
<i>schweinitzii</i>29. <i>Helonias bullata</i> (last
observed in 2001)30. <i>Houstonia montana</i>31. <i>Ilex collina</i> | <ol style="list-style-type: none">32. <i>Isoetes piedmontana</i>33. <i>Liatris helleri</i>34. <i>Lilium canadense</i> spp.
<i>editorum</i>35. <i>Lilium grayi</i>36. <i>Lilium philadelphicum</i>
var. <i>philadelphicum</i>37. <i>Lilium pyrophilum</i>38. <i>Lindera melissifolia</i>39. <i>Lithospermum</i>
<i>canescens</i>40. <i>Litsea aestivalis</i>41. <i>Ludwigia suffruticosa</i>42. <i>Lysimachia</i>
<i>asperulifolia</i>43. <i>Lysimachia fraseri</i>44. <i>Magnolia macrophylla</i>45. <i>Micranthes</i>
<i>pensylvanica</i>46. <i>Oenothera perennis</i>47. <i>Packera</i>
<i>schweinitziana</i>48. <i>Panicum flexile</i>49. <i>Pellaea wrightiana</i>50. <i>Platanthera</i>
<i>grandiflora</i>51. <i>Polygala hookeri</i>52. <i>Portulaca smallii</i>53. <i>Rhexia aristosa</i>54. <i>Rhus michauxii</i>55. <i>Rhynchospora harperi</i>56. <i>Rhynchospora</i>
<i>pleiantha</i>57. <i>Ruellia humilis</i>58. <i>Ruellia purshiana</i>59. <i>Sagittaria fasciculata</i>60. <i>Sarracenia jonesii</i>61. <i>Scutellaria leonardii</i>62. <i>Scutellaria nervosa</i> | <ol style="list-style-type: none">63. <i>Shortia galacifolia</i> var.
<i>brevistyla</i>64. <i>Silene ovata</i>65. <i>Sisyrinchium</i>
<i>dichotomum</i>66. <i>Symphyotrichum</i>
<i>depauperatum</i>67. <i>Symphyotrichum</i>
<i>georgianum</i>68. <i>Symphyotrichum laeve</i>
var. <i>concinnum</i>69. <i>Thermopsis mollis</i>/T.
<i>fraxinifolia</i>70. <i>Trichostema</i>
<i>brachiatum</i>71. <i>Trillium simile</i>72. <i>Utricularia cornuta</i>73. <i>Vaccinium</i>
<i>macrocarpon</i> |
|---|---|--|

Other species of special note:

Phemeranthus piedmontanus

-This species is not a North Carolina Protected Plant Species; however, it was not included in the most recent threat assessment because it was not named at the time. PCP Staff believe it will be included in future updates of the protected plant list.

Stachys eplingii

-Although globally secure (G5), PCP protects one of two known extant populations of this species in North Carolina.

Partnerships/Collaborations:

Appalachian State University, biology.appstate.edu
Atlanta Botanical Garden, www.atlantabotanicalgarden.org
Blue Ridge Conservancy, blueridgeconservancy.org
Blue Ridge Parkway, www.nps.gov/blri/index.htm
Conserving Carolina, conservingcarolina.org
Catawba Lands Conservancy, catawbalands.org
City of Boiling Spring Lakes, www.cityofbsl.org
Duke Forest at Duke University, www.dukeforest.duke.edu
Eno River Association, www.enoriver.org
Foothills Land Conservancy, foothillsland.org
French Broad River Garden Club, www.fbrgc.org
Friends of Mountains to Sea Trail, www.ncmst.org
Friends of Plant Conservation, www.ncplantfriends.org
Great Smoky Mountains National Park, www.nps.gov/grsm/index.htm
Highlands-Cashiers Land Trust, www.hicashlt.org
James F. Matthews Center for Biodiversity Studies, <http://charmeck.org/MECKLENBURG/COUNTY/PARKANDREC>
Land Trust for Central NC, landtrustnc.org
NC Botanical Garden, ncbg.unc.edu
NCDA&CS Forest Service, ncforestservice.gov
NCDA&CS Research Station Division, www.ncagr.gov/research
NC Museum of Natural Sciences, naturalsciences.org
NC Native Plant Society, www.ncwildflower.org
NC Natural Heritage Program, www.ncnhp.org
NC Division of Parks and Recreation, www.ncparks.gov
NC Wildlife Resources Commission, www.ncwildlife.org
Sandhills Area Land Trust, www.sandhillslandtrust.org
The Nature Conservancy, www.nature.org
UNC Asheville, www.unca.edu
US Army Corps of Engineers
US Fish and Wildlife Service, www.fws.gov/southeast
US Forest Service, www.fs.usda.gov/nfsnc

**Thank you to the many partners, volunteers, and other supporters
who help us do this work!**