

Conservation through propagation and restoration

"In the end we will *conserve* what we love."



Pitcherplant Bogs

These wetland habitats were once found throughout Georgia. As a result of human activities, they have been eradicated from the Piedmont and nearly eradicated from Georgia's Blue Ridge Mountains. Our Natural Heritage Program botanists know of only two remaining mountain pitcherplant bogs in the state; the rest have been converted to agricultural land. The Nature Conservancy considers mountain pitcherplant bogs to be the most endangered habitat in the Blue Ridge Mountains.

Propagating

One way botanical gardens in the Georgia Plant Conservation Alliance (GPCA) conserve plant species is by studying the needs of rare plants in cultivation and then applying the resulting horticultural knowledge to recovery of these species in their natural habitats. Many rare wetland plants can be propagated from seed or cuttings; in extreme cases where seeds are hard to come by, tissue culture may be an option.

Restoring

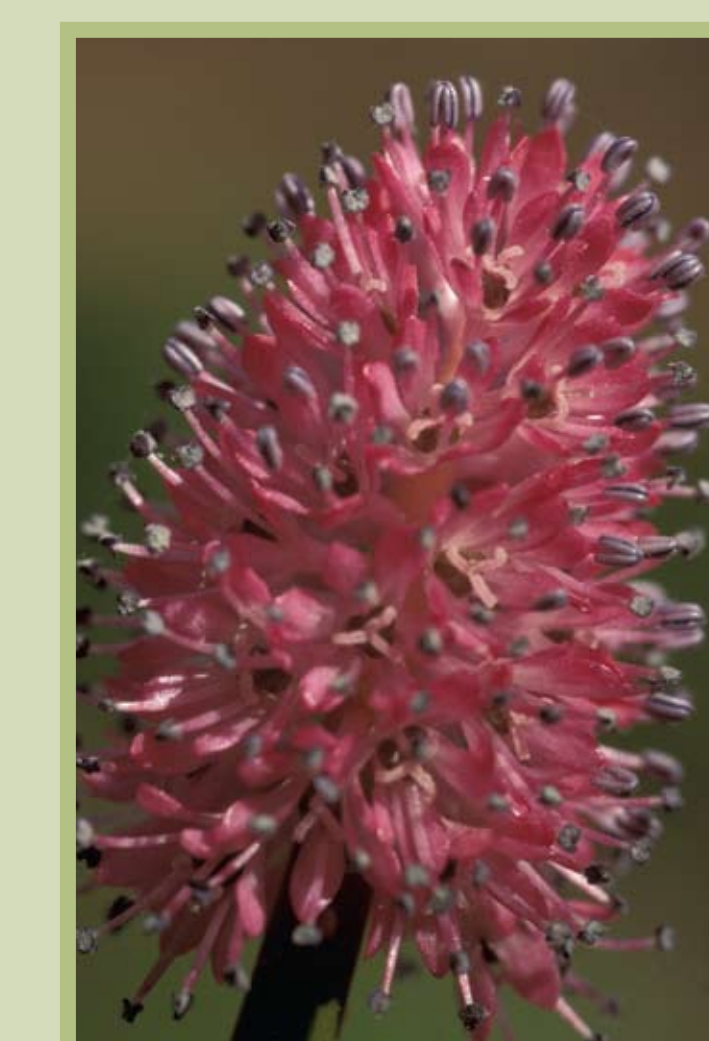
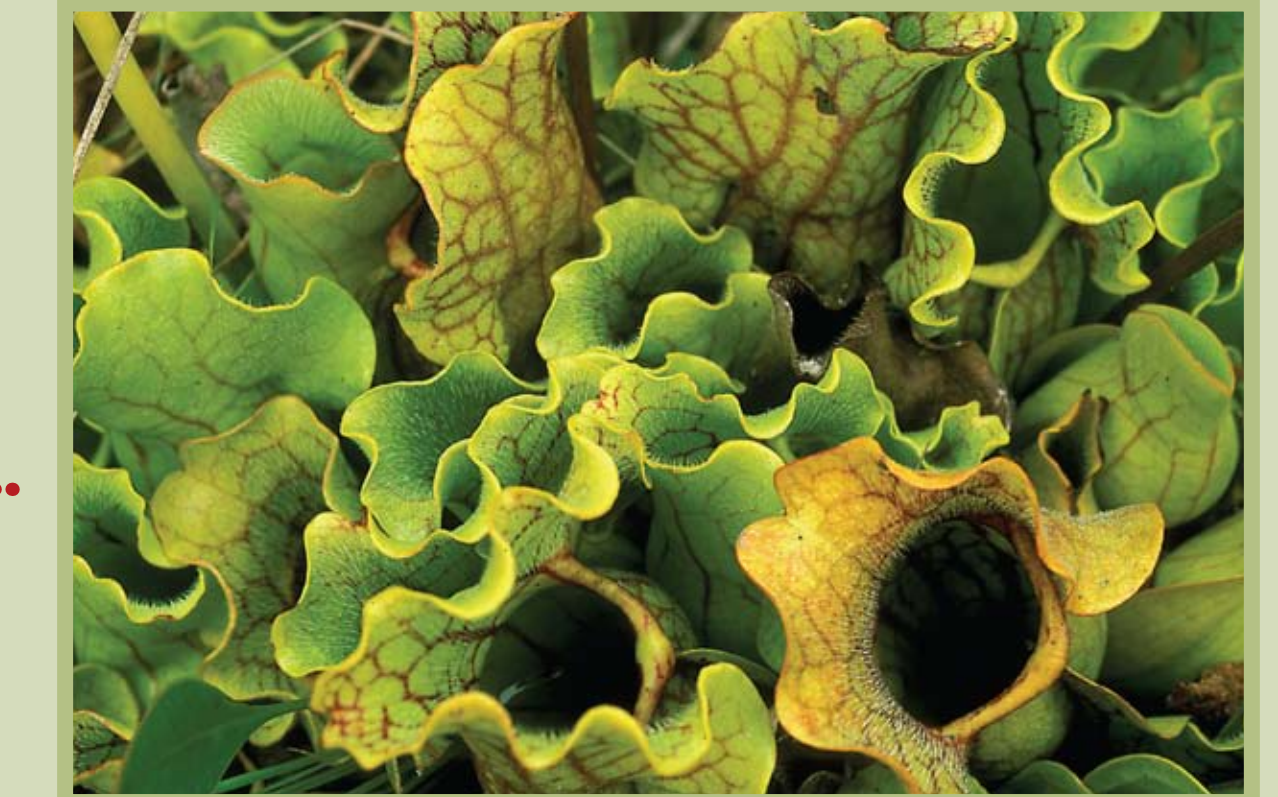
Using machetes and chainsaws, GPCA scientists and volunteers remove woody plants that are creating too much shade and hand-pull invasive species that are out-competing the native vegetation. Restoring the original hydrology of the bog may require significant mechanical restoration, such as repairing ditched streams or removing spoil piles and drainage tiles, to create a slow and spreading flow of water across the bog.

Safeguarding

After propagating plants from wild-collected seeds, GPCA returns the documented offspring to protected sites. This increases the number of individuals in the wild and safeguards the genetic diversity of the original populations. Offspring may be returned to augment their original populations, or they may be used to restore abandoned agricultural lands that were originally wetland sites.

Mountain Purple Pitcherplant (*Sarracenia purpurea* subsp. *venosa* var. *montana*)

Ten years ago, only two populations of this mountain form of the purple pitcherplant were left in Georgia. Unethical plant collectors then removed all the pitcherplants from one of these two remaining sites; the location of the surviving natural population is a closely-guarded secret. The remaining site has been slowly restored over the last 15 years. In 2003, a GPCA work party observed seedlings of Mountain Purple Pitcherplants for the first time in over twenty years, an encouraging sign that the remaining wild population was making a comeback.



Swamp Pink (*Helonias bullata*)

Only one natural population of this beautiful lily remains in Georgia. This site has been decimated by plant collectors and disturbed by erosion caused by cattle crossing the creeks upstream. Offspring of the Georgia population have been propagated and planted at three restored safeguarding bogs.

Bog Turtle (*Clemmys muhlenbergii*)

This is the smallest freshwater turtle in North America, and it is highly prized in the illegal pet trade. Black market sales and loss of habitat are leading causes for this federally threatened species' decline over the past several decades. Bog turtles are known from only four extant populations in Georgia. A team led by the Georgia Department of Natural Resources is collecting eggs from gravid females in the wild and rearing hatchlings in captivity. These are destined for later release within restored habitat on federally owned conservation lands in Georgia. These habitats are also GPCA mountain bog plant safeguarding sites.



Georgia Facts

"We will *love* only what we know."

Honoring

Georgia is blessed with a rich flora. With nearly 4,000 species, subspecies, and varieties of vascular plants it ranks seventh in the nation in terms of plant diversity. This is the result of many factors including our relatively warm climate and a geologic history stretching back nearly a billion years. From the Blue Ridge Mountains to the barrier islands on the coast, Georgia's topographic and soil diversity supports spectacular plant life that contributes to the beauty and character of the southern landscape. Plants, and their uses, are also an important part of southern heritage.

Networking

Many groups in Georgia participate in plant conservation including botanical gardens, state and federal agencies, academic institutions, and environmental organizations like The Nature Conservancy. In 1995, several of them formed a new organization — the Georgia Plant Conservation Alliance (GPCA) — designed to pool their resources and coordinate their activities. Since so little is known about the biology and management needs of most rare species, research is an important component of most GPCA activities. The combined resources, expertise, and outreach strategies of GPCA members provide powerful tools for plant conservation in Georgia (www.uga.edu/gpca).

Threatening

Georgia's biological diversity is increasingly at risk. The primary threats to rare plant communities are habitat destruction, non-native invasive species, widespread herbicide use, exotic pests and diseases, unethical plant collecting, and global climate change. With the fastest growing population east of the Mississippi River, the state's natural resources are under mounting pressure as natural areas are cleared for development, rivers are dammed, and pollution increases. The population of Georgia more than doubled from about 4 million in 1960 to 9.1 million in 2005. There are in excess of 1,000 plant species of conservation concern in Georgia, and the number of plant species that are protected by state law has increased to 155.

GPCA Participating Organizations and Research Collaborators

Atlanta Botanical Garden
 Atlanta History Center
 Callaway Gardens
 Chattahoochee Nature Center
 Coastal Plain Research Arboretum
 Fort Valley State University
 Georgia Botanical Society
 Georgia Department of Natural Resources
 Georgia Department of Transportation
 Georgia Native Plant Society
 Georgia Power
 Georgia Southern Botanical Garden
 Georgia Wildlife Federation
 Joseph W. Jones Ecological Research Station
 The Nature Conservancy of Georgia
 North Georgia College and State University
 The State Botanical Garden of Georgia
 The University of Georgia
 USDA Forest Service
 US Fish and Wildlife Service
 Valdosta State University Herbarium
 Zoo Atlanta



Carolina Hemlock (*Tsuga caroliniana*): Invasive insect killing trees

Eastern Hemlocks (*Tsuga canadensis*) are under attack throughout the eastern United States by the Hemlock Woolly

Adelgid (*Adelges tsugae*), an aphid-like insect from Asia. The woolly adelgid is advancing through north Georgia along several of our watersheds, taking the graceful Hemlocks with it. The insect also attacks a related, but much rarer species, the Carolina Hemlock. There is only one confirmed population of Carolina Hemlock in Georgia, consisting of four trees in Tallulah Gorge State Park. Park staff and volunteer climbers collected seeds of Carolina Hemlock for a GPCA-sponsored project. They used ropes to safely ascend three smaller trees growing on the edge of the 600 foot gorge, and free-climbed the largest specimen (to avoid damaging it with ropes). Now GPCA botanical gardens have seedlings of this species under protection.

Florida Torreya (*Torreya taxifolia*): Root rot disease threatens extinction

Florida Torreya was once abundant throughout the ravines of the lower Chattahoochee River in southwest Georgia and the



upper Apalachicola River in north Florida. Trees began dying in the 1950s, apparently the victims of a fungal blight. They are now found in their natural habitat only as sprouts from diseased trees. With its numbers reduced to about 200 individuals in the wild, Florida Torreya hovers on the brink of extinction and it is one of North America's most endangered trees. GPCA is helping to protect Florida Torreya from extinction by planting clones (grown from cuttings taken from wild trees) in grove-like settings at its partner institutions to safeguard the species in areas outside the range of the fungal pathogen.



Georgia Plume (*Elliottia racemosa*): Tree not reproducing sexually in the wild

Georgia Plume is a small tree endemic to Georgia. It is believed to be clonal (propagating only as spreading root shoots) with limited genetic diversity, and is found primarily in the Coastal Plain. Although the trees offer a show of flowers, are visited by a variety of pollinators, and produce fruit and viable seed, seedlings have never been documented in the wild. Scientists and land managers are puzzled by their absence.

GPCA members have initiated a variety of horticultural, ecological, and genetic studies to better understand the life history of Georgia Plume and improve management and recovery of the remaining natural populations. University of Georgia scientists are now using tissue culture to propagate samples of the surviving populations until this mystery can be unraveled.

Education and Botanical Guardians

"and we'll *know* only what we are taught." - Baba Diom



GPCA partners are working to restore the unique habitat that hosts these and other rare plants. The habitat, described by botanists as openings in oak-hickory-pine forests, is being restored with hand clearing, prescribed fire, and plant reintroduction.

Volunteering

Georgia's rare plants often grow in remote habitats scattered across the state. Given the relatively small number of career plant conservationists, this poses a substantial logistical problem in terms of stewardship and oversight. Years of careful management and restoration can be destroyed in a single afternoon by ATVs, feral hogs, herbicide sprayers, vandals, or unethical collectors. Failure to catch these events in progress can place an entire plant population, or even a species, at risk of extinction. In response, GPCA has created a network of volunteers throughout Georgia to help locate rare plant populations, monitor sites, and serve as stewards for rare plants and their habitats. This network is called the Botanical Guardians project.

Educating

Education and outreach are as important as research and land management when it comes to saving rare plants, and the future of many of these species depends as much on today's teachers and elementary school students as it does on field biologists and policy makers.

GPCA partners at the State Botanical Garden of Georgia initiated the Endangered Plant Stewardship Network (EPSN) to train teachers and students to become stewards of Georgia's rare plants. Students plant their own pitcherplant bogs, conduct field experiments, and share their observations with others. Visit our Lesson Planner for activities about teaching conservation topics and enhancing student science skills (www.epsn.org).

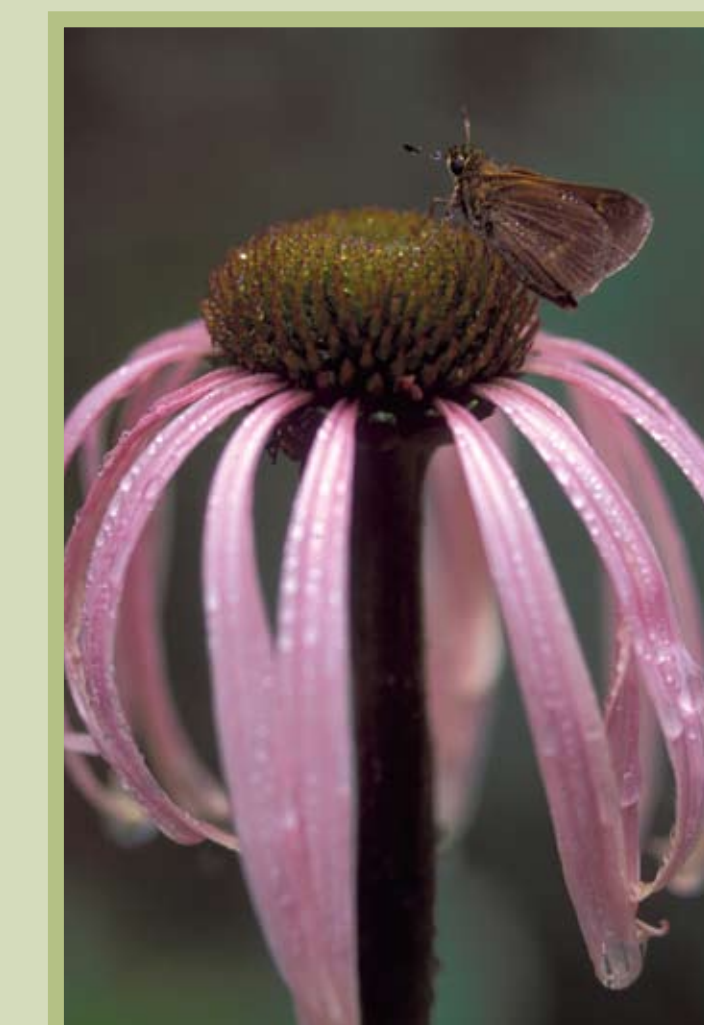
Georgia Aster

Symphyotrichum georgianum, threatened in Georgia, is a candidate for federal listing. It has bright purple flower heads much larger and more striking than common asters in our state, and blooms late into autumn.



Smooth Coneflower

Echinacea laevigata is a federally endangered species with scant populations found in only 2 counties in the Appalachian foothills of Georgia. It is one of nine species of Echinacea, a popular medicinal herb. It lives along-side the Georgia Aster in the grassy meadows and open woodlands, which are threatened by fire suppression and development.



Curlyheads

Clematis ochroleuca, a species of Special Concern in Georgia, also grows in the dwindling grassy meadow habitat. It is a perennial, whose seeds are born in clusters with long fuzzy beaks for which the plant is named.



GPCA thanks the following for donating their images for this display.

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Successes in Conservation

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Endangered Plant Stewardship Network (EPSN): The future of many of these species depends as much on today's teachers and elementary school students as it does on field biologists and policy makers. GPCA partners at the State Botanical Garden of Georgia initiated an environmental education program that trains teachers and students to be stewards of the environment by actively growing, studying, and exploring rare plants of Georgia. (www.epsn.org).

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