

The Center for Biodiversity at Joseph Pines Preserve

Philip Sheridan, Ph.D.
Director and President
Meadowview Biological Research Station
8390 Fredericksburg Tnpk.
Woodford, VA 22580
804-633-4336
meadowview@pitcherplant.org
www.pitcherplant.org

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Brief description of the history and mission of the agency

Meadowview is a world-renowned research station with a mission of preserving and restoring rare pitcher plant habitats, and associated ecosystems, in Maryland and Virginia. The organization was founded in 1995 and has attracted local, regional, national, and international support for its efforts. Meadowview is a grass-roots environmental organization that has developed and sustained itself largely through the development of a unique business model: a conservation organization supported by sales of ornamental pitcher plant cultivars and novel native wetland plants with a supporting membership base. This business model has been successful in funding the organization to date but efforts are now underway to develop an endowment to support operations in the future. Meadowview also has a fifteen-year history of working with local elementary, middle, high school and college students. Our mission is accomplished through a unique five-step process of discovery, propagation, research, reintroduction, and education. Long-range goals are being met through the development of a preserve system for Virginia's endangered longleaf pine/ pitcher plant ecosystem. Two preserves have been developed in Virginia: the Central Virginia Preserve in Caroline County and the Joseph Pines Preserve in Sussex County. The Central VA Preserve is protecting the northern-most pitcher plant bog in Virginia with state threatened species while the Joseph Pines Preserve is re-assembling the indigenous biodiversity of the endangered Virginia longleaf pine/pitcher plant ecosystem. Support for these land conservation efforts has been obtained from the Virginia Dept. of Environmental Quality, Virginia Dept. of Forestry, Virginia Land Conservation Foundation, Community Foundation of the Rappahannock River Region, Mary Morton Parsons Foundation, International Carnivorous Plant Society, and worldwide members of the organization.

Description of the project, statement of need, timeframe for completion and how it supports the mission of the agency

Executive Summary

An education and biodiversity center will be established on a 1.5 acre parcel adjacent to Meadowview's 232 acre Joseph Pines Preserve. The education and biodiversity center will support the conservation, protection, and restoration of the endangered longleaf pine/pitcher plant ecosystem in Virginia. The preserve is now in conservation easement with Virginia Department of Forestry. The education and biodiversity center will train students and the general public about the need and value of rare plant and animal conservation, support ongoing scientific research and restoration efforts at the Joseph Pines Preserve, and demonstrate how a sustainable lifestyle can support habitat restoration. Purchase of the education center property is part of a conservation plan to acquire almost 2000 contiguous acres and provide one of the largest and best managed examples of a longleaf pine ecosystem in a multi-state area. This property represents the northern limit of the known range of the longleaf pine ecosystem. Habitat restoration has included mechanical clearing, chemical site treatments, prescribed fire, and controlled reintroductions of at least 18 indigenous rare plant taxa (including one federally endangered species). Habitat is also provided for one federally endangered bird species (red-cockaded woodpecker), one state threatened bird species (Bachman's sparrow), and one endangered fish species (black-banded sunfish).

Objectives

The objectives of this project are to provide an education and biodiversity center in an existing 2000 sq. ft. house. The education center will provide the facilities for intern, student, volunteer, staff, and visitor lodging (currently lacking from the existing Joseph Pines Preserve). Specifically, the project will:

- Provide an education and biodiversity center to educate the public about rare plant conservation and provide the facilities to enable regional habitat restoration through an on-site rare plant nursery.
- Develop a native Virginia longleaf pine seed orchard in collaboration with the Virginia Department of Forestry to assist in regional restoration efforts.
- Propagate 18 rare plant species as part of an integrated longleaf pine-pitcher plant ecosystem restoration.
- Enlarge the Joseph Pines Preserve towards our goal of acquiring additional land to connect with both Cherry Orchard Preserve and DGIF's Game Lake to form a total managed longleaf pine/pitcher plant ecosystem preserve and wildlife corridor of over 2000 acres.
- Provide an outside laboratory for research on various aspects of the longleaf pine/pitcher plant ecosystem.
- Provide optimal conditions for recreational hunting by creating and maintaining habitat conducive to deer, turkey, quail, rabbit and other game animals.

- Provide opportunities for primitive camping, hiking, bird watching, nature walks, photography, and other recreational activities.

Needs being addressed

Educational

- Addresses need for environmental education facility identified by the Virginia Outdoor Plan (see also MSIC letter of support in Appendix)
- Hands-on training in ecological restoration
- Research

Environmental and Ecological

- Rare, threatened, and endangered species conservation and restoration
- Groundwater preservation and enhancement
- Longleaf pine seed orchard in collaboration with VDOF to meet state longleaf pine seedling shortage (see DOF letter of support in appendix)
- Appropriate scope and scale of preserve size to ensure long-term success
- Recreation
- State land conservation objectives

Community Needs

- Provide facilities for Meadowview staff working on-site
- Provide southern Virginia headquarters for Meadowview
- Provide facilities for rare plant propagation

Plan of Action and time frame

We anticipate the education center will be providing the first courses in year one with full course offerings at year five. Seed orchard development and rare plant nursery build-out will take five years. Meadowview is competent to do courses, nursery build-out, and restoration work because these are activities currently performed by the organization at our headquarters in Caroline County.

Project budget

The Center for Biodiversity at Joseph Pines Preserve Project Budget Proposal	
<i>Budget Line Item Description</i>	<i>Dollar Amount</i>

Acquisition cost	\$219,000
Used Tractor and implements.....	\$24,025
Nursery beds, GARN wood gasifier, GARN barn, hot water solar panels	\$52,000
Preserve manager intern.....	\$3,000
.....	\$
.....	\$
	\$
	\$
	\$
	\$
TOTAL PROJECT COST	\$298,025

Detailed estimate of post-completion operating costs and a plan to sustain these additional expenses

The average monthly operating costs of the education center by the previous owners was \$200/month for electricity. These presumed operating costs will now be supported by operating funds of Meadowview. Expenses for construction of rare plant propagation beds (\$2000) and climate controlled poly tunnel greenhouse (\$10,000) would also be paid for with operating funds over the five year build-out. Electrical expenses for these operations are expected to increase by about \$50/month. High-speed broadband internet is essential to the functions of the center and we will use I-phones as internet hot-spots, for now, to meet this need. Our proposed installation of an outside (gasifier) wood furnace and hot water solar panels (range of \$15,000 - \$30,000 depending on make and model of wood furnace and panels) will be paid for either by bank loan or grant funding. The outside gasifier wood furnace and hot water solar panels will greatly reduce electric expense.

Location of Work

The project is located in Sussex and Prince George Counties, Virginia, about 5 miles northwest of the town of Waverly (Figs. 1 & 2).



Figure 1. Location of project.

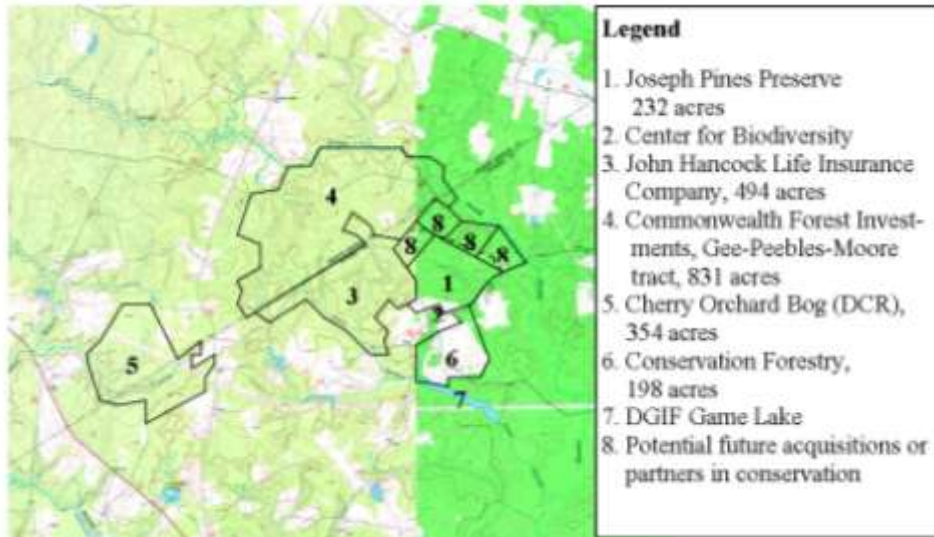


Figure 2. Joseph Pines Preserve Grand Plan.



Figure 3. Mentoring home school students at Meadowview headquarters in Caroline County.

Testimonial

“Dr. Sheridan -

Thank you so much for an amazing field trip for the REACH group last week! I have to be honest, I expected a somewhat dull experience and hadn't even realized your facility was there, let alone so local and so crucial. I was SO wrong! You used wonderful examples to meet the kids (Fig. 3) where their previous experience is - you involved them, not giving up asking questions when they were quiet or stumped. The dissection of the pitcher plants and feeding the flytraps were intriguing! You consistently passed around samples and engaged all of our senses, moving the group frequently enough and to enough differing landscapes that a high level of interest was inevitable. These are the kind of field trips that make lesson planning easy for a homeschool parent. We are so grateful that you spent such quality time with us!

Laura Martinsen
Homeschool Parent”

Need

The Virginia Outdoor Plan specifically identifies a need for an education center in the region where the Joseph Pines Preserve is located (see below “Facilities for nature study” under consistency with comprehensive plan...).



Figure 4. The Center for Biodiversity at Joseph Pines Preserve.

The center structure (Fig 4) gives us the facilities for intern and staff lodging, food preparation, museum, and conference facilities (Fig. 5). The grounds provide ample space to support seedling nursery, poly tunnel, and rare plant propagation beds while the adjoining Conservation Forestry tract of the preserve provides 35 acres to install a native Virginia longleaf pine seed orchard, (Fig. 6). There are many reasons to have nursery and horticultural operations at the education center. First, production of indigenous rare plants on-site provides the most efficient and effective way to deliver the plants for restoration at Joseph Pines Preserve. Second, nursery operations are a vital component of the educational process and allow on-site student and volunteer horticultural effort. Third, a dedicated facility of indigenous plant propagation greatly diminishes the chance for alien, non-native plant invasion of plugs and the possibility of genetically polluting the Joseph Pines Preserve.



Figure 5. Floor plan of the biodiversity center.

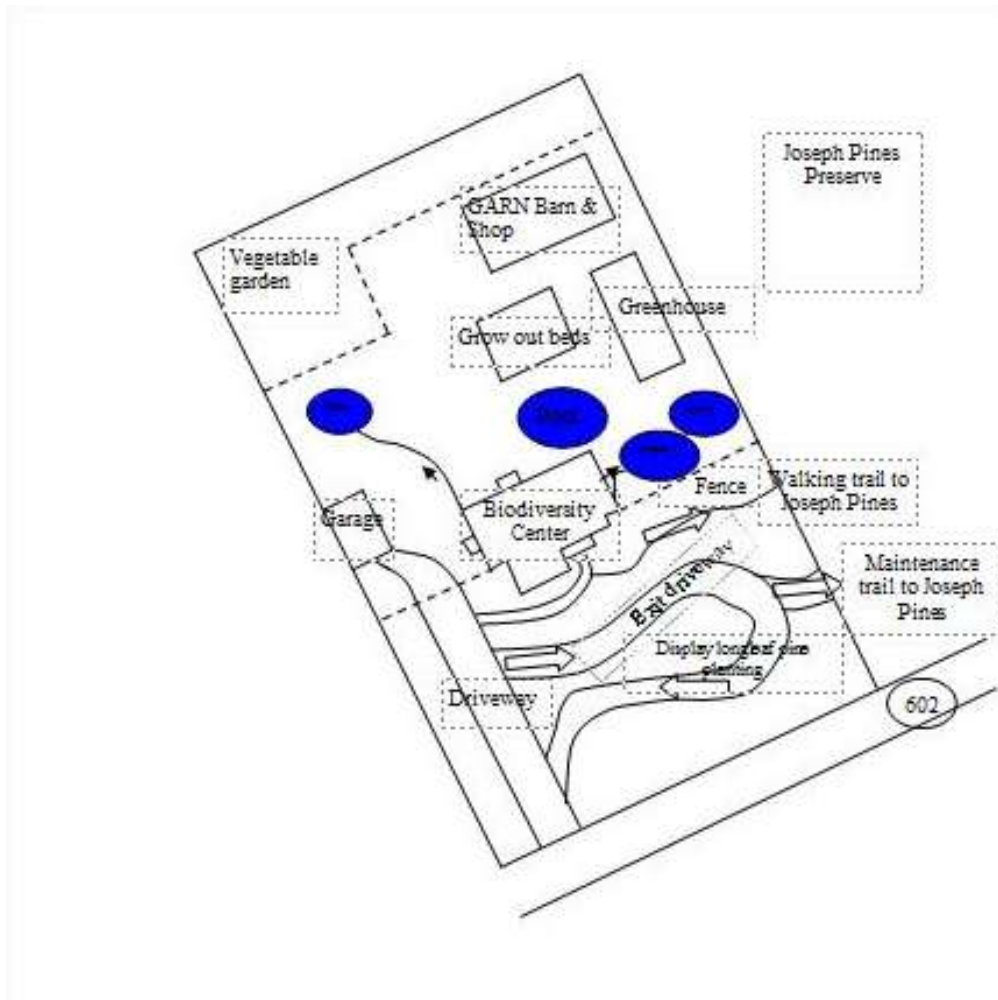


Figure 6. Proposed use of the grounds at the Center for Biodiversity.

Heating of the education center and greenhouse would be provided by a gasifier wood heating system (such as GARN, Portage and Main wood furnace, or Central Boiler E-classic) to eliminate, or greatly reduce, the existing use of propane fossil fuel. The proposed gasifier is a certified EPA Phase II wood heating system and provides a clean burning, efficient, and virtually smoke-free way to heat structures (greenhouse, house, domestic hot water). We have experience with old-style outdoor wood furnaces and the gasifier wood furnace is a vastly superior product since it uses half the fuel and produces much lower emissions. In either case, outside wood furnaces use a renewable fuel (wood) that is part of the carbon cycle and do not produce a net increase in global greenhouse gases. A gasifier wood furnace allows the education and biodiversity center to showcase innovative ways to replace fossil fuels in an intelligent, sustainable manner. An outside wood furnace will also decrease operating costs by

eliminating the use of propane fuel. Wood fuel is abundant at the Joseph Pines Preserve and is a renewable by-product of habitat restoration efforts.

A wood gasifier is not the only way in which Meadowview would strive to highlight sustainability at the education center (Figs. 7 & 8). Since we work with rare plant conservation our corporate ethos has been to practice sustainability to lessen our impact on the environment. Our plans for the education center include mandatory recycling and efforts to install solar water heaters, and solar and wind electrical generation. A vegetable garden would be included to provide food for students and interns working on-site and to process organic vegetable waste from the compost bins. Similar efforts are already in-place at our operations center in Caroline County, VA. All of these activities, including educational tours of the center and preserve and workshops (see below) would be part of daily operations by Meadowview staff.



Figure 7. Outside wood furnace and hot water solar panels provide domestic hot water and heat facilities at Meadowview.



Figure 8. The intern vegetable garden at Meadowview provides delicious and nutritious food in a sustainable way.

The Education Center for Biodiversity at Joseph Pines would be totally unique in Virginia. The dedicated on-site propagation effort of indigenous flora for local and regional restoration, combined with the outdoor educational facilities, staff, and large longleaf pine/pitcher plant preserve would provide an incredible benefit to the public. We are competent to perform the functions of an education center and nursery since similar work already occurs at our headquarter operations center in Caroline County, VA.

Workshops offered at the Center for Biodiversity

The main education point of the Center for Biodiversity is a direct, hands-on educational experience with a unique ecosystem. We recognize that lack of transportation funds and the rural location may limit many school groups from visiting. Therefore, life science and STEM disciplines (Science, Technology, Engineering, Math) would be integrated with technology via the broadband Hughes network to provide outreach to local and national educational systems. One way to do this would be to have monitoring or measurements of biological processes updated on an interactive website with teacher and student access. This would allow them to use the data in their class exercises. Teachers would find this particularly useful for the “warm up” period of class (where the kids practice on a problem or some data to get their minds engaged and ready for the class period).

A tangible gap exists in Middle and High School science and math curriculum for graphing. There is state focus on this area because graphing scores are so low. The

Center for Biodiversity provides an opportunity to work on educational aspects that could promote this type of data analysis using plant growth, soil nutrient manipulations, and plant demographics with independent and dependent variables and simple cause/effect scenarios. Many of these courses also have practical application for the general public and to environmental science practitioners. Here is an initial list of workshops which we can offer to the public.

- Basic botany
- Edible wild plants of southeastern Virginia
- Restoring longleaf pine/pitcher plant ecosystems in Virginia
- Sustainable lifestyle in the modern era – biomass, solar, and wind power
- Heirloom crops and you
- How to balance your fish pond while getting something to eat
- Rare plant propagation and restoration
- Identifying wetland soils and hydrology

Hydrological benefits

Our restoration methods involve converting a low diversity, dense loblolly pine/hardwood forest to a species rich savanna dominated by longleaf pine. This phase change in ecosystem produces tangible, positive results in groundwater hydrology through the reduction of evapotranspiration rates. Our graduate student research has found that a 25% reduction in evapotranspiration occurs after this phase change, equivalent to a savings of 3.9 million gallons of water on a 24 acre watershed (McLeod et al. 2012, Sheridan et al., 2013). The implications of this research are that as we continue to acquire more land, and proceed with restoration, there will be a significant hydrological benefit to the area. The projected, restored 2000 acre preserve could potentially be saving and storing several hundred million gallons of water over existing land use in an area where future water supplies may be limited and needed.

15,000 in 15 Years

In November 2012, a group of state, federal, and non-profit organizations formed a state coordination team known as the Virginia Longleaf Pine Cooperators. The group decided that a reasonable objective was the planting of 15,000 acres of longleaf pine in Virginia in 15 years. The goal of expanding the Joseph Pines Preserve to almost 2000 acres, and planting most of those acres in Virginia longleaf pine, would have a significant impact in achieving this objective.

Consistency with comprehensive plans and strategic conservation efforts

Our proposal also meets the **Forest Lands Criteria** found in the **Virginia Land Conservation Foundation** manual in the following ways.

1. The land is in an area where there is a high potential for land use changes or conversions that threaten the retention of forestland. The Joseph Pines Preserve is located on Cabin Point Road, route 602, in Sussex County, Virginia approximately 5 miles n/w of the town of Waverly. The Waste Management Atlantic Waste Disposal Landfill and Sussex 1 and 2 maximum security prisons are within 4 miles of the preserve and are either on the same road or intersecting roads. Large chunks of forest and agricultural land are being permanently converted to residential development. There has been tremendous development pressure and land conversion on Cabin Point Road (route 602) which fronts the Joseph Pines Preserve. Land pressure has come from the need for housing employees of Sussex 1 and 2 prisons, retirees fleeing Virginia Beach for relatively inexpensive rural land, DOD employees at an expanding Fort Lee seeking housing, and an expanding population in Prince George County seeking affordable land and housing. The proposed preserve will help to blunt this development trend in a rural area and protect a significant ecologic and hydrologic resource.
2. Joseph Pines Preserve will protect primary and secondary headwater streams feeding the Nottoway River. The Nottoway River is listed on the state 303(d) list. In addition, the total proposed preserve of almost 2000 acres will provide significant groundwater recharge and aquifer preservation for anticipated future development.
3. The property is suitable for long-term research, special landowner demonstration opportunities, and conservation education. All of these activities have been performed on our original 101 acre property and we are expanding those activities on all properties acquired as part of the preserve. We hosted the 2007 Longleaf Pine Restoration Conference at the Airfield 4-H Center with DOF and Joseph Pines Preserve was an important field trip site demonstrating longleaf pine restoration. Several graduate students have performed ecological and hydrological research on the preserve and we expect more of this type of basic research.
4. The property is within an area (Cabin Point Road) identified in the local Sussex County comprehensive plan as important for open space, agricultural/forestall, and biological preservation and recognized by the board of supervisors in Sussex County in a resolution dated May 18, 2006.
5. The preserve provides vegetated buffers on all streams on the property.
6. The property has the potential to protect and/or restore:

- a. threatened and endangered species of fauna and flora as listed in this proposal
- b. unique habitat for threatened and endangered species
- c. provides the opportunity to restore diminishing native tree species (longleaf, shortleaf, and pond pine)

Furthermore, this property is strategic since it fits within a larger conservation plan of protecting and restoring the longleaf pine ecosystem in Virginia. The only site for the red-cockaded woodpecker (a denizen of longleaf pine forests) is within nine miles of Joseph Pines at Piney Grove Preserve while DCR's high diversity Cherry Orchard Preserve is within two miles (a site originally identified by Meadowview biologists and brought to the attention of DCR employees for purchase).

In addition, this proposal meets a specific recreational and resource conservation need identified in the *Virginia Outdoors Plan* (VOP) and local comprehensive plan. The local comprehensive plan recognizes the importance of seepage bogs (pitcher plant wetlands) and sand-hill (longleaf pine) ecosystems in section V111-1 – V111-4 and natural systems in X-24 – X-25. The plan also states in section X-3 – X-4 that the road the proposed project is on (Cabin Point) "should be encouraged to remain basically agricultural in nature". Since much development has occurred on Cabin Point Road our proposal helps meet the land conservation objectives identified in the Sussex County comprehensive plan.

Page 326, item 12, of 2002 VOP and page 19 of PDC 19 VOP draft 2007 state: "The Nottoway River and its environs in Sussex County offer an ideal location for various woodland and water-oriented recreational activities." Our proposed property for conservation drains into the Nottoway River.

Page 134 of 2002 VOP recommends: "statewide representation on protected lands for all natural community types and rare species; assist public and private land managers and owners with the management and/or restoration of natural heritage resources on their properties." Also, pg. 441 in the wetland chapter addresses the need for restoration of non-tidal wetlands. We are actively engaged in protecting and restoring the imperiled longleaf pine/pitcher plant ecosystem on our original 101 acre property and are continuing those activities on the expanded preserve. These properties include non-tidal wetlands and relict longleaf pine/pitcher plant ecosystems in need of restoration.

The 2007 VOP draft states a need for "Facilities for nature study" on page 2 of PDC 19. Page 4 of PDC 19 (2007 VOP draft) states "**Specific land conservation recommendations for Crater include:** Address the need for local and regional programs to promote conservation and the connection of conservation lands for wildlife and water quality." Our organization provides "facilities for nature study" on the Joseph Pines Preserve through tours and educational and research programs (Fig. 9). The proposed Center for Biodiversity would not only fill a critical need but allow us to greatly expand our educational and outreach programs in this area.



Figure 9. Educational longleaf pine workshop at Joseph Pines co-hosted with the Longleaf Alliance.

Page 16 of PDC 19 in VOP 2007 draft states “**26. Establish a natural area preserve in Prince George County to restore pine flatwoods and coastal plain depression pond communities.**” The John Hancock Fuqua tract and Commonwealth Investments Gee-Peebles-Moore tract are in Prince George County and have the pine flatwoods and coastal plain depression pond communities specified in the VOP plan. An important part of our restoration program on Joseph Pines includes the reintroduction of the sun-facing coneflower *Rudbeckia heliopsidis*, found only in this type of community in Virginia. Our reintroduction of this plant has been funded by the U.S. Fish and Wildlife Service under the Private Stewardship Grant.

In addition to the intrinsic open-space values of our project, the Joseph Pines Preserve provides significant benefits in the following areas: historic resources; natural heritage resources (rare, threatened, or endangered species and significant natural communities); forestland; wildlife habitat protection and/or management; recreation/parks.

Historic resources - Historic turpentine stumps are found on the property which date to at least 1840 and reflect the start of the turpentine industry in America. Old sawdust piles date to the 1920's when timber was cut on-site and at least one old house site (mid 1800's – no structure) is on the property awaiting investigation. A few native-American artifacts have also been found such as scrapers, spear points, and pottery fragments.

Natural heritage resources - Old turpentine stumps demonstrate the historic presence of the rare longleaf pine ecosystem on this property and rare species continue to appear

as we continue our restoration. Three indigenous state rare plant taxa have been discovered on the property (*Ludwigia hirtella* G5S1, *Lilium pyrophilum* G2S1, *Asclepias rubra* G4G5S2), and three watch list species (*Carex collinsii* G4S3, *Drosera brevifolia* G5S3, and *Juncus longii* G3QS3?). Reintroduction efforts are adding 18 rare plant taxa from native Virginia populations.

Forestland - We are restoring the rare longleaf pine ecosystem in Virginia. This forest type has been identified by the Virginia Dept. of Forestry, as well as state and federal agencies, as an imperiled ecosystem for restoration. Continued management of non-longleaf pine forest resources under our Forest Stewardship Plan will provide pulp and fiber to the Commonwealth of Virginia for years to come.

Wildlife habitat protection and management - Our management of the Joseph Pines Preserve has greatly improved habitat for Northern bobwhite quail. There is also an abundance of habitat for deer and turkey and the general nature of the property is conducive to wildlife habitat protection and management.

Recreation/parks - The Joseph Pines Preserve allows passive recreation on a controlled basis.

Pitchers for the Public! Why are Pitcher Plants Important?

In 2011 Meadowview launched the “Pitchers for the Public!” campaign to highlight the need to preserve and restore Virginia pitcher plant bogs. The public has a right and need to see these beautiful and interesting plants within their native haunts. While pitcher plants are important to us, it is important to justify their importance and value to underline the need for their preservation. Here are eight reasons why pitcher plants are important and why they should be protected at the Joseph Pines Preserve.

1. They are beautiful.
2. They bring limiting nutrients into their environment from their carnivorous habit.
3. They are valuable commercial plants.
4. They are early bloomers and nourish the first pollinators in bogs.
5. In many cases, they are state listed rare, threatened, or endangered species.
6. They are a model organism for study of complex ecosystems. The National Science Foundation has provided ongoing funding to a group of Harvard researchers to develop this model.
7. The pitcher plants are part of 0 order stream systems where water first emerges from the ground. Protection of this habitat, of which pitcher plants are a part, maintains high water quality.
8. The prime directive or precautionary principle. We shouldn't lose our biota or consciously allow components of an ecosystem to be lost forever. We sometimes don't know all the parts an organism plays in an ecosystem or how critical that part might be. In addition, there is the possibility of a future medical use of the plant. Some research has shown efficacy of pitcher plants compounds

for the treatment of HPV, inflammation, and some skin cancers (see www.howdoitreatnaturally.com).

How the Project's Success will be determined, measured, and communicated

The project's success needs to be assayed in three separate but related arenas:

- Water quality
- Longleaf pine seed orchard and rare plant nursery
- Education Center

Project success can be determined and measured in the three areas as follows:

- Water quality
 1. Install cisterns in year one to capture rainwater from roof for vegetable garden and rare plant beds
 2. Install separate cistern for gray water from pool discharge for garden use
 3. Install low flow toilets in year two
- Longleaf pine seed orchard and rare plant nursery
 1. Seed orchard installed and growing within five years on 32 acres of land
 2. Poly tunnel greenhouse (20' x 60') installed and raising 18 rare plant species within two years
 3. Grow out beds (600 sq. ft) installed and raising rare plants within three years
- Education Center
 1. Wood gasifier heating system installed and working within five years
 2. Solar hot water panels installed and replacing electric hot water heater within two years
 3. Upgrade heat pump from SEER 10 to SEER 16 or above within two years
 4. Upgrade attic insulation to R15 within one year
 5. Educational kiosk installed within 6 months
 6. Room accommodations for interns, volunteers, and eco-tourists on-line within 6 months
 7. Tourist group (students, plant societies, general public, etc.) visits tabulated by date and number of people. A target of 100 visitors the first year considered a success rising to 500/year in five years.
 8. Two workshops/courses conducted first year of operation with fifteen per year at five years.

9. Interactive classroom established in year one, with class development complete at five years.

Project success will be communicated in our newsletter, peer reviewed publications, local, state, and national media, and electronic media such as FaceBook and YouTube.

Detailed Narrative of Joseph Pines Preserve

Introduction and History to date

Meadowview Biological Research Station is a non-profit IRS 501(c)(3) organization that was started in 1995 to preserve and restore the remaining fragments of Virginia's imperiled longleaf pine-pitcher plant ecosystem. We meet the conditions of the Virginia Conservation Easement Act since we are a charitable corporation which has been declared exempt from taxation pursuant to 26 U.S.C.A. § 501 (c) (3) and have maintained an office in Virginia for at least 5 years. In addition we have a mission statement pertaining to land conservation activities on both our web site and articles of incorporation as follows:

“Meadowview Biological Research Station (Meadowview) is an organization dedicated to preserving and restoring rare wetland plants and habitats on the coastal plain of Maryland and Virginia... Our goal is to preserve and restore a part of our natural bog heritage.” (Meadowview Articles of Incorporation, Amended and Restated, August 17, 2000).

“Our goal is to preserve and restore a part of our natural bog heritage by returning the endangered Yellow Pitcher Plant, *Sarracenia flava*, and the Purple Pitcher Plant, *Sarracenia purpurea*, to their historic ranges in Virginia and Maryland utilizing an integrated ecosystem restoration approach...We also are developing a system of bog preserves in Maryland and Virginia which will guarantee the preservation of the unique ecosystems supporting the pitcher plant community.” (Meadowview web site goals at www.pitcherplant.org)

Our ten year goal was to establish a system of bog preserves in Maryland and Virginia that would guarantee the preservation of the unique pitcher plant ecosystem. Populations of rare plant species, as well as their important associates, continue to go extinct on unprotected land. While buying all of these remaining rare plant sites may be desirable, this goal is unrealistic from a financial, political (since some landowners may not want to sell), and biological point of view (some sites are degraded to the point that only a few rare plant elements are left). This goal was partially accomplished by the purchase of the 101 acre Joseph Pines Preserve in Sussex County, VA by Meadowview Biological Research Station in 2004.

The Joseph Pines Preserve is located in the gently rolling terrain of Sussex County, Virginia in the heart of the historic range of the longleaf pine-pitcher plant ecosystem. We started working in 1995 with the previous landowners, Brad and Marsha Whitehead, successfully reintroducing native Sussex County yellow pitcher plant and performing test plantings of longleaf pine. We planted one acre of native Virginia longleaf pine on the preserve and over 1200 native yellow pitcher plant from six populations (Fig. 10). In the past several years we have cleared (mechanical chipping of invasive hardwoods and pines), burned, and or chemically treated the entire 101 acres. Over 65 acres have been planted with almost 5000 native Virginia longleaf pine seedlings. Joseph Pines Preserve represents one of the largest plantings of native longleaf pine in Virginia! These seedlings were all raised in-house and collection of seed was performed by Meadowview biologists from native Virginia longleaf pine trees. Some of the longleaf pine from which we gathered cones have since been cut and thus Joseph Pines has unique longleaf pine genetic material no longer available in Virginia.



Figure 10. Virginia yellow pitcher plant in restored wet meadow at Joseph Pines Preserve.

The preserve is dedicated to protecting the entire remaining population of native Virginia yellow pitcher plant. For fifteen years Meadowview maintained six Virginia yellow pitcher plant populations in raised beds at the research facility in Caroline County, Virginia just south of Fredericksburg. During this period detailed studies were done on the reproductive biology of this native yellow pitcher plant stock. During the study four of the populations went extinct in the wild while we safeguarded and protected this valuable germplasm from loss. During the late winter and spring of 2003 trails were cut on the Joseph Pines Preserve and all the native yellow pitcher plant was moved from the research station and planted on the preserve. This large project involved a considerable amount of volunteer labor breaking apart the beds, dividing and cleaning the plants, transporting them to the preserve, and planting and flagging.

The preserve is also dedicated to capturing the entire Virginia longleaf pine (*Pinus palustris* Miller) genome by grafting, fascicle rooting, or seed propagation (Fig. 11).

With less than 2000 native longleaf pine trees left in Virginia, capturing the entire genome of this economically and ecologically valuable tree species is entirely possible. Longleaf pine is an associate species of yellow pitcher plant and is a keystone species in fire maintained ecosystems. The preserve will perform the vital role of preserving rare components of the longleaf pine-pitcher plant ecosystem which are left in small, isolated, unprotected fragments in southern Virginia. Restoration efforts at the preserve will also provide habitat for rare animal taxa known from the area. Due to our extensive field work in southern Virginia we know where these fragmented populations exist and who the landowners are so as to obtain permission to collect divisions or seed.



Figure 11. Restored Virginia longleaf pine savanna at Joseph Pines Preserve.

The preserve will also be used for our ongoing educational and scientific endeavors. In brief, we are attempting to restore a property to its colonial pre-settlement condition while at the same time preserving rare biological diversity in Virginia. By gathering together fragments of an ecosystem at the limits of its range we will restore breeding populations and maintain genetic reservoirs for future restoration work. Without this effort we will continue to lose valuable genetic material and subsequently suffer a loss of diversity.

Many pitcher plant habitats have been lost in Virginia through drainage, development, fire exclusion, agricultural and silvicultural practices, urban expansion, or neglect. Most of the associate plants found in these unique ecosystems are threatened with extinction. The rarity of these habitats is further highlighted by the state rarity ranking of many of the plant and animal species found in these sites. Many of these species are extremely state rare in Virginia and reach the northern limit of their range in southeastern Virginia.

Less than 100 clumps of the yellow pitcher plant, *Sarracenia flava* L., remain in the wild in one natural site (Fig. 12) in southern Virginia (Sheridan and Karowe 2000). The yellow pitcher plant is a fascinating, carnivorous plant that attracts, captures, and digests insects. The plant evolved the carnivorous habit to compensate for the lack of nutrients in its native soil. The significance of these sites is further highlighted by the fact that southern Virginia is the northern limit for *S. flava* and the associated longleaf pine, *Pinus palustris* Miller, ecosystem (Fig. 13). The longleaf pine ecosystem has emergent properties that support the pitcher plant community. One of the major properties provided by longleaf pine is mediation of natural, lightning caused fires.

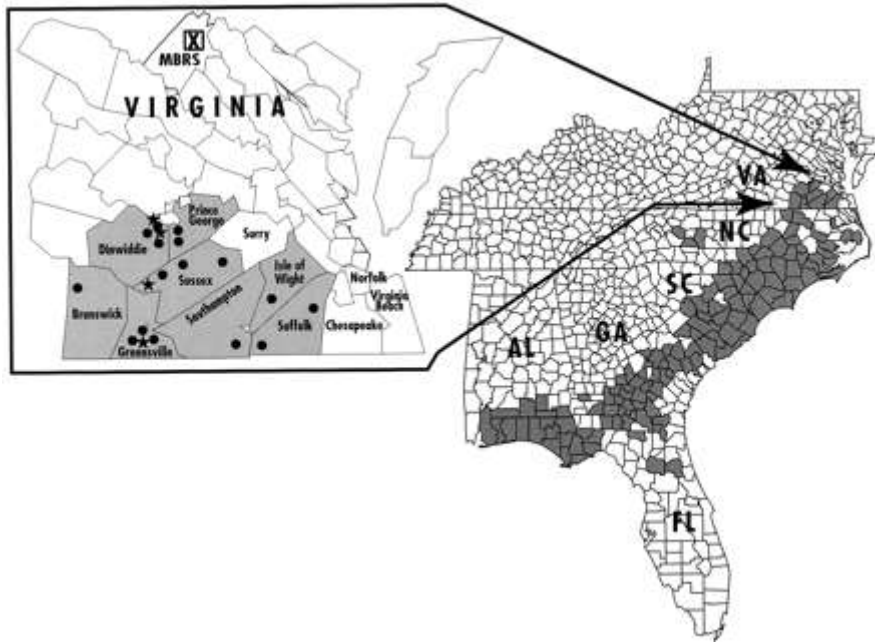


Figure 12. Historical distribution of *Sarracenia flava* in Virginia (Sheridan and Karowe 2000).

Longleaf pine needles are longer than other southern pines, provide a matrix of aerated fuel in the groundcover, and are both slower to decompose and have a higher resin content than other southeastern U.S. pine species. All of these factors come into play to provide the requisite frequent fire to maintain pitcher plant habitats in an early successional state. Longleaf pine is also a commercially valuable tree, disease and fire resistant, that produces high quality saw timber. Historically, longleaf pine provided invaluable naval stores (turpentine, tar, pitch) to the colonists in southeastern Virginia.

Unfortunately, four hundred years of settlement in Virginia has resulted in almost the complete destruction of native Virginia longleaf pine. Virginia longleaf pine covered 1.5 million acres at settlement but only 4432 trees remained on less than 800 acres based on a 1998 census by Meadowview Biological Research Station (Sheridan et al. 1999). Meadowview also determined that Virginia longleaf pine has greater fitness for in-state planting (Table 1, Sheridan et al. 1999) and that finding has been validated by researchers (Fig. 14) at the Virginia Dept. of Forestry (Creighton et al., 2009 and 2011).

Within the past few years great effort has been made to restore longleaf pine in Virginia leading to a total of over 2000 acres planted with that tree (Sheridan et al., 2012).



Figure 13. Historical distribution of longleaf pine in Virginia.

Table 1. Relative Fitness of Longleaf Pine Co-planted in Virginia
 Source Survival x Height = Overall Fitness

Nansemond (Suffolk) Co. Virginia	1.0	1.0	1.0
Rapides Parish Louisiana	0.97	0.96	0.93
Harrison Co Mississippi	0.90	0.95	0.86
Treutlen Co Georgia	0.85	1.0	0.85
Hillsborough Co. Florida	0.53	0.32	0.17

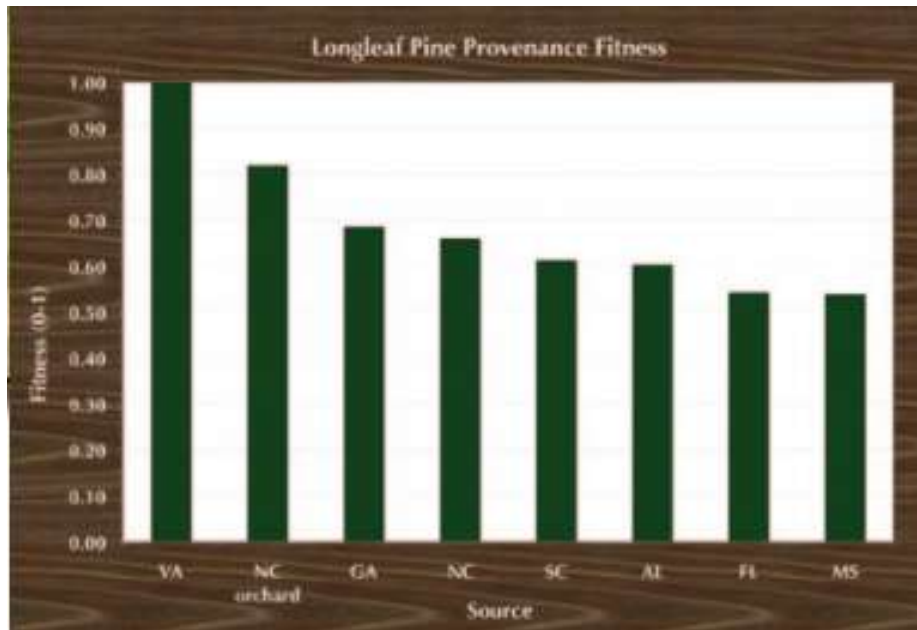


Figure 14. Relative fitness (avg. height, diameter, and survival) for longleaf pine across three locations (from Creighton et al., 2011).

There is currently no preserve in Virginia, other than Joseph Pines Preserve, for native Virginia longleaf pine **and** yellow pitcher plant because the intact, exemplary examples typically purchased by conservation organizations do not remain within the state. Many of the rare species normally found within the longleaf pine/pitcher plant ecosystem occur as isolated, fragmented populations on unprotected, private land in southeastern Virginia. We are obtaining divisions from these unprotected sites to both maintain genetic diversity and to restore this ecosystem on our preserve. By bringing together fragments of this ecosystem we will not only maintain genetic diversity but also restore breeding populations.

Our goal is to have a functioning longleaf pine-pitcher plant ecosystem at the Joseph Pines Preserve. We have successfully restored our core 101 acres by converting 65

acres to native Virginia longleaf pine habitat, performing regular understory burns on 29 acres of mature loblolly pine woods, and restoring 7 acres of sphagnum seepage bogs with burning and mechanical clearing. We are more than half way through the reintroduction process of 18 indigenous rare plant taxa.

In 2012 we purchased the Posey and Conservation Forestry tracts with a \$145,000, 0.25% interest loan from the Virginia Resources Authority and a \$145,000 grant from the Virginia Clean Water Revolving Loan Fund Green Reserve Program from DEQ. We donated a conservation easement on our existing 101 acre property and the total 232 acre property was placed under conservation easement with the Virginia Department of Forestry. These recent acquisitions give us almost complete control of the watershed and add additional habitat types such as creek bottoms and cypress swamps, in addition to numerous sphagnum seepage bogs.

Our long term goal is to continue to expand the preserve through further purchases of adjoining land from John Hancock Life Insurance Company, Conservation Forestry, and Commonwealth Forests Investments to connect with both the Virginia Department of Conservation and Recreation's Cherry Orchard Preserve and DGIF's Game Lake so that a total preserve of over 2000 acres may eventually be created. Not only does our proposal provide significant water, air, and conservation benefits but our long term plan outlines a strategy to significantly expand and enhance the scope of our environmental and educational efforts. Meadowview is competent to handle this undertaking since we have the requisite field experience and understanding of the ecology of the respective species. We also have designed the preserve to ensure that hydrologic regimes are maintained in seeps and ecological processes are restored for species persistence and spread.

Project Justification and Significance

Restoring Biodiversity and Preventing Extinction

The longleaf pine/pitcher plant ecosystem in Virginia has suffered 400 years of degradation to the point that remaining examples are severely deficient in plant biodiversity. The best remaining examples of the longleaf pine/pitcher plant ecosystem in Virginia contain only ¼ the species historically found in the system (Sheridan 2010, Sheridan and Petzke 2013). Meadowview is attempting to restore this historic diversity at the Joseph Pines Preserve while at the same time preventing the extinction of critical plant populations. Preventing extinction of local plant populations that are part of the ecosystem is essential to both restoration efforts at Joseph Pines and regionally. Restoring biodiversity also potentially adds resistance and resilience to the ecosystem.

An essential method to restoring plant biodiversity is reintroduction. Our reintroduction policy and approach is consistent with written protocols of the Maryland Dept. of Natural Resources (1999) since they state reintroduction is:

“To establish a plant taxon that was recently lost from part of its historic range¹ or that enhances populations which remain within its historic range.

¹Historic range is defined as “in suitable habitat within the physiogeographic range of the taxa since the 1600s, **but not necessarily documented from the specific site.**”

The discovery of several rare wetland plant species at Joseph Pines which are known associates for pitcher plant wetlands also support our reintroduction strategy. We have compelling evidence (Sheridan, 2010) that segments of the pitcher plant community are selectively lost over time due to competition and succession and that some genera, notably *Sarracenia*, may be irretrievably lost and require reintroduction from local stocks to restore the ecosystem. We are now predicting the total extinction of all native Virginia pitcher plant populations no later than 2060 (Figs. 15 & 16). In fact, the extinction vortex is likely accelerating and total extinction is expected by 2030. These extirpations are occurring because of lowered ground water tables, lack of prescribed fire, land development, herbicide use, and other factors, or a combination of the these factors. These predictions highlight the need and urgency for the managed preserve at Joseph Pines. While native pitcher plant populations are being extirpated in southern Virginia, the reintroduced populations at Joseph Pines are flourishing and reproducing. These results are a strong testament to our good management and excellent hydrology.

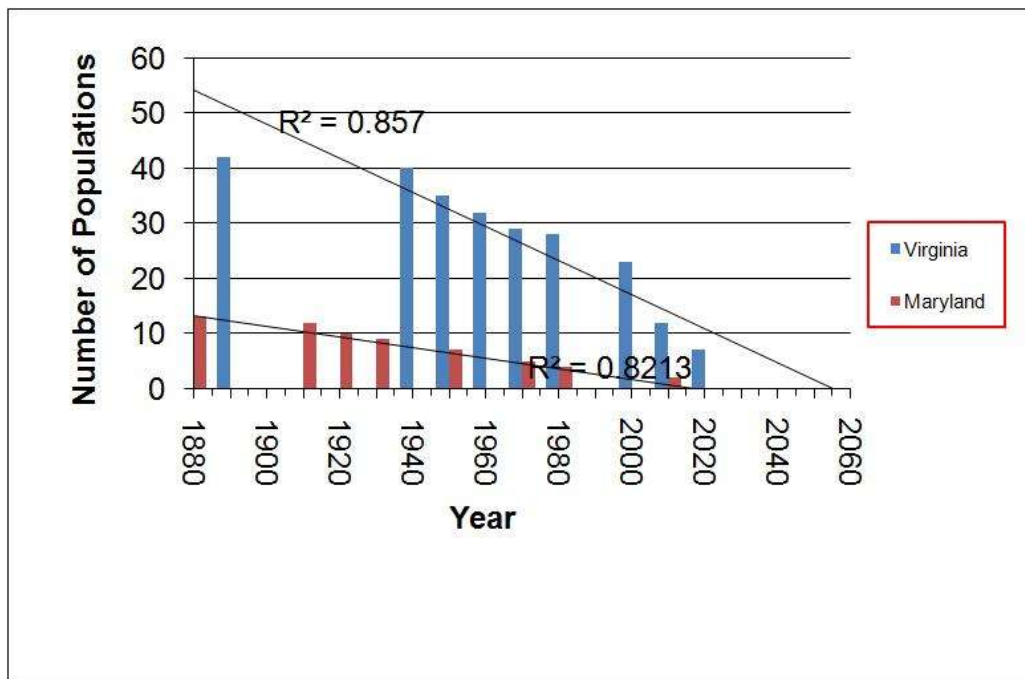


Figure 15. Regional extinction prediction for purple pitcher plant, *Sarracenia purpurea* L.

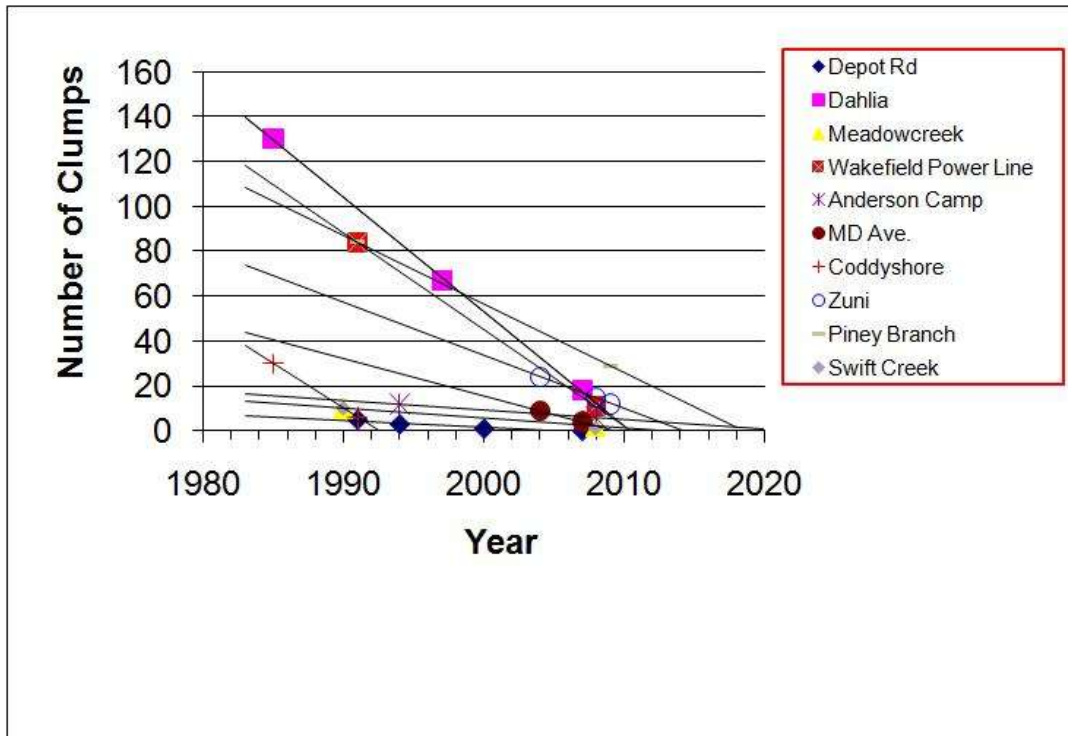


Figure 16. Local extinction prediction for Virginia populations of purple pitcher plant, *Sarracenia purpurea* L.

Target Species

In 2006 Meadowview received the Private Stewardship Grant from the U.S. Fish and Wildlife Service for the Joseph Pines Preserve. This grant allowed us to restore habitat and populations of one federally-listed and eighteen state-listed plant taxa (Table 2). In addition habitat was enhanced for one federally and state endangered bird, one state threatened bird, and one state endangered fish (Table 3). The U.S. Fish and Wildlife Grant was a follow-up to a previous EQIP grant from NRCS which allowed us to restore and plant 23 acres with native Virginia longleaf pine. Restoration efforts continue at Joseph Pines Preserve to reintroduce many of the rare species known to historically occur in Virginia pitcher plant bogs and associated uplands. The proposed education center (see below) and nursery will greatly facilitate this effort to restore biodiversity.

Table 2: Rare, Endangered and Threatened Plants of southeastern Virginia longleaf pine-pitcher plant ecosystem to be protected and restored at Joseph Pines Preserve

SCIENTIFIC NAME	COMMON NAME	Global Rank	State Rank	State Status	Federal Status
<i>Aletris aurea</i>	Golden colicroot	G5	S1		
<i>Cleistes divaricata</i>	Spreading pogonia	G4	S1		
<i>Ctenium aromaticum</i>	Toothache grass	G5	S1		
<i>Drosera capilaris</i>	Pink sundew	G5	S3		
<i>Eriocaulon decangulare</i>	Ten-angle pipewort	G5	S2		
<i>Helenium brevifolium</i>	Shortleaf sneezeweed	G3/G4	S2		
<i>Lachnocaulon anceps</i>	Bog-buttons	G5	S2		
<i>Pinus palustris</i>	Longleaf pine	G5?	S1		
<i>Plantanthera blephariglottis</i> var. <i>conspicua</i>	White fringed orchid	G4/G5T3T4	S1		
<i>Pseudolycopodiella caroliniana</i>	Slender clubmoss	G5	SH		
<i>Rudbeckia heliopsidis</i>	Sun-facing coneflower	G2	S1		
<i>Sabatia campanulata</i>	Slender marsh rose-pink	G5	S2		
<i>Sarracenia flava</i>	Yellow pitcher plan	G5?	S1		
<i>Sarracenia purpurea</i> ssp. <i>venosa</i>	Southern purple pitcher plant	G5T3T5	S2		
<i>Schwalbea americana</i>	Chaffseed	G2	SH		LE
<i>Tetragonatheca helianthoides</i>	Pineland square-head	G5	S1		
<i>Utricularia juncea</i>	Southern bladderwort	G5	S2		

<i>Zigadenus densus</i>	Dense-flowered camas	G5	S1		
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Table 3: Rare, Endangered and Threatened Animals for which habitat will be restored on Joseph Pines Preserve					
SCIENTIFIC NAME	COMMON NAME	Global Rank	State Rank	State Status	Federal Status
<i>Aimophila aestivalis</i>	Bachmans sparrow	G3	S1B	LT	
<i>Enneacanthus chaetodon</i>	Black-banded sunfish	G4	S1	LE	
<i>Picoides borealis</i>	Red-cockaded woodpecker	G3	S1	LE	LE

Global Rank: G1- Highly globally rare; G2-Globally rare; G3-Very rare and restricted range; G4-Apparently globally secure but may be quite rare in parts of its range; G5-Demonstrably secure globally but quite rare locally particularly at the periphery.

State Rank: S1- Critically Imperiled; S2-Imperiled; S3-Vulnerable; S4-Apparently Secure; S5-Secure: SH-Historical.

State Status - E- Endangered; T- Threatened; X- Endangered Extirpated

Federal Status - LT- Threatened, likely to become endangered in the near future

Project Staff, Organization, Management and Responsibility

Board Members

Meadowview has five members of the Board of Directors: Dr. Phil Sheridan, Dr. Robert Wright, Mr. Jim Robinson, Mr. Brad Whitehead, and Mr. Mike Hammond. Each board member brings unique and complimentary talents to the organization. All board members contribute significantly to the organization in their own personal way. Most board members are of modest and humble financial means and their contributions are in their activities, talents, and works for the organization. Dr. Phil Sheridan, founder of the organization, works full time as a non-compensated President managing the considerable day to day affairs of the organization. He is able to do this, not because he is wealthy, but because he has a wife that supports the important work of Meadowview. Mrs. Sheridan was the anonymous matching donor in the Joseph Pines fund-raising campaign and gave over \$33,000 for preserve acquisition. Dr. Sheridan

also donated his house to Meadowview (appraised value \$62,000) to endow the organization with a corporate headquarters and provide facilities for rare plant propagation and nursery operations. Dr. Robert Wright provides oversight of state and federal regulations, in addition to his botanical contributions, as they pertain to Meadowview because he works at an environmental consulting firm. Jim Robinson has been a supporter of Meadowview since its inception and has provided considerable financial support for land acquisition (over \$50K), infrastructure upgrades (50% of the cost of wood furnace installation \$7K), and preserve management (\$7K). Brad Whitehead worked with Meadowview and provided the property for sale that launched the Joseph Pines Preserve. Brad and his wife Marsha have supported the work of Meadowview since 1997 and their family has a long history in southern Virginia. Mike Hammond is a recent addition to the board but has proved himself with his ten year volunteer record and considerable contributions in infrastructure upgrades and rare plant propagation. Remaining officer positions such as secretary, vice-president, and treasurer are either handled by the existing board of directors or co-handled with qualified professionals (e.g. accountant supervising treasurer duties).

Dr. Phil Sheridan

Dr. Sheridan (Fig. 17) is both the President and one of the Directors of Meadowview Biological Research Station. He has both a B.S. and M.S. from Virginia Commonwealth University where he did his research work on pitcher plant genetics and biochemistry. He has a Ph.D. in Ecological Sciences from Old Dominion University on the population biology and genetics of purple pitcher plant in Maryland and Virginia. He developed a reproductive model for longleaf pine at the Blackwater Ecologic Preserve and is an active member of the Virginia Academy of Sciences. He has been a driving force for longleaf pine and pitcher plant preservation in Virginia and has numerous, peer-reviewed papers on these and other subjects. Dr. Sheridan is also a Certified Prescribed Burn Manager with the Virginia Dept. of Forestry (certification # 710). Dr. Sheridan directs the day-to-day activities of Meadowview Biological Research Station and would be responsible for supervising the proposed project. Dr. Sheridan also has an extensive background in finance. He has ten years of experience in the savings bank industry including positions as assistant programmer, accounting clerk, bookkeeper, records manager, and supervisor in check processing. He also has several years of course work in Business Administration.



Figure 17. Dr. Phil Sheridan

Dr. Robert Wright

Dr. Wright (Fig. 18) is a public service naturalist, instructor, and well-published field ecologist with over 20 years experience in public, private, governmental, institutional and military environmental consulting markets. He is a director of Meadowview with a BS in Environmental Science from Lynchburg College, an M.S. in Environmental Science from Americus University, and a Ph.D. in Environmental Planning from Hamilton University. Dr. Wright focuses on integrated natural resource management, environmental planning and multi-disciplinary ecological studies. In addition to having multiple certifications and specialized training in other related disciplines, he has specialized expertise in regional, state, and local flora with specific graduate coursework and commercial and research project experience in the Southern Appalachian Highlands, Cumberland Plateau, and Ridge and Valley, with taxonomic research interests in several plant groups, contemporary and historical floristics, and rare, threatened and endangered species. Dr. Wright also has expertise and special training in wildlife habitat assessments, tree stand evaluations, wetland compensation site identification/inventory, wetland functional assessment, Best Management Practices compliance, impact avoidance and minimization analyses, coastal zone management coordination, hazardous material investigations, land use analyses, litigation and trial support experience, and extensive NEPA document (CE, EA, EIS) preparation experience. He uses these positions and his expertise to conduct vegetation inventories, Mid-Atlantic and Appalachian floristic studies, regional plant taxonomic problems, and regularly conducts advanced studies in threatened and endangered species surveys and management throughout the U.S. including Maine, Michigan, Ohio, Pennsylvania, New Jersey, Maryland, West Virginia, North and South Carolina, Texas, Georgia Florida, California, Nevada, and Arizona.

Dr. Wright is also a research associate at the Freer-Ramsey Herbarium at Lynchburg College (LYN), as listed in *Index Herbariorum*. He is also past President (2007) of the Virginia Academy of Science Botany Section, the Secretary-Treasurer of the Virginia Botanical Associates, Inc., a 501(c) 3 organization dedicated to the study of Virginia

Flora and publisher of the *Digital Atlas of the Virginia Flora*, he sits on the Advisory Board of the Virginia Flora Foundation's Virginia Flora Project, and is a past (2003-2005) Board of Director at the Richmond Fire and Police Museum.



Figure 18. Dr. Robert Wright

Jim Robinson

Mr. Jim Robinson (Fig. 19) is a director of Meadowview and has studied and grown *Sarracenia* pitcher plants since the 7th grade. He received a B. A. in botany from Southern Ill. Univ. and worked in the nursery business for several years. After earning an M. S. in horticulture from Purdue University, Jim became Assistant Director of the Connecticut College Arboretum in the early 1980's. Jim worked under Director and world renowned ecologist Dr. William A. Niering. He eventually changed careers and became a successful computer programmer with Household Finance until his retirement in 2001. In addition to his own home gardening, Jim has helped since 1990 with prairie and savanna restoration in the forest preserve near his home in suburban Chicago, Ill. Jim has been a member and contributor to Meadowview since its inception and has played a significant role in supporting the activities of the organization both from a financial and management standpoint.



Figure 19. Jim Robinson (Left) and Brad Whitehead (right)

Hinton Bradford Whitehead

Mr. Brad Whitehead (Fig. 19) is a director of Meadowview with an extensive background in business administration. Brad has his MBA from UNC Chapel Hill with extensive background in the banking industry including a position at the Federal Reserve in Richmond, VA. Brads also has experience working at a local non-profit handling their financial accounting and performing financial consulting to various organizations. Brad and his wife Marsha have deep roots in southern Virginia and their families have lived and worked in the area for several generations. Brad also has local connections which are an important asset for our conservation work in southern Virginia.

Charles Michael Hammond

Mr. Hammond (Fig. 20) earned his B.S. degree from Eastern Mennonite University in Harrisonburg, VA. He was employed by the University of Delaware as a graduate research assistant while working on his M.S. degree in Entomology and Applied Ecology. Subsequently, Mike was employed by a large mid-Atlantic pest control Company where he held a number of positions including Branch Manager, Termite Division Manager and Regional Structural Fumigation Coordinator. He was also a member of the National Pest Control Fraternity, Pi Chi Omega for many years. While working as an entomologist, Mike was one of eight individuals serving on the Virginia State Pest Control Association Governor's Advisory Board. This led to the establishment of the standards of expertise for Certified Pesticide Applicators in Virginia. In addition he also participated in the establishment of similar certification standards for Maryland and the District of Columbia. Mike is a veteran of the U. S. Army serving two years in West Berlin, East Germany as a Section Leader for an eighty-one millimeter mortar platoon. He also served two years in the Peace Corp in Pakistan working as an Engineering Aide. His intensive training for this voluntary service was done at the University of Minnesota. In the years prior to his retirement, Mike worked as a Project Supervisor in the field of restoration construction. He started volunteering at Meadowview in the year 2000 and has made major contributions to infrastructure because of his expertise in carpentry. Mike has also played a role in



propagation and restoration efforts. Because of Mike's background and combination of skills he has been an excellent individual to discuss policies and strategies of Meadowview. As a result of this long vetting process, Mike has recently been inducted into the Board of Directors of Meadowview. He is also a Certified Prescribed Burn Manager with the Virginia Department of Forestry (Certification # 890).

Figure 20. Charles Michael Hammond

The Interns

Meadowview initiated an intern program in 2009 to train the next generation of biologists as stewards of the preserve system we are creating. The interns are involved in almost all operational phases of the non-profit and typically receive college credit for their work and published papers of their research. The intern program continues to grow and had six students in 2012.

High School and Graduate Students

Both high school and graduate students are involved in research projects at Meadowview leading to peer-reviewed publications. Meadowview has had three graduate students successfully complete their research program from nationally accredited universities (Arvind Bhuta, 2006, Virginia Tech; Yann Rodenas, 2012, Ball State University; John McLeod, 2013, Old Dominion University)

The Volunteers

Meadowview is an all volunteer organization that has been able to successfully accomplish its goals since 1995 by effectively utilizing the talents of this noteworthy group of individuals. Volunteer crews typically last two years and are replaced with new volunteers through attrition or completion of service. In other cases, typically retirees, long-term volunteer service has been contributed by this talented group of individuals. Volunteers are supervised and trained by Meadowview director Phil Sheridan and have fulfilled duties such as brush clearing, repotting, seed sowing, seedling planting, and public education.

Contractor and Professional Services

While staff, interns, students, and volunteers fulfill a vital role to Meadowview there are simply some tasks that must be delegated to contractors (examples include prescribed fire, herbicide application, or mechanical clearing) or to professional companies for technical reasons (for example lawyers, accountants, appraisers, etc.).

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Letters of Support for the Project

Carl E. Garrison III
State Forester



COMMONWEALTH of VIRGINIA

DEPARTMENT OF FORESTRY
900 Natural Resources Drive, Suite 800
Charlottesville, VA 22903
www.dof.virginia.gov
(434) 977-6555
Fax: (434) 296-2369

March 11, 2013

Dr. Phil Sheridan
President and Director
Meadowview Biological Research Station
8390 Fredericksburg Tnpk.
Woodford, VA 22580

RE: Letter of support for the proposal, "The Waste Management Center for Biodiversity At Joseph Pines Preserve".

Dear Dr. Sheridan,

Thank you for the opportunity for the Virginia Department of Forestry to express our support for the proposal "The Waste Management Center for Biodiversity at Joseph Pines Preserve".

The Virginia Department of Forestry protects and develops healthy, sustainable forest resources for Virginians. Headquartered in Charlottesville, the Agency has forestry staff members assigned to every county to provide citizen service and public safety protection across the Commonwealth. With nearly 16 million acres of forestland and more than 144,000 Virginians employed in forestry, forest products and related industries, Virginia forests provide more than \$27.5 Billion annually in benefits to the Commonwealth.

Since the early 1950's, the Department of Forestry has supported an Applied Research program that conducts structured research in the areas of pine and hardwood silviculture, tree improvement, growth and yield, and diminished species restoration. One of the most prominent recent initiatives has been the protection of native northern source longleaf pines and the restoration of the longleaf ecosystem within its original native range in southeastern Virginia.

To that end, the Department has been working for nearly two decades to protect the remaining native Virginia genotype and preserve it in a grafted native Virginia longleaf seed production area at our New Kent Forestry Center. Each year we collect as much seed as possible from the few remaining mature native longleaf still accessible (primarily on the South Quay Sandhills Natural Area Preserve owned by the Virginia Department of Conservation and Recreation) and raise native seedlings for restoration efforts.

Mission: We Protect and Develop Healthy, Sustainable Forest Resources for Virginians.

As you know, from the beginning the Meadowview Biological Research Station has played a major role in actively pursuing the same objectives with regard to longleaf pine restoration and collaborating with DOF and other stakeholders in these efforts. The expansion of your capabilities offered by this proposal is truly exciting as it would enhance the educational opportunities for landowners interested not just in longleaf but also the broader topics of biodiversity, conservation, and restoration. The additional seed production area would provide insurance that seedlings will remain available in the event of either an increasing market demand or unexpected damage to either the DOF or Meadowview orchard. At a minimum, the purchase of the Schwartz tract will secure these valuable gains. Additional funding could greatly expand the restored extent of native Virginia longleaf.

Therefore, the Virginia Department of Forestry supports the proposed education and conservation effort by the Meadowview Biological Research Station. We are excited about the opportunities this proposal would present, and would look forward to participating in and supporting your efforts. We encourage Waste Management to consider this project. Please keep us informed about the progress of this proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Jerre Creighton". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Jerre Creighton
Research Program Manager
Virginia Department of Forestry



MathScience Innovation Center

Imagine. Create. Lead.

March 11, 2013

Re: Meadowview Biological Research Station and the development of an educational center for biodiversity and the conservation, protection, and restoration of the historic endangered longleaf pine/pitcher plant ecosystem in Sussex County, Virginia.

Dear Dr. Sheridan,

As the coordinator of middle and high school special programs at the MathScience Innovation Center and director of our Summer Regional Governor's School, it is my pleasure to write this letter in support of your proposal entitled "The Waste Management Center for Biodiversity at Joseph Pines Preserve."

The MathScience Innovation Center is a STEM based educational institution in Richmond, VA. Our staff offers educational outreach to the K-12 students enrolled in the eight school divisions who are members of our consortium. This consortium includes the inner city schools of Richmond and Petersburg and their surrounding counties. Through our programs, we make contact with thousands of students every year.

Your workshop entitled "Bug Eating Plants" was well received by students in our Let's Innovate! Student Conferences for middle school youth, both in the spring of 2012 and in March, 2013. The workshop was tremendously engaging as the students explored the world of carnivorous plants, rare plants, and methods of preventing their extinction in Virginia. With a pedagogical approach that included both lecture and hands-on student involvement, the participants left the workshop with a new found appreciation for biological conservation and the role that plants play in stabilizing an ecosystem. We look forward to your continued association with the MathScience Innovation Center exploring innovative ways of explaining biodiversity and ecological sustainment to K-12 students. Your proposal to develop an educational center that focuses on these principles and offers a unique educational experience to our widely diverse population would be a tremendous resource for the Center. For instance, one of our Summer Regional Governor's School courses, A River Runs Through It, takes students through a variety of lab-based experiments and outdoor field studies on and around the water, as they conduct water quality and aquatic habitat research. It would be a logical extension of this course to explore the bog ecosystems being restored at Joseph Pines Preserve.

I wish you good luck on your proposal and look forward to your long term involvement in our programs.

Sincerely,

Daphne Schmidt
Director, Summer Regional Governor's School
Assistant Coordinator of Special Programs for Middle and High School
dschmidt@msinnovation.info
804-343-6525 Ext. 244



August 19, 2013

Phil Sheridan, Ph.D.
Meadowview Biological Research Station
8390 Fredericksburg Turnpike
Woodford, VA 22580
804-633-4336
meadowview@pitcherplant.org
www.pitcherplant.org

Dear Dr. Sheridan;

The *Humanities 211: Western Tidewater Cultural-Historical-Natural Landscape* class and I cannot thank you enough for the tour of the Joseph Pines Preserve in Sussex County this past July 15. As you know, this course is used by Educators in grades K-12 towards their teacher recertification. Thus it is a very important course to be offered by Paul D. Camp Community College.

The class received a wonderful overview of the educational and biodiversity goals which the Joseph Pines Preserve can offer to the public, particularly about rare plant conservation. The Preserve is unique in its regional habitat restoration. The restoration of longleaf pine is fundamental to a better understanding of our area's history, and has been so easily forgotten about. In fact, 18 rare plants and 3 animal taxa is an exciting restoration of the ecosystem.

Additionally, it is great to have the teachers realize that colonial and more recent history is also being investigated and explored. Our region does not separate easily from the natural to human historical association. There is so much to discover and learn in Western Tidewater. Appreciate your being a part of this effort.

Sincerely,


Felice Hancock, B.A., M.A.
Adjunct Faculty



April 6, 2008

As an instructor for the Fredericksburg Regional Governor's School, I have developed an association with Phil Sheridan's Meadowview Biological Research Station as a field study destination for my students. Our Governor's School summer program consists of an investigation of the value of wetlands ecology to our environment. The students selected are participants of the gifted programs from the counties of Stafford, Spotsylvania, Caroline, King George and the City of Fredericksburg. Students may also be home schooled or be enrolled in area private academies. Over the years of our association with Meadowview, I have been pleased with the excitement of the students when visiting the Biological Research Station. It is clear to the students, as it is to me, that Phil Sheridan is totally involved in his research. His passion for his subject clearly makes an impression on these young science students. Students learn the history and evolution of the carnivorous plants that Mr. Sheridan cares for. They are shown the propagation techniques that have been developed for Meadowview and the biology behind the research.

I have known students that return to Meadowview as volunteers in the ecological research that is continuing there and know at least one young man who acquired carnivorous plants at Meadowview, and has cared for them for 7 years. This former middle school student is now finishing his first year at Virginia Tech and is planning to major in environmental science.

In the years of our association, Phil Sheridan has volunteered to instruct students in my classroom and has brought his carnivorous plants for students to dissect as a hands-on lab experience for middle school students. The squeals of excitement and laughter as these 12 year-olds opened up and investigated the innards of carnivorous plants was not to be missed.

I cannot think of a better community partnership for hands-on ecological learning than I have experienced with my students and Meadowview Biological Research Station.
Sincerely,

Stephanie Larson
Science Department Chair
Walker-Grant Middle School
Wetlands Instructor, Fredericksburg Regional Governor's School