

POSTCARDS FROM THE FIELD: THE ROLE OF PARTNERSHIP AND HORTICULTURE IN PLANT CONSERVATION IN SOUTH- EASTERN UNITED STATES OF AMERICA

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ABSTRACT

Increasingly, botanic gardens and arboreta are highlighted as effective partners to conserve plant species diversity and restore natural communities at a time when the need for these activities has become more urgent. Capacity for restoration and conservation at botanic gardens comes directly from staff expertise for horticulture and research. Botanic gardens make good partners for connecting botanical science with conservation practice. They are in a position to communicate information about rare plant species to owners and managers of public and private lands, and they can be instrumental in creating networks for effective conservation action. Several examples from south-eastern United States of America illustrate how this has been put into practice. These examples provide evidence that efforts to expand collaboration between federal agencies, states and non-governmental organisations can lead to effective alliances to conserve plant biodiversity, especially when plants receive a disproportionately low share of resources for conservation.

INTRODUCTION

Increasingly, botanic gardens and arboreta are highlighted as effective partners for conserving plant species diversity and restoring natural communities (Hardwick *et al.*, 2011; Shaw *et al.*, 2015). The need for these activities will only become more urgent in coming years as one in five plants face extinction and we realise the impacts of global climate change (RBG Kew, 2016; Thuiller, 2007). Capacity for restoration and conservation at botanic gardens comes directly from staff expertise in horticulture and research, including experience in seed storage techniques, propagation and insight for identifying appropriate microsites for augmentation and introduction into natural habitats. This is particularly helpful because re-introducing rare plants into the landscape requires understanding of a species' biology and ecology (Falk *et al.*, 1996). Furthermore, gardens have resources for maintaining georeferenced databases and researching taxonomic and population genetic diversity, as well as programmes for training and outreach. In effect, gardens are ready-made centres for conservation as places with botanical and horticultural expertise at a time when we need them more than ever.

The Global Strategy for Plant Conservation (GSPC) outlines targets for plant conservation to be reached by 2020 (CBD, 2012). Several of the recommended approaches to

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in situ and *ex situ* plant conservation are particularly relevant to botanic gardens and their role as good partners:

- Target 7: At least 75 per cent of known threatened plant species conserved *in situ*
- Target 8: At least 75 per cent of threatened plant species in *ex situ* collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes
- Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes
- Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

The North American Botanic Garden Strategy for Plant Conservation, 2016–2020 (BGCI, 2016) takes a regional approach to outlining specific activities that botanic gardens can undertake to support the global targets for plant conservation including: documenting floras, assessing threats, appropriate land management and maintaining *ex situ* collections. Contributions by botanic gardens have increased as awareness for plant conservation needs and approaches have grown. For example, a recent evaluation of GSPC Target 8 in the United States found that germplasm and living plant collections reporting to BGCI increased by 38 per cent (241 US collections), with a 2 per cent increase (156 taxa) in collections of known threatened plants, between 2010 and 2013 (BGCI, 2013). However, the report also noted that only 39 per cent of threatened native plants (including extinct, critically endangered, endangered and vulnerable species) were held in collections, and the USA was still predicted to be more than 3,000 species away from meeting Target 8 by the year 2020 (BGCI, 2013).

In the USA the Endangered Species Act (ESA) of 1973 is the strongest piece of environmental legislation for rare species and is implemented by the federal government and its partners, including state agencies, private individuals and companies, and non-governmental organisations such as botanic gardens. After 40 years, however, less than 2 per cent of listed species have recovered to the point where they can be removed from the ESA, and the majority are either declining (52 per cent), presumed extinct (3 per cent) or unknown (2 per cent) (Evans *et al.*, 2016). In 1977, the first four plant species were listed under the ESA, all from San Clemente Island, the most southerly of the Channel Islands off the coast of California. By 1982, it was prohibited to collect listed plants from federal lands. By 2013, the number of listed species included 871 plants. Since 1994, the number of federally listed plants has been higher than that of animals, and plants now make up more than 55 per cent of species protected by the ESA with 80 per cent of these plants listed as endangered, or imminently at risk of extinction (Negron-Ortiz, 2014). However, the number of plant species listed under the ESA is significantly below the number ranked as imperilled by NatureServe (2016), an award-winning public-private network and database connecting science with conser-

vation, meaning there are many more species that should be federally protected that are currently not (Evans *et al.*, 2016). Approximately 31 per cent of the estimated 1,808 native plant species in the USA are at risk of extinction, however only 11 per cent receive protection under the ESA (Negrón-Ortiz, 2014).

One of the best predictors of recovery success for species listed under the ESA is government funding for species protection (Miller *et al.*, 2002; Male and Bean, 2005; Schwartz, 2008; Evans *et al.*, 2016). Although the ESA in the USA has succeeded in preventing extinction for potentially hundreds of species, funding has been insufficient and distribution has been uneven. Although plants make up 55 per cent of species protected by the ESA, they receive less than 4 per cent of government funding for listed species (Negrón-Ortiz, 2014). Unequal distribution of resources for conservation led Roberson (2001) to state that laws, budgets, and policies in the USA treat plants as “second class conservation citizens”.

Furthermore, unless available resources are directed towards plant conservation and training the next generation of plant scientists at botanic gardens and other institutions, it is unlikely that the USA will be able to meet challenges in botanical capacity in the 21st century (Kramer *et al.*, 2010). In this context botanical capacity refers to botanical education, environmental literacy, horticultural training and conservation research (including conservation genetics, restoration ecology and demographic surveys). Regardless of whether additional resources will become available, Evans *et al.* (2016) identified six broad strategies to increase effectiveness of the ESA for conserving species. One of these is “Strengthen partnerships for species recovery by expanding collaboration among federal agencies, the states, and nongovernmental organizations and by developing incentives for private landowners”.

One way of identifying priorities and increasing conservation partnerships in the USA is through the State Wildlife Action Plans (SWAPs). These are five-year proactive plans aimed at conserving species before there is a need to list them. They are developed by each state wildlife agency and make the states and five territories eligible for federal conservation dollars. However in 2005, when the SWAPs were first established, only eight states included plants among species of greatest conservation concern (Stein *et al.*, 2008). Notably, the state of Georgia did include plant species, as well as set habitat priorities, focal areas for conservation and targets for plant conservation action (Stein *et al.*, 2008). One reason for the exceptional nature of Georgia’s SWAP was because the Department of Natural Resources Nongame Conservation Section has been an active and contributing member of the Georgia Plant Conservation Alliance since its inception in the mid-1990s.

The south-eastern USA, including the state of Georgia, is a biodiversity hot spot in North America with areas of exceptional species uniqueness found in the panhandle of Florida, across the south-eastern coastal plain and within the southern Appalachian Mountains. In terms of overall biodiversity patterns, Alabama ranks fifth and fourth among the states for species diversity (4,533 total species) and conservation risk respectively (14.5 per cent of state species at risk: Stein, 2002), Florida ranks fourth among

states for the number of endemic species, with approximately 155 state-restricted plant species representing 5 per cent of its flora (Wunderlin, 1998; Stein *et al.*, 2000). Alabama, Georgia and Florida are ranked second, fifth and sixth respectively for the number of species that have become extinct (90, 26 and 23 total taxa per state, respectively: Stein, 2002). Florida, Georgia and Alabama are among the top ten states with the highest number of vascular plant species (approximately 3,000 plant species per state) and the highest plant species at risk of extinction (14 per cent in Florida, 11 per cent in Georgia and 9.4 per cent in Alabama of species at risk) (Stein *et al.*, 2000). The south-eastern USA also has a high concentration of species that are either listed by the ESA under a settlement agreement (a tool, such as a Candidate Conservation Agreement or Habitat Conservation Plan, that provides regulatory assurance and technical assistance) or are ranked as imperilled by NatureServe, including three out of seven hotspots identified for imperilled species (Evans *et al.*, 2016). These include the southern Appalachian Mountains, peninsular Florida and coastal parts of the south-east and Gulf states, which are also areas with higher rates of endemism.

A STATE-BASED PLANT CONSERVATION PARTNERSHIP –
THE GEORGIA PLANT CONSERVATION ALLIANCE

What brings people together to conserve plant species – effectively? Three botanic gardens and their partners in Georgia, USA

The award-winning Georgia Plant Conservation Alliance (GPCA) is a partnership that came together through the collaborative initiatives of three botanic gardens in Georgia to work with state and federal agencies to conserve rare plants across the state. As it has grown, the list of partners includes the Nature Conservancy, universities, utility companies, the state department of transportation, land trusts and private land owners, as well as an active network of botanical volunteers. Although each partner brings a different capacity to the network, the core of the GPCA's accomplishments is the connection between conservation horticulture and on-the-ground restoration.

The power of the alliance is in its simplicity and commitment of all partners to meet regularly during the year to prioritise species for conservation action, schedule projects and update the group on accomplishments. The group organises its efforts on a project basis and there are no bylaws or dues. One formal document, a Policy Statement on Safeguarding, signed by the highest official at each participating institution, was created in 2006. It establishes standards and guidelines for safeguarding activities as a conservation strategy. Overall the GPCA operates according to a three-legged stool model. Partners contribute to one or more of the legs that include conservation horticulture, land management and restoration, and regulation. If any one of the legs is missing the network will not stand up. Since its inception a true key to its success is coordination by the State Botanical Garden of Georgia. Without a GPCA coordinator, cooperation and communication within the network would be difficult.

The GPCA has been successful at coordinating safeguarding efforts for species of conservation concern in Georgia. Since 1995, more than 20 partner organisations have made a coordinated effort to establish *ex situ* collections of rare species for conservation purposes. These conservation collections represent invaluable genetic resources. In addition to assuring that these plant species are protected in cultivation, the GPCA has safeguarded rare species in their native and restored habitats. This has been achieved in part by augmenting existing populations *in situ* and re-introducing or establishing introduced populations using cultivated material propagated from known wild sources.

For example, across the south-eastern USA mountain bog habitats have been reduced to less than 3 per cent of their original distribution and are of critical conservation concern. By the late 1980s, mountain bog populations in Georgia were limited to one remaining *Sarracenia purpurea* var. *montana* (mountain purple pitcher plant – Fig. 1) population with fewer than 20 plants in the National Forest. Using hand tools, chainsaws and eventually prescription fire, conservation partners within the GPCA restored microsites within the bog. At the same time the Atlanta Botanical Garden propagated the few remaining mountain purple pitcher plants, first by clonal propagation and later from seed once numbers in the wild had increased. Over the next two decades this material was used to augment the remaining bog and was introduced into



Fig. 1 *Sarracenia purpurea* var. *montana* at what was the last remaining mountain pitcher plant bog in Georgia on the Chattahoochee National Forest. This population started the conservation horticulture programme at the Atlanta Botanical Garden. *Ex situ* safeguarding and conservation efforts have led to the establishment of more than six restored mountain purple pitcher plant bogs with new seedling recruits. Photo: Dr Brad Wilson.



Fig. 2 *Helonias bullata* (Swamp pink) is a federally listed threatened species native to forested wetlands of the eastern USA. This species is locally abundant in the states of New Jersey, Delaware and Virginia. However small, isolated, high elevation bogs in the south-eastern USA have been shown to have populations that represent glacial refuges with higher levels of genetic diversity than other larger more northern populations. Photo: Jim Fowler.

restored bogs at six other locations in Georgia. During this time, the GPCA began to address conservation needs for a suite of rare species found in south-eastern mountain bogs, including *Helonias bullata* (swamp pink – Fig. 2) and *Sarracenia oreophila* (green pitcher plant – Fig. 3) among others. By 2012, survival rates for augmented mountain purple pitcher plants and swamp pink were 76 per cent and 88 per cent respectively, and the first seedling recruitment was documented for both species. By 2010, population genetic markers (microsatellites) were developed to assess the evolutionary impacts of restoring the mountain purple pitcher plant (Rogers *et al.*, 2010; Cruse-Sanders, in prep.). Representing more than two decades of conservation partnership, mountain bog restoration by the GPCA has been recognised as a model for successful plant conservation at regional and national levels.

A regional approach to conservation in south-eastern USA

The regional approach to conservation enables priorities to be coordinated across a larger area or across the entire natural distribution of a species, thus making the efforts more efficient. If a conservation institution or alliance takes a regional approach they can target a single species or a suite of species in a similar habitat across multiple states,



Fig. 3 *Sarracenia oreophila* is a federally listed endangered species endemic for the south-eastern USA. The species range is restricted to Alabama, Georgia and North Carolina. The greatest threats to this species are loss of habitat through development and wetland conversion to other uses. Photo: Dr Brad Wilson.

and coordinate this effort with multiple state agencies and other partners. Many gardens make good partners for coordinating long-term efforts across multiple states because garden networks are well connected between academic, agency and private partners. As connections are built for information sharing, these networks become stronger through these initiatives.

In considering a regional approach to conservation and the resources available to achieve conservation action, it is interesting to look at how the south-eastern USA is defined by federal agencies (Fig. 4). The US Fish and Wildlife Service (USFWS) Southeast Region, within the US Department of the Interior (Region 4) extends north to North Carolina and Kentucky and west to Arkansas and Louisiana, whereas the US Forest Service south-eastern region, within the US Department of Agriculture (Region 8) includes Virginia and Texas. Both include Puerto Rico and its unique tropical flora. The Landscape Conservation Cooperative (LCC) is administered by the US Department of the Interior and aims to develop networks for science, management and conservation planning tools. It is divided into 22 LCC areas. The south-eastern region as defined by other federal budgets and congressional districts encompasses at least seven of the LCC regions, including the south Atlantic LCC, Gulf Coastal Plains and Ozarks LCC, and Peninsular Florida LCC amongst others. Within each of these and other agencies

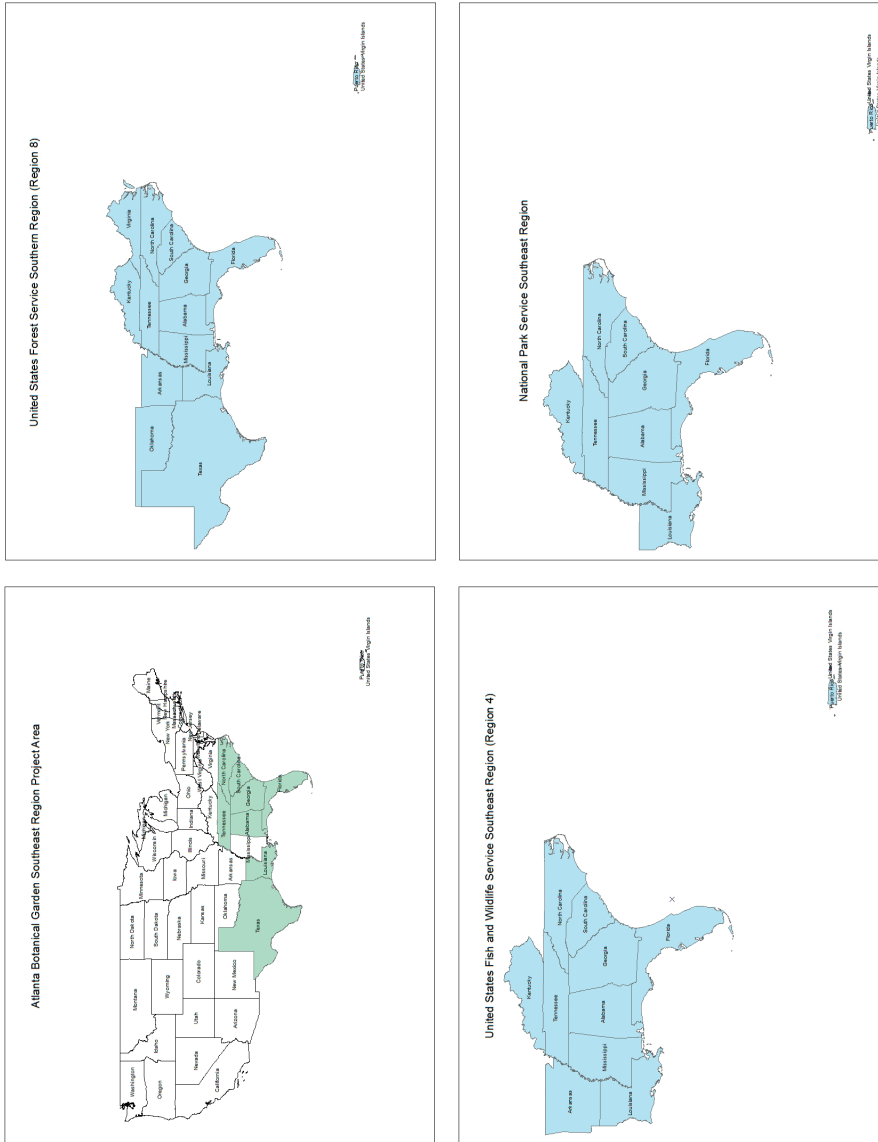


Fig. 4 The extent of the south-eastern region of the USA is different depending on the federal agency or conservation organisation under consideration. A (top left) The Atlanta Botanical Garden has active conservation and restoration projects from the Carolinas to eastern Texas. B (top right) The USDA Forest Service Southeastern Region, Region 8. C (bottom left) The US Fish and Wildlife Service Southeastern Region, Region 4, is responsible for conservation of at-risk and species listed under the Endangered Species Act. D (bottom right) The National Park Service is one more example of a federal agency that defines the south-eastern USA differently than other federal agencies. Important conservation efforts are underway in National Parks, National Wildlife Refuges, and on state protected land. There is an immediate need to coordinate all of the efforts for plant conservation on these diverse properties. Botanic Gardens can facilitate this.

are resources and tools that can be applied in the south-eastern USA, including alternative funding sources under the ESA, State Wildlife Action Grants and stewardship programmes and projects.

A recent example of this regional partnership and collaborative research across three states resulted in a conservation success story for *Symphyotrichum georgianum* (Asteraceae) (the Georgia aster – Fig. 5). This species is distributed primarily along the piedmont from North Carolina to Alabama, and has been a candidate for protection under the ESA since 1999. Collaborative research developed out of existing GPCA partnerships between Atlanta Botanical Garden, the State Botanical Garden of Georgia, the US Forest Service, and including the North Carolina Botanic Garden, and the Citadel analysed genetic diversity and seed viability of the Georgia aster for large and small populations across its range (Gustafson *et al.*, 2016). This research was funded by the US Forest Service and provided valuable data to the USFWS that led to a Candidate Conservation Agreement for this species. The agreement for this species was between landowners, including the Department of Natural Resources, Department of Transportation, Southern Company and the National Park Service. They pledge to work together to protect remaining plants, keep populations from dwindling, and the species from becoming a critical conservation issue. The agreement also prevented the inclusion of *S. georgianum* on the endangered species list.



Fig. 5 The Candidate Conservation Agreement for *Symphyotrichum georgianum* (Georgia Aster) represents a broad scale conservation collaboration among federal, state, and private partners to work together for conservation of this species and management that will prevent its listing under the federal endangered species act. Photo: Michele Elmore, The Nature Conservancy.

ATLANTA BOTANICAL GARDEN'S CENTER FOR SOUTHEASTERN
CONSERVATION – IMPERILLED SPECIES AND HABITAT RESTORATION

In 2015, the Atlanta Botanical Garden launched the Center for Southeastern Conservation. Embracing the Garden's mission and drawing upon its vast collections and expert staff, the Center aims to be a hub for the large and growing conservation community in the south-east. As a venue for coordination and collaboration, the Center will enable partner institutions to expand and better carry out their work. Through collaborative conservation of imperilled species and habitats in the Carolinas, Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana and east Texas the Center protects the natural heritage of one of North America's most biodiverse regions.

With the establishment of a Research and Conservation Department in 2008 the Garden was able to formalise the science behind its conservation activities and finally develop and name a centre of excellence for conservation and training in 2015. Building on 20 years of adaptive management and collaboration, the Center for Southeastern Conservation at the Atlanta Botanical Garden and its partners across the south-eastern US have restored bogs, flat wood seepage slopes, wetlands and other native habitats for more than two decades. This management follows tractable processes: the habitat is surveyed; conservation partners identify restoration needs; partner institutions and volunteers implement applied restoration activities (removal of invasive species, cutting encroaching woody vegetation with hand tools, prescribed fire management, habitat mapping). Any rare plant species that occur in the habitats are surveyed and assessed for needed conservation activities. If priority plant species are in need of augmentation or re-introduction, they are propagated from seed or cuttings. These species are then safeguarded and indexed with associated information into the conservation collection. Propagated species are finally augmented back into source populations or introduced into restored habitats. Original and restored populations are then monitored and the habitats managed until a level of sustainability is achieved. Efforts are taken to maintain the health of materials propagated for restoration. These include identifying appropriate seed sources, propagating and growing material directly from field-collected seed, removing flowers in safeguarded material to prevent hybridisation, washing all nursery soil from roots before outplanting and bare root packing plants in moist paper towels before transporting them to the field site. One key to the success of the programme is involving conservation horticulturists in the restoration process from the field to the greenhouse and back to the field restoration sites to identify the correct growing conditions and microsites for restoration.

As the Atlanta Botanical Garden builds a regional conservation centre, some things have become apparent. First, it is necessary to clearly identify the objectives for conservation at the institution. This includes listing strategic priorities that provide institutional buy-in. The Atlanta Botanical Garden has four areas of focus:

1. priority conservation species with a focus on orchids and imperilled plants
2. priority habitat conservation with a focus on wetlands of the longleaf pine ecosystem

3. specific projects on urban habitat restoration
4. the Greater Atlanta Pollinator Partnership

The Atlanta Botanical Garden has also identified partners with whom to work on these four areas. These are agencies or institutions that have shared priorities and capacities or a willingness to share and build capacity. In establishing collaborative partnerships and tracking funding priorities, it makes the most sense to target points where your institutional strength meets the partner's needs.

In 2015, the Atlanta Botanical Garden was awarded funding from the National Fish and Wildlife Foundation and Gulf Environmental Benefit Fund for a project coordinated with the Florida Park Service. The Garden has partnered with the Florida Park Service for more than a decade to restore endangered species, such as the critically endangered *Torreya taxifolia* and the rare epiphytic orchid *Cyrtopodium punctatum* (Fig. 6). In this case the partners are working together to restore wetland communities (seepage slopes, wet prairies and stream side seeps) to re-establish the historical abundance, distribution and balance of native plant species and hydrologic flow that passes through the watershed of four coastal dune lakes along the Gulf of Mexico.



Fig. 6 *Cyrtopodium punctatum* (the cigar orchid) was down to only 19 known individual plants in the Fakahatchee Strand Preserve State Park, an area that became well known as the home of the ghost orchid in the publication *The Orchid Thief*. Since 2009, the Atlanta Botanical Garden has trained park staff, travelled for field surveys, propagated and grown orchids for restoration and monitored populations of the cigar orchid on the Park. Over several years more than 1,200 orchids have been outplanted in the park with more than 60 per cent survival rates. Photo: Dr Brad Wilson.

The original project was supported by the US Fish and Wildlife Service Coastal Program with funds going to both the Florida Park Service and Atlanta Botanical Garden, and this resulted in 10 restored hectares. Garden staff collected seeds from 14 species (10 genera) from 16 source populations. Between 2013 and 2016, more than 6,832 plants (3,317 of them orchids) were re-introduced into the restored areas with a survival rate of approximately 75 per cent after at least one year. Restored species include *Platanthera conspicua*, *Pogonia ophioglossiodes*, *Calopogon* spp., *Sarracenia* spp., *Pinguicula* spp. and *Lilium catesbaei*. The current project aims to restore 89ha. Both partners bring essential elements and skills necessary for the project's success. The Florida Park Service is the land owner and manager. Their team is responsible for carefully clearing woody biomass from degraded wetlands and managing the landscape with prescription fire to restore the connections between uplands and wetland habitats. The team from Atlanta Botanical Garden provide project coordination, the restoration plan, project mapping, prioritisation, monitoring and plant propagation to augment what should be a biodiverse herbaceous wetland community.

THE SAFEGUARDING DATABASE

Atlanta Botanical Garden's relationships with both public and private partner institutions are vital to its conservation work. One of the goals for the Center for Southeastern Conservation is to facilitate partnership across the region. This is achieved through data management and sharing, as well as project planning and reporting. As a private non-profit organisation the Atlanta Botanical Garden looks to federal and state agencies to set conservation priorities. It then works with land owners and land managers to restore habitats and imperilled species, including those species that are identified as at-risk in the state, as well as taxa imminently at risk of extinction (endangered) and those that are vulnerable to becoming at risk of extinction in the near future (threatened).

Until recently, the Atlanta Botanical Garden and its conservation partners including the GPCA and others across the region maintained separate records in various formats for documenting and tracking conservation activities. As these efforts progressed and gained traction there became a need for standardising data collection as well as centralising all pertinent information in order to support species review and recovery. The Safeguarding Database for GPCA and the Center for Southeastern Conservation facilitates a process that involves steps to identify and update missing and deficient data in the state database. Filling in these holes facilitates and supplements critical updates, which feed into NatureServe (2016) and inform federal partners including the US Forest Service and the USFWS. The Safeguarding Database also coordinates direct communication and planning for collaborative projects in addition to emphasising successes and needs for species research and recovery.

In 2011, the Georgia Department of Natural Resources developed the centralised database in Microsoft Access to track *ex situ* and *in situ* safeguarding actions of the GPCA. In 2012 Atlanta Botanical Garden adopted the Safeguarding Database to manage

it as a long-term project. This fulfilled the need for it to be migrated to an institution with the capacity to incorporate it into its regular conservation activities. At that time the database was migrated to SQL to enable flexibility and improve development of relational tables and ability to query data. It was also structured so that geospatial data and information from multiple monitoring surveys could be accommodated.

The value of the Safeguarding Database is that it is a tool for connecting conservation horticulture at botanic gardens to conservation planning and reporting. Database entries contain Elemental Occurrences, global positioning system coordinates, *in situ* safeguarding site directions, conservation status and threats, landowner information, monitoring and outplanting details, plant material collection and propagation details, participating institutional contacts and project leader information. The Safeguarding Database has been expanded to incorporate repeated monitoring data, threats and needs, outplanting survivorship analysis, and site and landscape level management records. Combined with the project goals and needs for management and research suggested by project leaders and supporters, this database facilitates more efficient reviews of project successes, needs and formal planning. Information pertaining to projects is integrated into this database determined by GPCA and the priorities and needs of its partners. It is a powerful tool that is now being expanded to document the regional projects carried out by Atlanta Botanical Garden.

SOUTH-EASTERN PARTNERS IN PLANT CONSERVATION

Recently, the USFWS received a multi-species listing petition that included roughly 85 plant species from the south-eastern USA. However, the information necessary to inform management decisions and to provide a baseline for measuring conservation outcomes is currently lacking. For example there are 156 plant species G1G2 (Critically Imperilled or Imperilled) plant species that occur on the National Forests of the south-eastern USA alone. Many of the species identified as at risk are data-deficient. In addition, information on their status is often scattered among multiple agencies and institutions, and occurrence records have not been updated. There is a pressing need therefore to collate current information on natural history, conservation status, threats in the wild and potential distribution for petitioned plant species as well as other plant species of special concern. The next step is to identify meaningful conservation action that would 'move the needle' towards achieving conservation goals. This type of information is important for at-risk species, as well as species listed under the ESA, with recovery plans, for about 300 plant species of concern.

To meet this need the Atlanta Botanical Garden, together with the USFWS, the US Forest Service, the Georgia Plant Conservation Alliance and the National Wildlife Refuge Association are hosting the first Southeastern Partners in Plant Conservation (SePPCon) meeting on 1–3 November 2016. This meeting will be the first of its kind and will serve multiple purposes including networking gardens with other groups interested in establishing state-based plant conservation alliances; establishing priorities for

conservation action for endangered and at-risk plants; and opening a dialogue between botanical experts, state wildlife agencies, federal agencies, academic and botanical institutions, and gardens. The data gathering and needs categories for at-risk species have been coordinated through a web-based knowledge hub over the past few years. However, the SePPCon meeting aims to focus much needed attention on plant species in particular. The intention is to look at the list of priority plant species in three ways, by identifying categories of conservation action required for plants in a geographic locality; by evaluating the list in detail to provide priorities within each category of need (such as landscape and habitat management, safeguarding, surveys required, taxonomic or population genetic research required); and by state to bring together potential or existing state-based plant conservation alliances to develop conservation action plans for the prioritised list for their state. Expected outcomes of the meeting include a list of network partners with identified expertise, a list of recommended actions for top priority species and a model for information sharing and partnership building.

CONCLUSIONS

Local experiences and outcomes of building partnerships for plant conservation in the south-eastern USA can inform approaches to conservation in other geographic areas. As the group of experts from multiple government agencies, botanic gardens and herbaria develop the SePPCon they are reaching out to share it with wide-reaching and well-known organisations such as Botanic Garden Conservation International, the Center for Plant Conservation, the American Public Garden Association, the Plant Conservation Alliance, the Institute for Regional Conservation and the Association for Zoological Horticulture. As they have done in the past, this group of conservation partners in the south-eastern USA intends to incorporate lessons learned from other regions, such as New England and the efforts of the New England Wildflower Society (2015) or orchid restoration programmes in Australia (Reiter *et al.*, 2016).

As more expert groups and agencies responsible for conserving species diversity call for strengthening partnerships (Hardwick *et al.*, 2011; Evans *et al.*, 2016), botanic gardens have the capacity to be good partners and to provide broader impacts for plant science and conservation.

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THE MERLIN TRUST: A FUND FOR YOUNG HORTICULTURISTS

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ABSTRACT

In 1990, the renowned plantswoman Valerie Finnis VMH founded the Merlin Trust, a charity that awards travel grants to young horticulturists. Ten years after her death in 2006, the Merlin Trust remains true to her vision, and the ever-growing band of 'Merlins' enrich the horticultural world with the knowledge and skills they have gained on their travels. Many of these horticulturists have gone on to work in botanic and physic gardens and this paper gives some examples of these.

INTRODUCTION

Aspect, soil, climate, associated flora and fauna are all factors that give horticulturists an insight into the role a plant plays in a complex ecosystem and the conditions it needs in which to thrive. And while botanic gardens have rich library and herbarium resources that might yield this information, there is nothing so enlightening as seeing a plant in the wild.

The Merlin Trust is a small charity that helps early-career horticulturists to do just that. Each year, up to 20 'Merlins' undertake expeditions supported by travel grants from the Trust. In 2015–2016 the Trust has made awards to young horticulturists to support travel to habitats and gardens in, among others, Australia, Burma, California, France, Japan, Madagascar, Sweden and western Scotland. As a condition of this support the horticulturists write detailed reports, copies of which are held at the Royal Geographical Society and the RHS Lindley Library, swelling a rich public resource. More recent reports are digitised and can be accessed on the Merlin Trust website (Merlin Trust, 2008). The Trustees judge the reports for two coveted prizes that are awarded annually, the Christopher Brickell prize for best report and the Valerie Finnis prize for best photographs. These two famous names give an idea of the origins of the Merlin Trust, and explain why it is so deeply embedded in UK horticulture.

FOUNDING THE TRUST

Valerie Finnis VMH (Fig. 1) was a renowned plantswoman and photographer who founded the charity in 1990. VMH is the Victoria Medal of Honour awarded by the Royal Horticultural Society Council to outstanding British horticulturists. Only 63 horticulturists can hold the medal at any one time. Valerie trained at Waterperry Horticultural School for Women, which she joined during the Second World War. She remained there

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