

# Examples of implementing the PCA National Framework for Progress in Plant Conservation

*based on survey responses from 2011*

<b><u>Strategy A (Collaboration for Conservation)</u></b> .....	<b>2</b>
<u>Academic</u> .....	2
<u>Non Profit</u> .....	2
<u>For Profit</u> .....	3
<u>Federal Government</u> .....	3
<u>State and Local Government</u> .....	4
<b><u>Strategy B (Education)</u></b> .....	<b>6</b>
<u>Academic</u> .....	6
<u>Non Profit</u> .....	6
<u>For Profit</u> .....	7
<u>Federal Government</u> .....	7
<u>State and Local Government</u> .....	8
<b><u>Strategy C (Restoration)</u></b> .....	<b>9</b>
<u>Academic</u> .....	9
<u>Non Profit</u> .....	9
<u>For Profit</u> .....	9
<u>Federal Government</u> .....	10
<u>State and Local Government</u> .....	11
<b><u>Strategy D (Research)</u></b> .....	<b>13</b>
<u>Academic</u> .....	13
<u>Non Profit</u> .....	13
<u>For Profit</u> .....	13
<u>Federal Government</u> .....	13
<u>State and Local Government</u> .....	14
<b><u>Strategy E (Sustainability)</u></b> .....	<b>15</b>
<u>Non Profit</u> .....	15
<u>For Profit</u> .....	15
<u>Federal Government</u> .....	15
<u>State and Local Government</u> .....	15
<b><u>Strategy F (Data Sharing)</u></b> .....	<b>16</b>
<u>Non Profit</u> .....	16
<u>For Profit</u> .....	16
<u>Federal Government</u> .....	16
<u>State and Local Government</u> .....	16

## **STRATEGY A (COLLABORATIVE CONSERVATION)**

### **BRING PEOPLE AND ORGANIZATIONS TOGETHER TO SHARE RESOURCES AND TALENTS TO EFFECTIVELY CONSERVE THE NATION'S NATIVE PLANTS.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **ACADEMIC**

- Collaborate with local state conservation agencies to host workshops to educate private landowners on land management techniques that promote native plant communities.
- Conduct research on the distribution of genetic variation of rare plants, and how this might impact conservation and restoration, and use breeding programs to provide genetically diverse seed of rare species for use in reintroduction programs.
- Conduct research on invasive species, and carry out experiments on methods of restoration (providing training opportunities by involving students in this research).

##### **NON PROFIT**

- Develop local management groups consisting of conservationists and government officials as well as volunteer groups.
- Collect and store seed of threatened plant species as part of the Center for Plant Conservation network and Seeds of Success program, and support statewide plant conservation alliances.
- Work with local land trusts (e.g. the Land Trust Alliance) to seek protection (purchase and/or easement) for significant plant habitat.
- Advocate for native plant buffers in new developments, plant and maintain demonstration gardens on county lands, host annual Arbor Day educational events and hold annual native plant sales.
- Be a strong voice in local communities for the appreciation of native flora and its habitats - build native plant demonstration gardens throughout the area, and publish native plant landscape books and resources for the public.
- Develop training and print materials explaining restoration concepts to the public and members, including teaching and assisting with land management and native plant propagation for members. Propagate native plants and sell them to the public, along with information about the plants. Proceeds of plant sales support education (e.g., helping local science teachers with native plant study).
- Facilitate communication and information-sharing via monthly newsletters to members (include links to PCA news from the native-plants listserv).
- Advocate and educate state assemblies in support of the natural heritage programs, raise funds to sponsor rare plants with the Center for Plant Conservation, and provide outreach on conserving wild plants in their natural habitats by protection of their habitats. (e.g. The Virginia Native Plant Society, which includes 13 chapters and some 1900 members. [www.vnps.org](http://www.vnps.org))
- Help organize conferences that bring academics, agencies and interested public together, and produce newsletters that support communication throughout the botanical community.
- Offer research scholarships for botanical field-work conducted by graduate students (e.g. the Wyoming Native Plant Society).
- Provide visibility to nationally-significant resources and research through newsletters and conferences.
- Seek funding and develop partnerships to restore and protect high value habitat, operate native plant nurseries, and establish guidelines for propagating native plants for restoration projects.
- Share expertise through hosting annual restoration workshops, engage volunteers in native plant conservation, and be innovative in approaches to fundraising beyond traditional sources like government and foundation grant writing.
- Support events that engage and inform the public about invasive plants (e.g. the Estes Park Annual Weed Roundup).
- Develop and/or support multi-institutional task forces to deal with invasive species eradication around the country.
- Host programs for the public that incorporates experts from other organizations, agencies and native plant societies.
- Educate property owners on different native plant species (e.g., publications geared specifically to local residents), host weekly and monthly work parties at various restoration sites, and partner with local conservation & professional organizations.

## **FOR PROFIT**

- Work with globally rare habitat restoration, associated rare species monitoring and community inventories on public and private land. Partner with State Natural Heritage Programs, USFWS and National Forest to support rare species monitoring and database updates.
- Support forest restoration projects emphasizing culturally important rare species, participate in restoration activities, and assist land trusts with recovery plans for endangered plant species.
- Use advocacy and art to raise awareness about plants and pollinators within government agencies, non-profits and industry in an effort to encourage cooperation between them.
- Work with members of the oil & gas industry for restoring lands disturbed due to oil & gas exploration and extraction - this often involves working with universities, private companies and regulators to establish common goals for restoration.
- Make recommendations for states conservation status lists, promote communication regarding rare/sensitive plant /fungi species between government agencies and other sectors, consult on developing biological survey protocols, teach courses on rare lichens/bryophytes/fungi/vascular plants.
- Conduct on farm field trials for native plant propagation and bring feasibility information to local agricultural producers. Share collecting and propagation information with local high school students. Provide native plant materials to local land management agency for rangeland restoration.

## **FEDERAL GOVERNMENT**

- Support environmental education programs for students about native desert and riparian communities which helps them appreciate the amazing adaptations that plants have to survive the harsh desert climate. Also work with local museums and native plant societies for spring wild flower shows, host events that allow the public to help eradicate invasive plants, and take members of the public on wild flower walks on public lands.
- Produce brochures and interpretive panels about wild flowers of the region, give presentations about native wild flowers to local organizations, design an interpretive trail planted next to the community college with native plant species identified and interpreted.
- Monitor Off Road Vehicles (ORV) and user-created routes that travel off of designated routes, hire SCA crews to put barriers across illegal routes and restore disturbed areas so native plants can revegetate. Work with local ORV groups to promote compliance with staying on designated routes, and put up route signs to prevent the public from going off-route and to protect native vegetation.
- Work on resource management plans to promote conservation, support state-level committees to develop standardized stipulations for land use activities involving rare and imperiled species and communities.
- Offer plant identification and noxious weed workshops and field trips to the public, work with partners to develop common goals, priorities, research needs, and conservation strategies for critical habitat.
- Identify and prioritize vegetation data collection needs for grazing allotments and other potential ground-disturbing projects on public land.
- Initiate rare plant monitoring to collect baseline data prior to potential land development, work to develop habitat protection and native plant material guidelines, control and treat noxious weeds on public lands, and ensure seasonal staff are trained in plant identification.
- Work with NGO's for native plant restoration projects: includes species selection, seed collection, grow-out and installation. Write grant proposals to leverage state agency- and NGO-contributed funds for on-the-ground projects, and to leverage support from agency scientists and universities to initiate landscape restoration efforts.
- Support data sharing between agency databases and state heritage program databases, provide data sets to researchers and contractors when requested, and coordinate with other federal agency employees to help ensure data compatibility between databases.
- Support research, planning and implementation of restoration plans, sometimes contracting private companies to conduct restoration work. Work on field surveys, map and share expertise on plants to restore habitat and increase diversity with other agencies and organizations.
- Work with partners to measure, classify and store data systematically so future inventory and monitoring activities can be streamlined, effective and scientifically defensible. Build capacity for grow-out operations for native plant species, with the aim of integrating into park operations.
- Promote rare plant information exchange with tribal, state, and federal agencies. Develop conservation partnership with state agencies, develop research program and funding for rare plant research

projects, promote mitigations and impact reductions for construction, maintenance, fire management, and visitor use plans and projects.

- Inventory and monitor sensitive species, control non-indigenous plant and animal species (e.g., Exotic Plant Management Team Program), and encourage conservation of rare plants. Also prioritize and plant restoration and reintroduction projects, contribute to agency databases and promote data sharing.
- Work with local partners (NGO and state agencies) to coordinate native plant conservation activities.
- Support the Seeds of Success program through an interagency agreement, partner with non profits for work on pollinators, collaborate with university researchers on plant-pollinator interactions, and partners with local non-profit organizations to promote youth involvement in restoration activities.
- Partner with state Fish & Game agencies to develop native seedbank and native seed increase programs, or with wildlife groups to restore habitat (e.g. work with Trout Unlimited to collect native plant materials to be used in riparian and stream restoration projects).
- Support collaborative, multi-sector projects (e.g. Great Basin Native Plant Selection and Increase Project) including partnerships between academic and government agencies to produce seeds of native plants for restoration (e.g. Native Wildflower Seed Production Trials, see [www.cropinfo.net/crops/WildflowerSeedProd.html](http://www.cropinfo.net/crops/WildflowerSeedProd.html))
- Work with partners to establish native plants back into degraded ecosystems within forests, utilizing funding from multiple sources and engaging partners and volunteers to plant, pull weeds and harvest native seeds.
- Develop native plant species seed-increase beds, assist in planning and implementing vegetation projects that conserve and promote the healthy restoration of various species, both plant and animal, and pursue collaboration with other federal and state agencies and members of the public wherever possible. Promote consistent plant conservation policies through special reports and various documents under the guidance of the National Environmental Policy Act, and participate in botanically/plant ecology focused seminars and annual meetings to connect with a diverse cross section of researchers, land management specialists and private industry.
- Work with non-profit research groups on rare plant research germination and outplanting trial, native plant societies for outreach, and with interagency partners.
- Support partnerships with State Heritage Programs (sharing information) and local interest groups.
- Support research projects that utilize diverse expertise to develop innovative research.
- Support maintenance of natural diversity databases to ensure land managers throughout the state have access to information on rare plants.

## **STATE AND LOCAL GOVERNMENT**

- Collaboratively develop strategic plans for invasive weeds management, establish cooperative weed management areas and foster partnerships with key organizations. Provide technical advice for invasive species management, organize conferences & workshops to develop networking. Apply for grants from a variety of sources, and work with others to garner funds for their projects. Work toward policy development, revising regulations, and review project permits dealing with land disturbance.
- Coordinate ESA Section 6 projects between state and USFWS, participate in rare plant recovery planning, developing and maintaining the public information websites, as well as funding for university researchers to conduct rare plant research and herbarium databasing.
- Support funding, development, and maintenance of listservs, websites, and collections databases (e.g., NM Biological Collections Consortium database).
- Work with non-profit agencies to coordinate rare plant monitoring surveys by professionals and volunteers.
- Share information and communicate with others interested in weed management, train park rangers, maintenance workers and volunteers on identification and control of invasive plants; as well as emphasizing the value and importance of doing the control work.
- Conduct stream restoration, control invasive species, plant trees, and revegetate cleared areas with native species, often with participation from the public (volunteers). Also give presentations on rare plants at workshops and meetings, and teach courses on restoration.
- Provide education, prevention and outreach on aquatic invasive species, including working with lake groups/landowners to treat invasive species. Offer assistance to lake groups applying for grants to promote native species and treat invasives.

- Educate the public about the need to restore native plant vegetation, and provide funding and expertise to assist landowners in restoring native vegetation.
- Work with research partners to develop recommended native species lists for restorations, work with local nurseries to develop and make available nursery stock of local ecotypes, and work with individuals and non-profit organizations to prevent and control invasive species.
- Partner with state agencies and private landowners to restore native habitat.
- Partner with collaborative national programs to bank seeds (e.g. Seeds of Success) and share data, and develop priority regional collection lists and new partners (e.g., development of a Mid-Atlantic Regional Seed Bank) to ensure strategic and effective collections are made. Provide native plant material from wild collected seed for restoration projects throughout the region, help inform area restorationists about species lists and plant material availability.

## **STRATEGY B (EDUCATION)**

### **PROVIDE OPPORTUNITIES FOR PEOPLE TO ENJOY, UNDERSTAND, AND VALUE NATIVE PLANTS AND PLANT COMMUNITIES.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **ACADEMIC**

- Host field trips for the public and college community to share information about work on native plant community restoration and management.
- Teach courses in conservation biology and plant systematics, and consistently use examples of endangered species in plant systematics.
- Conduct research on the distribution of genetic variation of rare plants, and how this might impact conservation and restoration, and use breeding programs to provide genetically diverse seed of rare species for use in reintroduction programs.

##### **NON PROFIT**

- Use citizen science in rare plant monitoring and natural community and invasives management (e.g., New England Wildflower Society, Denver Botanic Garden, Chicago Botanic Garden, Lady Bird Johnson Wild Flower Center). Also give courses, lectures, and provide opportunities for volunteers to help with field work.
- Reach out to the public and explain why invasive plants are detrimental to native plants and habitats and how they, as individuals, can be part of the solution.
- Maintain strong media contacts throughout the state and make good use of social media outlets to talk about native plants and plant conservation.
- Advocate for native plant buffers in new developments, plant and maintain demonstration gardens on county lands, host annual Arbor Day educational events and hold annual native plant sales.
- Develop multi-sector partnerships that are supported by creative approaches to funding (e.g., the Florida Native Plant Partnership receives funding from the State Wildflower license plate).
- Native plant societies are a strong voice in their communities for the appreciation of native flora and its habitats - they have built native plant demonstration gardens throughout the area, and publish native plant landscape books and resources for the public.
- Develop training and print materials explaining restoration concepts to the public and members, including teaching and assisting with land management and native plant propagation for members. Propagate native plants and sell them to the public, along with information about the plants. Proceeds of plant sales support education (e.g., helping local science teachers with native plant study).
- Facilitate communication and information-sharing via monthly newsletters to members (include links to PCA news from the native-plants listserv).
- Support outreach to the public, inventory and monitor plants on private and public lands, conduct plant rescues, present programs and displays to other organizations, document plant and wildlife interactions, write and distribute articles on plant conservation issues via the internet, seminars, and local papers and magazines.
- Support outreach to groups about native plant use in landscaping and restoration.
- Support public education programs; provide walks and invasive plant removal projects support programs to educate people about native habitats.
- Sponsor hike and conference events that are publicized and open to the public.
- Develop volunteer restoration work days that include an educational component, conduct field trips with local high school groups and organize restoration conferences for conservation organizations and land managers.
- Share expertise through hosting annual restoration workshops, engage volunteers in native plant conservation, and be innovative in approaches to fundraising beyond traditional sources like government and foundation grant writing.
- Use curated plant collections to support conservation, including outreach to the public through interpretation and public programs.
- Promote and participate in membership-based native plant societies as well as invasive plant councils, organize public programs with speakers, field trips, and wildflower hikes.

- Non-profit organizations help manage local natural habitat (and provide opportunities for volunteers to contribute to this) and are often used as a local resource for questions about preserving native flora and managing invasive species.
- Manage native habitat, provide hands-on outreach to the public about the compatibility of agriculture with native plantings, and write newspaper articles encouraging the use of native plants.
- Operate blogs and web sites that communicate information regarding conservation of native plants.
- Educate property owners on different native plant species (e.g., publications geared specifically to local residents), host weekly and monthly work parties at various restoration sites, and partner with local conservation & professional organizations.
- Support removal of invasive plants and provide invasive plant education.

### **FOR PROFIT**

- Work with globally rare habitat restoration, associated rare species monitoring and community inventories on public and private land. Partner with State Natural Heritage Programs, USFWS and National Forest to support rare species monitoring and database updates.
- Support public outreach on rare plants and native habitat via social media outlets.

### **FEDERAL GOVERNMENT**

- Initiate rare plant monitoring to collect baseline data prior to potential land development, work to develop habitat protection and native plant material guidelines, control and treat noxious weeds on public lands, and ensure seasonal staff are trained in plant identification.
- Conduct field trips and participate in numerous restoration projects, wildflower appreciation trips and development of botanical fact sheets and publications.
- Support environmental education programs for students about native desert and riparian communities which helps them appreciate the amazing adaptations that plants have to survive the harsh desert climate. Also work with local museums and native plant societies for spring wild flower shows, host events that allow the public to help eradicate invasive plants, and take members of the public on wild flower walks on BLM lands. Produce brochures and interpretive panels about wild flowers of the region, give presentations about native wild flowers to local organizations, design an interpretive trail planted next to the community college with native plant species identified and interpreted.
- Monitor Off Road Vehicles (ORV) and user-created routes that travel off of designated routes, hire SCA crews to put barriers across illegal routes and restore disturbed areas so native plants can revegetate. Work with local ORV groups to promote compliance with staying on designated routes, and put up route signs to prevent the public from going off-route and to protect native vegetation.
- Conduct education and outreach programs to promote conservation and protect rare plants and their habitats. This includes conducting guided field tours, participating with partners at diverse forums to promote the conservation of rare plants, and working with an active group of volunteers and students who help with outreach, restoration and research activities.
- Coordinate and teach native plant and noxious weed identification workshops; encourage participation in plant community and rare plant species monitoring opportunities and noxious weed pulls.
- Offer plant identification and noxious weed workshops and field trips to the public, work with partners to develop common goals, priorities, research needs, and conservation strategies for critical habitat.
- Plan and conduct habitat rehabilitation, and work with land managers to educate them about plant conservation.
- Use public speaking opportunities to promote using native plants in the landscape to audiences like garden clubs, native plant societies, master gardener programs & garden shows; lead field trips to show the public native landscapes and plants on public land
- Coordinate with school groups and volunteers on projects to identify and remove exotic plants, explaining the impacts of exotics to the environment and how their spread can be prevented. This includes a diverse audience of elderly volunteers, K-12 students and at-risk youth.
- Promote native plant conservation, conduct public education and give in-the-field presentations to college classes.
- Promote rare plant information exchange with tribal, state, and federal agencies. Develop conservation partnership with state agencies, develop research program and funding for rare plant research projects, promote mitigations and impact reductions for construction, maintenance, fire management, and visitor use plans and projects.

- Support production of Plant Guides for PLANTS website on important native plants for conservation practices in California, develop promotional materials for USDA Plant Materials Center conservation plant releases, collaborate with local governments on annual wildflower walks for the public, and participate in field days promoting native plant conservation and production.
- Develop propagation and seed production protocols and cost estimates for native species as part of the Seeds of Success project, and provide training to interns helping with the project.
- Support range management and cooperative monitoring workshops for public and agency staff.
- Engage volunteers in native plant materials program, support Wildflower week activities, and help develop native firewise gardens for public demonstrations.
- Work with partners to establish native plants back into degraded ecosystems within forests, utilizing funding from multiple sources and engaging partners and volunteers to plant, pull weeds and harvest native seeds.
- Engage with native plant societies and mycological societies, and give presentation and field trips with them. Also lead school groups in plantings and outdoor school activities focused on native plants.
- Work with non-profit research groups on rare plant research germination and outplanting trial, native plant societies for outreach, and with interagency partners.
- Support outreach to school programs and the "kids in the woods" programs.
- Share information on biological control measures for noxious weeds with the news media.

### **STATE AND LOCAL GOVERNMENT**

- Educate policy makers and the public about invasive weeds impacts to natural resources, work to broaden participation in these activities with new groups. Produce public service announcements about invasive weeds, in addition to publications in papers, magazines and other forms of media.
- Coordinate ESA Section 6 projects between state and USFWS, participate in rare plant recovery planning, developing and maintaining the public information websites, as well as funding for university researchers to conduct rare plant research and herbarium databasing.
- Give presentations at botany and ecological society meetings, publish in proceedings, and make presentations and conduct field trips for state native plant societies.
- Work with school groups, Master Gardeners, and corporate clubs to educate people on the great need to support native plant conservation. Also give presentations on the importance of creating healthy forest communities and create public outings including wildflower hikes and work days.
- Support in situ conservation of plants and plant assemblages, and ensure unique habitat that displays plant diversity is open for study and respectful enjoyment. Also work to restore degraded or destroyed habitat, including seed collection of species with high restoration potential and coordinated efforts to propagate suitable species for direct restoration use.
- Work with non-profit agencies to coordinate rare plant monitoring surveys by professionals and volunteers.
- Produce annual reports to educate commissioners on the importance of vegetation management and land stewardship on county lands.
- Conduct stream restoration, control invasive species, plant trees, and revegetate cleared areas with native species, often with participation from the public (volunteers). Also give presentations on rare plants at workshops and meetings, and teach courses on restoration.
- Educate the public about the need to restore native plant vegetation, and provide funding and expertise to assist landowners in restoring native vegetation.
- Hold seed collection workshops for land managers and volunteer groups, conduct tours and workshops for local organizations and corporations, and use annual wildflower week events to promoting native plants in the landscape.
- Promote the use of native plants in the landscape through our website, workshops, programs, participation in area conferences and project advice.



## **STRATEGY C (RESTORATION)**

### **ENSURE CONSERVATION AND RESTORATION OF NATIVE PLANTS AND NATURAL PLANT COMMUNITIES THROUGH ECOSYSTEM-BASED MANAGEMENT.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **ACADEMIC**

- Develop collaborative, online, publicly available herbarium databases.
- Conduct research on the distribution of genetic variation of rare plants, and how this might impact conservation and restoration, and use breeding programs to provide genetically diverse seed of rare species for use in reintroduction programs.

##### **NON PROFIT**

- Work with local land trusts (e.g. the Land Trust Alliance) to seek protection (purchase and/or easement) for significant plant habitat.
- Provide funding for ex situ conservation and restoration efforts, comment on government plans impacting plant communities, and attend meetings to support habitat conservation and invasive plant management.
- Offer research scholarships for botanical field-work conducted by graduate students (e.g. the Wyoming Native Plant Society).
- Collect and store seed of threatened plant species as part of the Center for Plant Conservation network and Seeds of Success program, and support statewide plant conservation alliances.
- Develop training and print materials explaining restoration concepts to the public and members, including teaching and assisting with land management and native plant propagation for members. Propagate native plants and sell them to the public, along with information about the plants. Proceeds of plant sales support education (e.g., helping local science teachers with native plant study).
- Support outreach to the public, inventory and monitor plants on private and public lands, conduct plant rescues, present programs and displays to other organizations, document plant and wildlife interactions, write and distribute articles on plant conservation issues via the internet, seminars, and local papers and magazines.
- Support outreach to groups about native plant use in landscaping and restoration.
- Seek funding and develop partnerships to restore and protect high value habitat, operate native plant nurseries, and establish guidelines for propagating native plants for restoration projects.
- Non-profit organizations help manage local natural habitat (and provide opportunities for volunteers to contribute to this) and are often used as a local resource for questions about preserving native flora and managing invasive species.
- Develop and/or support multi-institutional task forces to deal with invasive species eradication around the country.
- Manage native habitat, provide hands-on outreach to the public about the compatibility of agriculture with native plantings, and write newspaper articles encouraging the use of native plants.
- Identify plants of concern and invasive species outbursts, establish a standardized monitoring system to help evaluate restoration success.
- Work with government agencies that lack capacity to help restore habitat on public lands.
- Support removal of invasive plants and provide invasive plant education.

##### **FOR PROFIT**

- Work with globally rare habitat restoration, associated rare species monitoring and community inventories on public and private land. Partner with State Natural Heritage Programs, USFWS and National Forest to support rare species monitoring and database updates.
- Support work through multi-sector invasive species and threatened species recovery committees, help coordinate permitting collections and research for several landowners, and provide wild-collected seeds and plants for local restoration and reintroduction efforts.
- Support forest restoration projects emphasizing culturally important rare species, participate in restoration activities, and assist land trusts with recovery plans for endangered plant species.
- Design experimental propagation protocols for native species.

## **FEDERAL GOVERNMENT**

- Participate in the Seeds of Success Program, with interns collecting and sending native seed to be stored for use in restoration work. Inventory and monitor special status plant species, consider potential adverse impacts that projects may have on plant communities and rare plants, and minimize or prevent adverse impacts. Issue permits for collecting plants and seeds to avoid adverse effects on plant communities and species.
- Conduct education and outreach programs to promote conservation and protect rare plants and their habitats. This includes conducting guided field tours, participating with partners at diverse forums to promote the conservation of rare plants, and working with an active group of volunteers and students who help with outreach, restoration and research activities.
- Support environmental education programs for students about native desert and riparian communities which helps them appreciate the amazing adaptations that plants have to survive the harsh desert climate. Also work with local museums and native plant societies for spring wild flower shows, host events that allow the public to help eradicate invasive plants, and take members of the public on wild flower walks on BLM lands. Produce brochures and interpretive panels about wild flowers of the region, give presentations about native wild flowers to local organizations, design an interpretive trail planted next to the community college with native plant species identified and interpreted.
- Monitor Off Road Vehicles (ORV) and user-created routes that travel off of designated routes, hire SCA crews to put barriers across illegal routes and restore disturbed areas so native plants can revegetate. Work local ORV groups to promote compliance with staying on designated routes, and put up route signs to prevent the public from going off-route and to protect native vegetation.
- Coordinate and teach native plant and noxious weed identification workshops; encourage participation in plant community and rare plant species monitoring opportunities and noxious weed pulls.
- Offer plant identification and noxious weed workshops and field trips to the public, work with partners to develop common goals, priorities, research needs, and conservation strategies for critical habitat.
- Initiate rare plant monitoring to collect baseline data prior to potential land development, work to develop habitat protection and native plant material guidelines, control and treat noxious weeds on public lands, and ensure seasonal staff are trained in plant identification.
- Work cooperatively with federal, state and local government agencies and non-profit organizations to develop policies, strategies and mechanisms to identify and provide for the long term conservation and management of habitat with high conservation value (e.g. Pine Hill Preserve in California).
- Support native seed projects to develop native seed volumes to be utilized in restoration projects.
- Support invasive annual grass control and rehabilitation efforts.
- Develop rare plant propagation protocols for rare species and help implement weed eradication projects to benefit rare plant species.
- Conduct projects prior to disturbance to avoid sensitive habitats (including habitat inventory) and, post-disturbance work to rehabilitate native habitat, including long-term monitoring.
- Promote rare plant information exchange with tribal, state, and federal agencies. Develop conservation partnership with state agencies, develop research program and funding for rare plant research projects, promote mitigations and impact reductions for construction, maintenance, fire management, and visitor use plans and projects.
- Support invasive weed control, native community restoration, wild fire control and rehabilitation.
- Support research, planning and implementation of restoration plans, sometimes contracting private companies to conduct restoration work. Work on field surveys, map and share expertise on plants to restore habitat and increase diversity with other agencies and organizations.
- Work with partners to measure, classify and store data systematically so future inventory and monitoring activities can be streamlined, effective and scientifically defensible. Build capacity for grow-out operations for native plant species, with the aim of integrating into park operations.
- Develop propagation and seed production protocols and cost estimates for native species as part of the Seeds of Success project, and provide training to interns helping with the project.
- Inventory and monitor sensitive species, control non-indigenous plant and animal species (e.g., Exotic Plant Management Team Program), and encourage conservation of rare plants. Also prioritize and plant restoration and reintroduction projects, contribute to agency databases and promote data sharing.

- Work with partners to establish native plants back into degraded ecosystems within forests, utilizing funding from multiple sources and engaging partners and volunteers to plant, pull weeds and harvest native seeds.
- Work with non-profit research groups on rare plant research germination and outplanting trial, native plant societies for outreach, and with interagency partners.
- Partner with state Fish & Game agencies to develop native seedbank and native seed increase programs, or with wildlife groups to restore habitat (e.g. work with Trout Unlimited to collect native plant materials to be used in riparian plant and stream restoration projects).
- Support plant materials development, foster graduate research opportunities.
- Implement management activities to improve habitat conditions for threatened species, reintroduce or augment threatened plant populations, and monitor success of these actions.
- Develop native plant species seed-increase beds, assist in planning and implementing vegetation projects that conserve and promote the healthy restoration of various species, both plant and animal, and pursue collaboration with other federal and state agencies and members of the public wherever possible. Promote consistent plant conservation policies through special reports and various documents under the guidance of the National Environmental Policy Act, and participate in botanically/plant ecology focused seminars and annual meetings to connect with a diverse cross section of researchers, land management specialists and private industry.
- Manage land to protect rare plant species and their habitats, and implement restoration projects to enhance rare plant habitat. This includes collecting and propagating rare species for replanting on site, and maintaining an aggressive weed treatment program that is focused on early detection and rapid response.

## **STATE AND LOCAL GOVERNMENT**

- Establish priorities for sensitive plants, including listed and non listed species for internal activities. Obtain grants to do work on the ground: recovery; invasive species control. Target eradication of invasive species in small areas where high value endangered plants live. Train other staff to increase plant based skills and conservation.
- Develop/support data collection and sharing for invasive plant distribution.
- Prioritize management of invasive species statewide and locally, strategically manage species to prevent invasion of nationally and regionally significant habitat areas, participate in training for those involved in plant conservation related to weed management.
- Coordinate ESA Section 6 projects between state and USFWS, participate in rare plant recovery planning, developing and maintaining the public information websites, as well as funding for university researchers to conduct rare plant research and herbarium databasing.
- Obtain grants to buy and restore critical habitat for threatened plant species, and conduct status surveys for candidate threatened plant species on various land ownerships and jurisdictions.
- Support in situ conservation of plants and plant assemblages, and ensure unique habitat that displays plant diversity is open for study and respectful enjoyment. Also work to restore degraded or destroyed habitat, including seed collection of species with high restoration potential and coordinated efforts to propagate suitable species for direct restoration use.
- Work with scientists at local botanic gardens and universities to help build herbarium collections and expand availability and accuracy of locality and plant identification information for native species to the region (e.g. New York Metropolitan Flora Project).
- Share information and communicate with others interested in weed management, train park rangers, maintenance workers and volunteers on identification and control of invasive plants; as well as emphasizing the value and importance of doing the control work.
- Work with research partners to develop recommended native species lists for restorations, work with local nurseries to develop and make available nursery stock of local ecotypes, and work with individuals and non-profit organizations to prevent and control invasive species.
- Partner with state agencies and private landowners to restore native habitat.
- Conduct stream restoration, control invasive species, plant trees, and revegetate cleared areas with native species, often with participation from the public (volunteers). Also give presentations on rare plants at workshops and meetings, and teach courses on restoration.
- Educate the public about the need to restore native plant vegetation, and provide funding and expertise to assist landowners in restoring native vegetation.

- Partner with collaborative national programs to bank seeds (e.g. Seeds of Success) and share data, and develop priority regional collection lists and new partners (e.g., development of a Mid-Atlantic Regional Seed Bank) to ensure strategic and effective collections are made. Provide native plant material from wild collected seed for restoration projects throughout the region, help inform area restorationists about species lists and plant material availability.

## **STRATEGY D (RESEARCH)**

### **ENCOURAGE THE SCIENTIFIC COMMUNITY TO CONDUCT RESEARCH AND TECHNOLOGY DEVELOPMENT IN SUPPORT OF NATIVE PLANT CONSERVATION.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **ACADEMIC**

- Participate in meetings related to the importance of genetic diversity and sampling strategies in conservation.
- Conduct research on invasives species, and carry out experiments on methods of restoration (providing training opportunities by involving students in this research).
- Conduct research to help identify species in need of conservation

##### **NON PROFIT**

- Encourage university students to utilize and participate in programs set up by local botanical gardens and herbaria.
- Forward information from PCA to college instructors and government agency employees.
- Support production and updating of state-wide floras (e.g., the Virginia Native Plant Society is supporting publication of the first Flora of Virginia manual since 1762 - to be published 2012).
- Support herbaria, including contributing and using specimen, and work with state natural heritage programs to conduct rare plant searches.
- Offer research scholarships for botanical field-work conducted by graduate students (e.g. the Wyoming Native Plant Society).
- Provide visibility to nationally-significant resources and research through newsletters and conferences.
- Monitor habitat using a variety of methods, work to make monitoring efforts more consistent, including via discussion of monitoring during annual restoration workshops.

##### **FOR PROFIT**

- Monitor sites disturbed by oil & gas exploration and extraction activities to determine achievement of restoration goals and satisfactory compliance with governing regulations related to restoration.

##### **FEDERAL GOVERNMENT**

- Offer plant identification and noxious weed workshops and field trips to the public, work with partners to develop common goals, priorities, research needs, and conservation strategies for critical habitat.
- Participate in the Seeds of Success Program, with interns collecting and sending native seed to be stored for use in restoration work. Inventory and monitor special status plant species, consider potential adverse impacts that projects may have on plant communities and rare plants, and minimize or prevent adverse impacts. Issue permits for collecting plants and seeds to avoid adverse effects on plant communities and species.
- Monitor upland and riparian areas to insure that grazing does not adversely affect habitats and plant communities, and constantly adapt protocols for assessing the health of communities.
- Use adaptive management strategies in the development of environmental assessment and allotment management plans to protect native plant communities. Partner with native plant societies to help monitor native plant species and to help teach classes on native plant identification.
- Promote rare plant information exchange with tribal, state, and federal agencies. Develop conservation partnership with state agencies, develop research program and funding for rare plant research projects, promote mitigations and impact reductions for construction, maintenance, fire management, and visitor use plans and projects.
- Develop species conservation guidelines via USFWS species recovery plans and work with research institutions on rare plant ecophysiology and applied restoration.
- Cooperate with universities and USGS for ongoing research to support science-based vegetation management.
- Work with scientists and outside researchers to use principles of adaptive management, and to stay abreast of current findings and developments. Work with research scientists to use the best of practical and academic worlds to carry out conservation projects.

- Encourage researchers to work within parks for their own projects or for priorities generated internally, and to publish resulting information.
- Work with university researchers to identify plant populations and prioritize research needs.
- Support plant materials development, foster graduate research opportunities.
- Support the GRIN system and facilitate plant materials exchange with a network of researchers.
- Support collaborative, multi-sector projects (e.g. Great Basin Native Plant Selection and Increase Project) including partnerships between academic and government agencies to produce seeds of native plants for restoration (e.g. Native Wildflower Seed Production Trials, see [www.cropinfo.net/crops/WildflowerSeedProd.html](http://www.cropinfo.net/crops/WildflowerSeedProd.html))
- Maintain local herbaria and work with internal and external research partners for native plant restoration and invasive species monitoring, developing scientific monitoring plots to measure weed control methods, and native plant restoration.
- Support research projects that utilize diverse expertise to develop innovative research.

#### **STATE AND LOCAL GOVERNMENT**

- Work with Universities and Colleges to conduct meaningful research on county park lands, so staff can make better, well-informed decisions toward land stewardship.
- Conduct stream restoration, control invasive species, plant trees, and revegetate cleared areas with native species, often with participation from the public (volunteers). Also give presentations on rare plants at workshops and meetings, and teach courses on restoration.
- Work with scientists at local botanic gardens and universities to help build herbarium collections and expand availability and accuracy of locality and plant identification information for native species to the region (e.g. New York Metropolitan Flora Project).
- Use adaptive management principles when managing invasive species, conduct research in modeling invasive species spread, write letters to agencies which appear to be lagging in staffing botanists and researchers, and approach scientists to present at conferences and workshops which are open to the public.
- Coordinate ESA Section 6 projects between state and USFWS, participate in rare plant recovery planning, developing and maintaining the public information websites, as well as funding for university researchers to conduct rare plant research and herbarium databasing.

## **STRATEGY E (SUSTAINABILITY)**

### **ENCOURAGE PRACTICES THAT SUPPORT APPROPRIATE AND SUSTAINABLE USES OF BENEFICIAL PLANTS.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **NON PROFIT**

- Conduct educational outreach to general public and school groups with ethnobotanical uses of native plants.
- Help organize conferences that bring academics, agencies and interested public together, and produce newsletters that support communication throughout the botanical community.
- Hold native plant sales for the public and twice a year and encourage local and commercial nurseries to offer more native plants.
- Support urban ecology programs that promote use of native plants to increase the sustainability of urban landscapes.
- Work to better promote the use of appropriate plants for our local environments.
- Support implementation of nationwide programs that encourage use of native plants (e.g., Sustainable Sites Initiative and Landscapes for Life).

##### **FOR PROFIT**

- Support forest restoration projects emphasizing culturally important rare species, participate in restoration activities, and assist land trusts with recovery plans for endangered plant species.
- Work with several working groups to effectively deliver education about the plants native to their area.
- Work with native people to conserve important areas in the Pinyon-Juniper woodlands for pinenut gathering so as to manage against wildfire and unauthorized tree cutting.

##### **FEDERAL GOVERNMENT**

- Closely monitor and prevent the public from impacting the botanical resources at our preserve, and educate visitors on the importance of conscientious use of native plants.
- Inventory and monitor special status plant species, consider potential adverse impacts that projects may have on plant communities and rare plants, and minimize or prevent adverse impacts. Issue permits for collecting plants and seeds to avoid adverse effects on plant communities and species.
- Work with local indigenous people to protect and promote their traditional resources during land management activities, and monitor the demand and use of forest products.
- Promote rare plant information exchange with tribal, state, and federal agencies. Develop conservation partnership with state agencies, develop research program and funding for rare plant research projects, promote mitigations and impact reductions for construction, maintenance, fire management, and visitor use plans and projects.
- Manage seed collection permits and work with local Native American tribes to promote propagation of target plant species used for food and medicine.
- Work with a number of tribes to provide technical assistance in native plant conservation, collection and propagation, and support work to integrate traditional practices into agency conservation practices.
- Monitor and identify public demand for native plants through special forest product programs.

##### **STATE AND LOCAL GOVERNMENT**

- Work collaboratively to develop guidelines for small scale commercial harvest of native plants for ethnobotanical use.
- Promote the use of native plants in the landscape through our website, workshops, programs, participation in area conferences and project advice.
- Creating a policy regarding the intellectual protection of cultural plants from exploitation.

## **STRATEGY F (DATA-SHARING)**

### **PROMOTE THE DEVELOPMENT AND USE OF COORDINATED DATABASES AND INFORMATION-SHARING TO SUPPORT NATIVE PLANT CONSERVATION.**

#### IMPLEMENTATION EXAMPLES FROM DIFFERENT SECTORS

##### **NON PROFIT**

- Work with other herbaria to input data into a local database so it can be connected to other databases and made available online.
- Maintain online searchable databases that provide information to practitioners, policy makers, and the public on conservation status, ecology, and research needs of threatened species.

##### **FOR PROFIT**

- Work with oil & gas clients to build a database covering all of their restoration activities.

##### **FEDERAL GOVERNMENT**

- Work with state databases to maintain data records on rare plants.
- Identify and prioritize vegetation data collection needs for grazing allotments and other potential ground-disturbing projects on public land.
- Work with partners to measure, classify and store data systematically so future inventory and monitoring activities can be streamlined, effective and scientifically defensible. Build capacity for grow-out operations for native plant species, with the aim of integrating into park operations.
- Support data sharing between agency databases and state heritage program databases, provide data sets to researchers and contractors when requested, and coordinate with other federal agency employees to help ensure data compatibility between databases.
- Inventory and monitor sensitive species, control non-indigenous plant and animal species (e.g., Exotic Plant Management Team Program), and encourage conservation of rare plants. Also prioritize and plant restoration and reintroduction projects, contribute to agency databases and promote data sharing.
- Support the GRIN system and facilitate plant materials exchange with a network of researchers.
- Update information available to the public on the PLANTS website, work with state-based organizations (e.g. CalFlora) on updating/maintaining information available to the public, and update electronic information for agency staff (e.g. the NRCS eVegGuide).
- Support agency databases and share information with state heritage programs.
- Support partnerships with State Heritage Programs (sharing information) and local interest groups.
- Support maintenance of natural diversity databases to ensure land managers throughout the state have access to information on rare plants.

##### **STATE AND LOCAL GOVERNMENT**

- Develop/support data collection and sharing for invasive plant distribution.
- Provide technical advice for invasive species management, organize conferences & workshops to develop networking, participate in developing data-sharing platforms.
- Support funding, development, and maintenance of listservs, websites, and collections databases (e.g., NM Biological Collections Consortium database).
- Work with other agency divisions to develop databases and inventory systems to better manage park information for park staff and planners.
- Partner with collaborative national programs to bank seeds (e.g. Seeds of Success) and share data, and develop priority regional collection lists and new partners (e.g., development of a Mid-Atlantic Regional Seed Bank) to ensure strategic and effective collections are made. Provide native plant material from wild collected seed for restoration projects throughout the region, help inform area restorationists about species lists and plant material availability.



- Work with scientists at local botanic gardens and universities to help build herbarium collections and expand availability and accuracy of locality and plant identification information for native species to the region (e.g. New York Metropolitan Flora Project).