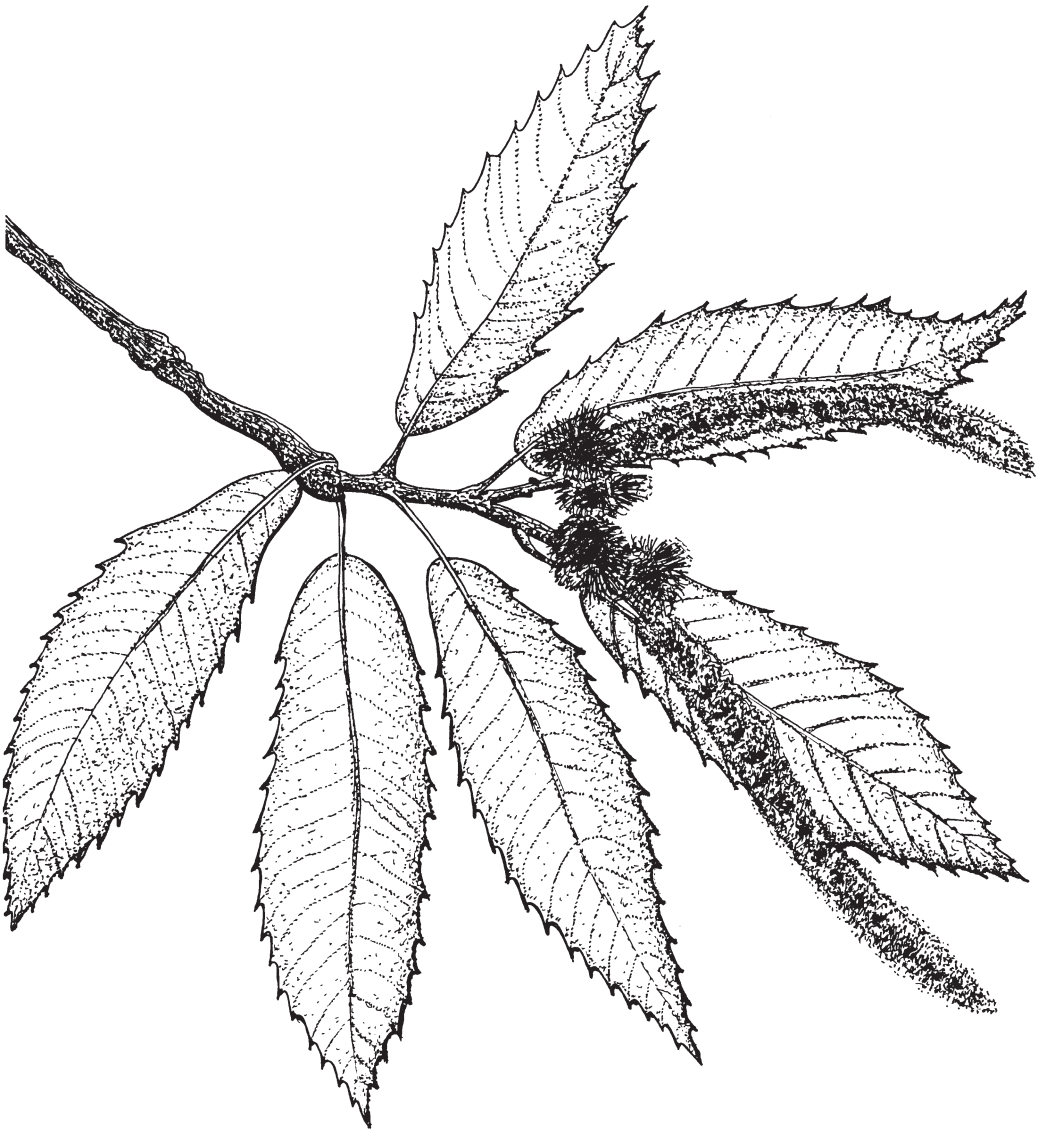
Intertribal Nursery Council Meeting

Moscow, Idaho

July 14, 2009



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American chestnut drawing by Steven Morrison, College of Natural Resources, University of Idaho.

An Introduction to the Colorado Plateau Native Plant Initiative

Wayne Padgett, Peggy Olwell, and Scott Lambert

Wayne Padgett is Program Coordinator with the USDI Bureau of Land Management, Utah State Office, 440 W 200 Street, Salt Lake City, UT 84101; Tel: 801.359.4076; E-mail: wayne_padgett@blm.gov. **Peggy Olwell** is the National Plant Conservation Program Lead with the USDI Bureau of Land Management, Washington Office; E-mail: peggy_olwell@blm.gov. **Scott Lambert**, Retired National Seed Coordinator with the USDI Bureau of Land Management, Idaho State Office,1387 S Vinnell Way, Boise, ID 83709; Tel: 208.373.3894; E-mail: scott_lambert@blm.gov.

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Abstract: The Colorado Plateau Ecoregion is occupied by a variety of ecosystems requiring restoration activities following natural and human-caused disturbances. The Colorado Plateau Native Plant Initiative, included in the BLM Native Plant Materials Development Program, was established as a part of the Seeds of Success program. This program is a partnership between USDI Bureau of Land Management, Royal Botanic Gardens (Kew, Richmond, United Kingdom), other federal agencies, and conservation organizations that focus on the collection, conservation, and development of native plant materials for stabilizing, rehabilitating, and restoring lands in the US. Opportunities and challenges for this program have been identified, and the vision, goals, and objectives that address these and more are being incorporated into a 5-year strategy and action plan. Advisory teams and working groups have been identified and their roles outlined in order for the program to reach its goals and objectives for restoring native ecosystems within the Colorado Plateau.

Keywords: ecosystem diversity, native plant materials, native plant seeds, restoration, rehabilitation

Introduction

The Colorado Plateau in the American Southwest is a land of extremes. From elevations near 600 m (2000 ft) at the bottom of the Grand Canyon, to elevations over 3800 m (12,500 ft) at the top of Mount Peal in the LaSal Mountains, the Plateau experiences a wide variety of temperatures and precipitation. Winters are cold, with precipitation from the north and west and significant snow depths at higher elevations. Summers are hot, with intermittent, often intense monsoonal storms that arise from the eastern Pacific, Gulf of California, and Gulf of Mexico. Plant communities of the Colorado Plateau evolved in these environments and are representative of the highly variable and extreme conditions that occur here.

The Colorado Plateau Native Plant Initiative (CPNPI) evolved from the more local program, the Uncompahgre Plateau (UP) Project, whose goal was to improve ecosystem health and function through collaboration with partners and local communities. This program was formally established in 2001 through the development of a Memorandum of Understanding/Cooperative Agreement with western Colorado's Public Lands Partnership, USDI Bureau of Land Management (BLM), Colorado Division of Wildlife, and the USDA Forest Service (USFS). In 2004, Western Area Power Administration and Tri-State Generation and Transmission Association joined the partnership. Representatives from several federal and state agencies, Northern Arizona University, and the UP Project met in 2007 to discuss the need for, and establishment of, the Colorado Plateau Native Plant Initiative. Conceptually, the CPNPI was to be an interagency, multi-state program whose focus would be the identification, development, increased availability, and use of native plant materials for restoration purposes throughout the Colorado Plateau. The Utah State Office of the BLM took the lead in establishing this program.

The Colorado Plateau has been defined in various manners by different agencies and organizations, but all agree that it occupies portions of four states: Arizona, Colorado, Utah, and New Mexico. Figure 1 illustrates the boundary used by the CPNPI, that incorporates ecological characteristics described by the US Environmental Protection Agency, USFS, and The Nature Conservancy.

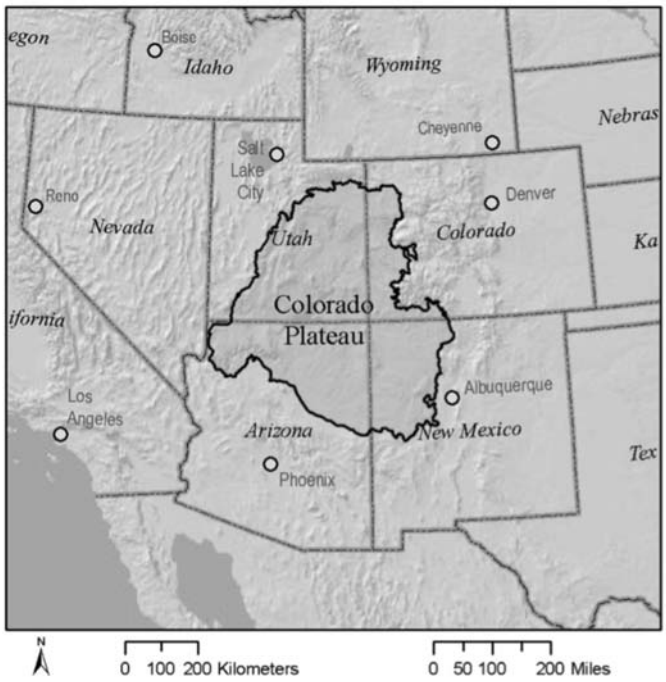

Figure 1. The Colorado Plateau in the Four Corners region of Arizona, Colorado, New Mexico, and Utah.

The CPNPI tiers directly to the national Native Plant Materials Development Program (NPMDP), which was created by Congress in the 2001 Department of Interior and Related Agencies Appropriations Act. In this Act, Congress directed the BLM to lead an interagency effort to develop a long-term program to supply and manage native plant materials for use in stabilization, restoration, and rehabilitation efforts on federal lands. The BLM has established programs for native plant materials development in the Colorado Plateau, Great Basin, and Mojave Desert ecoregions. The Wyoming Basin of southern Wyoming and Permian Basin of western Texas have also been identified as areas for future program development.

Vision and Goals

The CPNPI was conceptually identified, along with the vision, goals, and objectives for this program, by the 2007 Moab Working Group. It was the belief of this group that the synergy of this regional effort would make the best use of limited time and resources and assist all the partners in meeting their goals and objectives. At the 2009 meeting in Salt Lake City, issues and challenges for the CPNPI were identified, and the vision, goals, and objectives were updated as well. These are summarized below and provide the basis for the further development of this program.

Vision

The vision of the Colorado Plateau Native Plant Initiative is a Colorado Plateau that supports healthy and resilient native plant communities now and for future generations. This vision evolved out of initial work done in 2007 by the various state and federal agencies, Northern Arizona University, and the UP Project.

Goals

Long-Term Strategy

Development of a long-term strategy to facilitate the development of an adequate supply and diversity of native plant materials for restoration of landscapes within the Colorado Plateau was identified as Goal 1. In order to meet this goal, we developed a 5-year strategy and action plan, which will be updated annually in order to identify changes in priorities and to establish and maintain the program's annual operating needs. We are in the process of identifying current and future native plant materials needs, and target species have been identified for the Colorado Plateau for this purpose. Existing research and demonstration facilities are being evaluated regarding their ability to meet our needs.

Methodologies and Technologies

Identification of existing methodologies and technologies and future work with partners to develop and test new methodologies and technologies to ensure successful establishment and persistence of native plant materials was identified as Goal 2. The program is working with the Southwest Biological Science Center of the US Geological Survey (USGS), the research branch for the BLM, to provide an overview, synthesis, and assessment of existing and current research relevant to development of native plant materials for the Colorado Plateau. This will include topics such as: 1) plant life history; 2) seed transfer zones; 3) common garden studies; 4) seed germination and establishment data; as well as a broad variety of other topics. USGS will work in coordination with the CPNPI coordinator to develop a long-term strategy for conducting a cooperative research program specifically framed by the goals and objectives identified in the CPNPI Five-Year Strategy and Action Plan. USGS will begin research on genetic variability of priority restoration species identified by the BLM using plant materials collected through the Seeds of Success program.

Other objectives include the identification of adaptable prescriptions for different ecoregions, land types, and species. The variation among ecological sections within the Colorado Plateau Ecoregion is described below. Adaptable management prescriptions will be developed over time as different needs are identified for restoration and rehabilitation efforts. To ensure adequate evaluation of native plant materials for use in restoration, we are developing a species screening guide to assist in the determination of the feasibility of using any given germplasm for release.

Communication with Public and Private Entities

Goal 3 was to communicate with public and private entities (producer and consumer) to build demand and share information regarding the development and use of native plant materials. Communication is instrumental to the development of any native plant materials development program. Through workshops, symposia, publications, and the internet, CPNPI has made this one of its highest goals to meet in the near future. Links to the program are being developed and will be available on the BLM Utah State Office web page (URL: http://www.blm.gov/ut/st/en/prog/more.html). The program is also working with partners to establish demonstration gardens. The University of Utah Entrada Field Station, northwest of Moab, UT, is being considered as a location for both demonstration gardens and common garden studies because of its location, available study sites, and facilities. Locations of all demonstration areas will be identified on the above-mentioned web site. The web site will also provide information for growers and other users about the status of species in development. Success stories will be highlighted and links will be made with other agency web pages.

Opportunities and Challenges

Various opportunities and challenges were identified that the newly-established CPNPI will be able to address and meet. Opportunities for the program include: 1) increasing the availability of native plant

materials; 2) development of new technologies for the use of native plant materials; 3) improving the cost-effectiveness of using these materials; 4) updating restoration paradigms and guidelines; 5) meeting the needs for fire restoration and rehabilitation; and 6) providing outreach and education regarding the program.

Challenges include: 1) improving coordination among the various partners; 2) meeting the needs for the restoration of a diverse range of ecosystems within the Colorado Plateau; 3) improving the means for which commercial seeds can be collected; 4) providing assistance for agencies through the development of contracts and agreements for increasing native plant materials; and 5) developing realistic and effective long-term program planning to keep the program moving forward.

Opportunities

Increasing Availability of Native Plant Materials

Because of the amount and kinds of disturbances that have occurred and are occurring on the Colorado Plateau, and because of the desire to restore these ecosystems to a more resilient state, the demand for native plant materials has increased significantly over the past several years. Nationally, the BLM purchases a tremendous amount of seeds for revegetation purposes, mostly for fire rehabilitation. Figure 2 is based on data from consolidated seed purchases between 1996 and 2008 for wildfire restoration activities. In 1999, a year with many large fires, the BLM bought more than 2.9 million kg (6.5 million lb) of seeds, nearly 70% being non-native. The availability of native seeds was limited at that time and it was clear that efforts were needed to increase the supply of native plant materials for future uses.

In 2007, the BLM purchased more than 1.8 million kg (4 million lb) of native seeds, but demand fluctuates annually with variations in wildfire incidents. In 2008, total seeds purchased by the BLM decreased from approximately 3.4 million kg (7.4 million lb) to 0.7 million kg (1.5 million lb) because fewer acres burned. This illustrates the challenges faced by the native seed industry to meet changing needs by federal agencies as a result of the variation in acres burned from year to year. In order for federal agencies to stabilize these markets, they are challenged to identify resource restoration needs far beyond those of wildfire restoration. In addition to identifying needs for using native plant materials for wildlife habitat improvement and rangeland restoration, perhaps the expanded use of seed storage facilities during years with lower demand for wildfire restoration will assist in stabilizing the native seed market over time.

Seeds can be made available in two unique manners. The first is through wildland seed collection, which is simply the collection of native seeds from wildland settings. This may not be practical or economical for some species given annual seed production, access, or a variety of other reasons. Consequently, it will be necessary to increase the amount of some native materials through agricultural practice, for example, seeding and growing native species as a crop from which seeds are harvested. We need many native "workhorse" species, especially those that are most commonly used and needed in large quantities for revegetation projects, to be available at reasonable prices. For this to happen, they need to be produced in such a manner.

Warehouse capacity needs to increase, and the warehouse in Nephi, UT is nearly doubling in size. This will improve our ability to purchase and store select workhorse species in order to help stabilize the commercial development and price of these seeds. This increase in capacity will also increase our ability to store wildland seed collections. In years where the need for seeds is lower, they would be stored in the appropriate environment for use in later years when demand is higher.

Technology Development

A current problem is the general lack of native seeds available in the types and/or amounts required for restoration needs. As seeds become available, and as new species are developed, the need is tremendous for: 1) understanding the best methods for producing seeds; 2) applying seeds in restoration efforts; and 3) understanding how, where, and when to plant. A scientific approach is desired to address these issues in order to make our restoration efforts have the greatest potential for success. Therefore, the development of such technology is an important aspect of this program.

Improving Cost Effectiveness

The economics of a native plant materials program is multi-faceted. Costs are associated with the production of native materials, with the use of native materials, and with developing a stable market for native materials. Methods for producing and applying native seeds on the ground must be affordable in order for any native seed program to succeed. The cost-effectiveness of using native seeds in restoration efforts is a must. While the use of native plant materials may always be more expensive than using exotic species, the goals of restoration require that native materials be available. We not only must work with our seed producers to build the supply of native materials that meet our demands at an affordable cost, but also create a stable market for

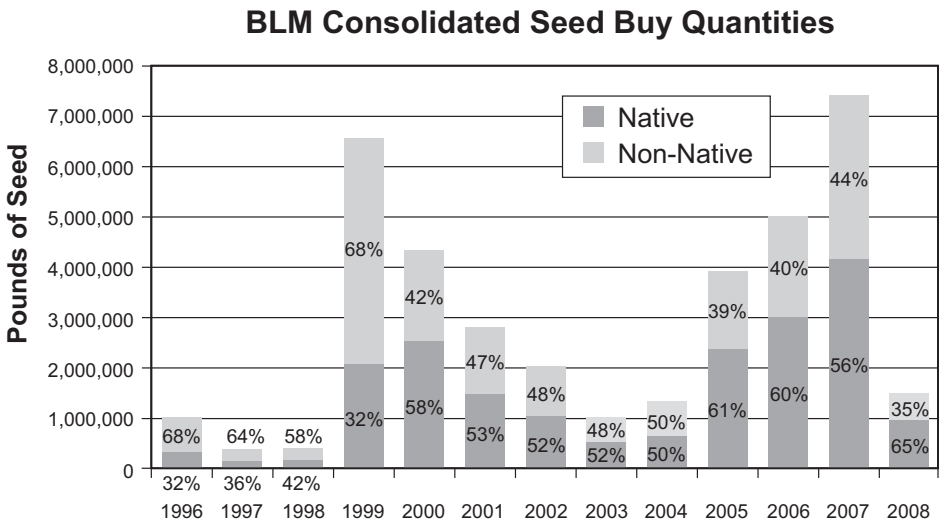

Figure 2. BLM consolidated quantities of native and non-native seeds bought between 1996 and 2007.

those materials in order to keep the producers in business. Our financial resources have been, and will always be, a limiting factor as long as the cost of restoring ecosystems remains high, but in order to build an affordable source of native plant materials, we must work closely with industry in order to understand their business needs. We must understand how we can help them help us achieve our goals and objectives for ecosystem restoration.

Updating Restoration Paradigms and Guidelines

It is important that, as a program, we work together to build restoration paradigms and guidelines that not only work to meet a variety of goals and objectives on the ground, but are also cost-effective. We can identify what does and what does not work and create a process for eliminating the use of methods with a poor track record of success. At the same time, we can promote the use of those methods that have a good record of success.

Meeting Needs for Fire Restoration and Rehabilitation

The largest use of native seeds has been for restoration of burned sites. This is likely to continue into the future, so it is important that we develop sufficient materials to meet those needs, and develop a process whereby information regarding the best materials for use in emergency restoration activities and in the restoration of any given site is easily available.

Providing Outreach and Education

More outreach and education materials (including web sites and hardcopy information) for use both within agencies and with seed producers and other private and public organizations are needed. These outreach and education materials would focus on conservation, sustainability, restoration, and research issues related to the development and use of native plant materials. They would also act as a means to showcase the successes associated with the use of native plant materials in restoration efforts. They would be used to: 1) increase awareness of the importance of ecosystem restoration; 2) enhance knowledge and skills associated with ecosystem restoration; 3) identify potential knowledge gaps and any efforts underway or planned to fill those gaps; and 4) provide recommendations for achieving restoration goals.

Challenges

Improved Coordination

Coordination within and between the various activities associated with native plant research and increase efforts in the Colorado Plateau ecoregion must improve. The CPNPI will focus on steps that will provide the most benefit to the agency, program cooperators, and partners through better coordination. In addition, the CPNPI will be actively involved in reducing any duplication of effort regarding research and development of native plant materials through increased outreach efforts. Coordination between CPNPI and adjacent ecoregional programs—the BLM Great Basin Restoration Initiative and Mojave Desert Native Plant Initiative, and the USFS Great Basin Native Plant Selection and Increase Project—will emphasize efforts to conduct research on species that occur across their boundaries.

Commercial Seed Collection

A permitting process must be established for seed collection that: 1) is simple to implement; 2) allows for monitoring where seeds are being collected; and 3) monitors the amount of seeds being collected from each site. It is critical that we allow for the collection of native seeds in a sustainable manner. It may be necessary for each agency and/or land owner to determine where, when, and how often seeds can be collected from any given area in order to avoid a detrimental effect on the native plant communities. Within federal agencies, however, the permitting process should be as consistent as possible. With the capabilities supplied through the use of GIS, it is possible to identify geographic areas where seeds may be available on some sort of a rotational basis, much like rest-rotational grazing, so that any given area is not over-collected. A regional database available to all permitting agents in the Colorado Plateau would be beneficial for such tracking as well as for assuring compliance with protocols as they are developed.

Contracts and Agreements

Contracts and agreements are a critical aspect of this program, and their development and use needs to be managed and available to agency personnel in order to meet goals and objectives of all aspects of the program. Developing a protocol to assist in the creation of contracts and agreements will assist the program in its growth. Through consolidated contracts and agreements processes, we can help maximize the cost effectiveness of available funding, a critical aspect of all program components.

Long-Term Planning

It is important to create a vision of what the Colorado Plateau Native Plant Initiative is and how to meet its goals and objectives. A 5-year strategy and action plan is being developed and is meant to be updated annually in order to incorporate any changes in priorities and to evaluate actual accomplishments versus those planned. The program will be adaptive in order to respond to changing budgets and updated or newly defined program needs and goals.

Ecosystem Diversity

Because the Colorado Plateau extends from the Uinta Basin in the north to the Painted Desert and Navajo Canyonlands in the south, and elevations range from near 600 m (2000 ft) at the bottom of the Grand Canyon to near 3650 m (12,000 ft) in the LaSal Mountains and San Francisco Peaks, there is a wide range of vegetation cover types. This diversity, as well as current levels of energy development and associated

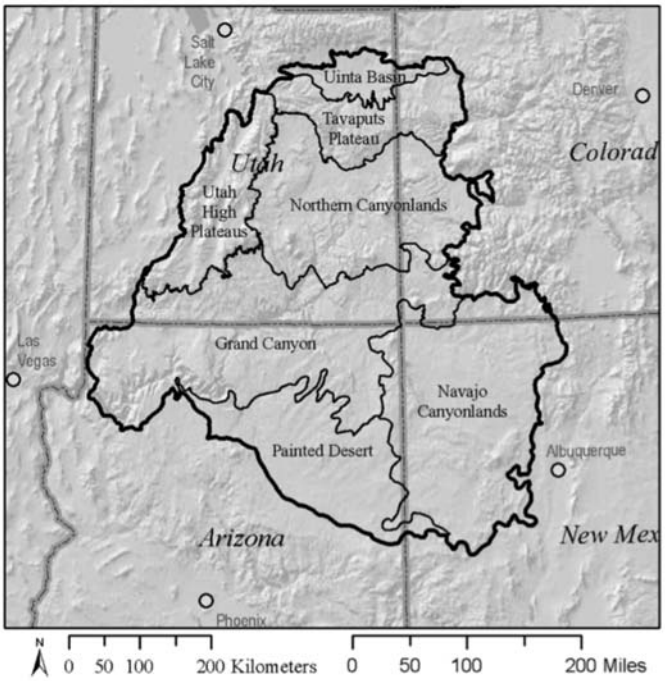

Figure 3. Ecological Sections within the Colorado Plateau.

Table1. Common Land Cover Types within each Ecological Section of the Colorado Plateau Ecoregion (see Figure 3).

Code	Land Cover Type	Utah High Plateaus	Tavaputs Plateau	Northern Canyon-lands	Uinta Basin	Grand Canyon	Painted Desert	Navajo Canyon-lands
S023	Rocky Mountain Aspen Forest and Woodland	D	D	D				
S032	Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	L	L					
S042	Intermountain Basins Aspen-Mixed Conifer Forest and Woodland	L	L			L		
S036	Southern Rocky Mountain Ponderosa Pine Woodland	L		L		D		D
S046	Rocky Mountain Gambel Oak-Mixed Montane Shrubland	D	L	L				
S039	Colorado Plateau Pinyon-Juniper Woodland	D	D	D	D	D	D	D
S052	Colorado Plateau Pinyon-Juniper Shrubland	D	D	D	D	D		
S075	Intermountain Basins Juniper Savanna					D	D	
S054	Intermountain Basins Big Sagebrush Shrubland	D	D	D	D	D	L	L
S071	Intermountain Basins Montane Sagebrush Steppe	D	D	L				
S056	Colorado Plateau Mixed Low Sagebrush Shrubland	L	L		L			
S065	Intermountain Basins Mixed Salt Desert Scrub			D	D	D	D	D
S096	Intermountain Basins Greasewood Flat			L	L	L	L	L
S045	Intermountain Basins Mat Saltbush Shrubland			D		L		
S079	Intermountain Basins Semi-Desert Shrub-Steppe	D	L	L	L	D	D	D
S090	Intermountain Basins Semi-Desert Grassland			L		L	D	D
S059	Colorado Plateau Blackbrush-Mormon-tea Shrubland			D		D	L	
S136	Southern Colorado Plateau Sand Shrubland			L		D	L	
D04	Invasive Southwest Riparian Woodland and Shrubland	L	L	L	L	L	L	L
S093	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	L	L	L	L	L	L	L
S092	Rocky Mountain Subalpine-Montane Riparian Woodland	D	L	L				
S091	Rocky Mountain Subalpine-Montane Riparian Shrubland	L	L	L				

D = Dominant Cover Type within the Ecological Section.
L = May be locally abundant, but is not a dominant component within the entire Ecological Section.

road construction, drought, fire, invasive species, and historical overgrazing throughout the Colorado Plateau, creates a need for the development of a wide variety of native plant materials. Figure 3 illustrates the ecological sections described by McNab and others (2007) within the Colorado Plateau. Each section is characterized by slight to great differences in climate, geology, soils, and vegetation.

Table 1 shows the distribution of some of the most common Land Cover Types (LCTs) described by the Southwest Regional GAP Analysis Project (NGAP 2004) within the ecological sections of the Colorado Plateau Ecoregion. Similar LCTs have been grouped in this table by growth form and by similarity in dominant species including: 1) Aspen and Conifer Forests and Woodlands; 2) Oak Woodlands; 3) Juniper and Pinyon Woodlands, Shrublands, and Savannahs; 4) Sagebrush Shrublands; 5) Salt Desert Shrublands; 6) Semi-Desert Shrublands and Grasslands; and 7) Riparian Shrublands and Woodlands. They are arranged, as much as possible, by similarities in distribution as well.

In general, the Colorado Plateau Pinyon-Juniper Woodland LCT is dominant throughout the Colorado Plateau Ecoregion, while Pinyon-Juniper Shrublands and Savannas occur only in portions of the Ecoregion. The Intermountain Basins Big Sagebrush Shrublands LCT occurs throughout the Ecoregion, but is not a dominant type in the Painted Desert or Navajo Canyonlands Sections. The Intermountain Basins Semi-Desert Shrub-Steppe LCT also occurs throughout the Ecoregion, but is less dominant in the Uinta Basin, Tavaputs Plateau, and Northern Canyonlands Sections. The Intermountain Basins Mixed Salt Desert Scrub and Greasewood Flat LCTs are dominant types throughout the Ecoregion, except at the higher elevations (Tavaputs and Utah High Plateaus Sections).

The Ponderosa Pine LCT is common in the Grand Canyon and Navajo Canyonlands Sections and on higher elevations within the Northern Canyonlands Sections (especially the Abajo Range); they are only minor components, or not present elsewhere in the Ecoregion. The Rocky Mountain Aspen Forest and Woodland and Intermountain Basins Aspen-Mixed Conifer Forest and Woodland LCTs are common only in the Tavaputs and Utah High Plateaus Sections and in higer elevations in the Northern Canyonlands and Grand Canyon Ecological Sections.

Riparian ecosystems occur throughout the Ecoregion and, as is typical of these systems, are relatively minor components with extremely high value for wildlife habitat, water quality, and hydrologic control. Gaskin and Schaal (2002) noted that eight to twelve species of *Tamarix* (Tamarisk/Salt Cedar) were brought into the United States in the 1800s for shade and erosion control. These authors described the invasion of *Tamarix* as second only to that of purple loosestrife (*Lythrum salicaria*). Today, it is estimated that nearly 600,000 ha (1.5 million ac) of riparian and wetland ecosystems have been invaded by these species and that they are expanding by nearly 18,000 ha (45,000 ac) annually. Its high seed output and ability to reproduce vegetatively have made it difficult to control.

Conclusions

For this program to be successful, it will take an organization that includes members from a wide variety of agencies as well as private organizations. The core team includes the program coordinator, national plant materials development program lead, national native seed coordinator, and state botanists from each of the four states included in the Colorado Plateau. Additionally, advisory teams (that provide advice and direction related to their specific needs regarding the development and use of native plant materials) and working groups (that complete projects associated with the program) will be needed. Each advisory team and working group will work independently as well as collaboratively with each other in order to achieve objectives and meet goals for this program.

Three advisory teams have been identified based on projected needs and include: 1) Natural Resource Needs; 2) Research and Development; and 3) Intertribal Council.

The Natural Resource Advisory Team will provide direction related to the ecological resource needs associated with native plant materials. Examples of advice and direction this team might provide on the use of native plant materials are: 1) to maintain or improve the biodiversity of a project area; 2) to maintain or improve watershed health; and/or 3) to define the roles they play in response to climate change issues.

The Research and Development Advisory Team will focus primarily on the identification of research needs related to native plant materials. This would include ecological characteristics (for example, seed transfer zones), restoration techniques (for example, appropriate equipment, seeding rates and depths, and so on), as well as social and economic factors associated with ecosystem restoration.

Native Americans have depended on native plant materials for food, medicines, basketmaking, dyes, and so on, and it is important to maintain those species within the landscapes of the Colorado Plateau. The Intertribal Council Advisory Team will provide guidance to the core team regarding traditional uses of, and tribal needs for, native plant materials throughout the ecoregion.

The following working groups have been identified based on the goals and objectives outlined above. These include: 1) Grants and Agreements; 2) Seed Certification and Increase; 3) Seed Industry Liaisons; 4) Outreach and Education; and 5) Web Development and Maintenance.

The Grants and Agreements Working Group would provide direction to the Core Team regarding contracts, grants, and agreements already in place for various aspects of the CPNPI Program. In addition, this group would work closely with agency staff to develop future contracts and agreements following appropriate protocols.

The Seed Certification and Increase Working Group would act as liaisons with the Arizona, Utah, and New Mexico Crop Improvement Associations and the Colorado Seed Growers Association for the certification of native plant materials. They would then work with members of the private seed industry to provide them with sources of foundation seeds for producing registered and certified seeds for use in restoration efforts on the Colorado Plateau.

The Seed Industry Liaison Working Group would act as direct contacts with members of the seed industry. Focus would be on developing a strong native seed industry within the Colorado Plateau Ecoregion. This group would be responsible for providing the most up-to-date information regarding the need for native seed materials and availability of seeds for production within the Colorado Plateau.

The Outreach and Education Working Group would be responsible for developing materials for agency personnel as well as a variety of state and private organizations. These materials would focus on conservation, sustainability, restoration, and research issues related to the development and use of native plant materials.

Web page development, management, and maintenance are critical components of this program. The Web Development and Maintenance Working Group would be responsible for developing and maintaining the CPNPI web page. This web page would not only provide the most up-to-date information regarding the CPNPI program, but would also provide links to other programs as well. It would provide current information regarding seed availability and restoration techniques for field managers, as well as information to assist the private seed industry in the needs for native seed materials.

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