Colorado Plateau Native Plant Development Program

2011 Annual Report

Colorado Plateau Native Plant Seed

Vision

The vision of the Colorado Plateau Native Plant Program is a Colorado Plateau that supports healthy and resilient native plant communities now and for future generations.

Spiderwort
Tradescantia occidentalis

2011 Annual Report
Colorado Plateau Native Plant Program

Introduction

This annual report illustrates the progress made in FY-2011 for the goals and objectives outlined in the Colorado Plateau Native Plant Program (CPNPP) Five-Year Strategy and Action Plan (Updated March 2011). For each of the four Goals, a set of Action Items have been identified and this report addresses each of those action items and the progress that has been made or the needs for continued effort. In some cases, action items have been described as being achieved and new items have been suggested for addition. These are clearly noted in the text of this report.

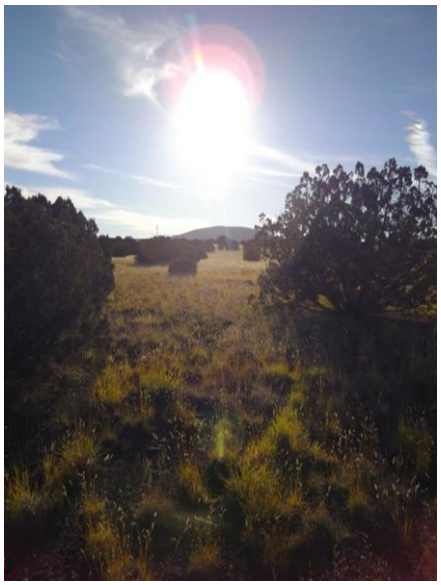

Figure 1. 2011 *Bouteloua gracilis* seed collection site in northern Arizona (Collection Site CP-129), through partnership with the Northern Arizona University, Landsward Institute.

The focus on this program in 2011 has been to identify which of those ecosystems are most in need of restoration activities in order to prioritize the evaluation and development of species to meet those needs. In addition, an emphasis has been placed on selecting criteria that help prioritize species for which increased effort will be made to develop native plant materials.

Goals, Objectives, Action Items and Key Focus Areas

The CPNPP Five-Year Strategy and Action Plan identified four goals, with objectives and action items articulated to describe how those goals will be met. These goals include:

Goal 1 – Identify existing and Future needs for native plant materials for restoration purposes on the Colorado Plateau

Goal 2 – Follow the National Native Plant Materials Development Program protocol[1] to develop an adequate supply of diverse, economical, and regionally-adapted native plant materials for restoration efforts on the Colorado Plateau.

[1] The National Native Plant Materials Development Program protocol includes six steps: 1) Native Seed Collection; 2) Evaluation and Development; 3) Field Establishment; 4) Seed Production by Private Growers; 5) Seed Storage; and 6) Restoration of Native Plant Communities. The CPNPP will not actively be involved in Restoring Native Plant Communities (Step 6), but will concentrate on following Steps 1-5 of this strategy and report accomplishments in each category annually.

Goal 3 – Identify existing methodologies and work with partners to develop and test new methodologies to ensure successful establishment and persistence of native plant materials.

Goal 4 – Communicate within agencies, partners, and the public regarding the roles, responsibilities, values, and products of the CPNPP.

To more clearly articulate these goals and their associated objectives and action items, seven "Key Focus Areas" were identified in the 2011 Operation Plan that address these in various manners. This annual report follows the previous format included in the Five Year Strategy and Action Plan, but future reports will likely address each focus area.

Focus Area	Goals	Objectives
Focus Area 1: Native Seed Collection	Goal 2	Objective 2.1 – Native Seed Collection – Annually collect seed from each of the four states included in the Colorado Plateau.
Focus Area 2: Native Seed Research, Evaluation, and Development	Goal 2, Goal 3	Objective 2.2 – Evaluation and Development – Begin/continue evaluation and development of priority target native plant materials. Objective 3.1 – Identify existing information regarding technology and methods for successfully establishing native plant materials. Objective 3.2 – Identify adaptable prescriptions for different landscapes and species. Objective 3.3 Ensure adequate evaluation of native plant materials for use in restoration.
Focus Area 3: Field Establishment	Goal 2	Objective 2.3 – Field Establishment – Increase native seed for distribution to private growers.
Focus Area 4: Native Seed Production by Private Growers	Goal 2	Objective 2.4 – Seed Production by Private Growers
Focus Area 5: Native Seed Purchase/Storage and Market Stability	Goal 2	Objective 2.5 – Seed Storage
Focus Area 6: Restoration of Native Plant Communities	Goal 2	Objective 2.6 – Ecosystem Restoration
Focus Area 7: Communications	Goal 4	Objective 4.1 – Establish demonstration areas, workshops, symposiums, publications, website, and other means to assist in efforts to inform individuals regarding the development and use of native plant materials for ecosystem restoration activities. Objective 4.2 – Identify and stimulate interest in new products (releases) as they become available. Objective 4.3 – Develop outreach materials to assist in communications efforts

Because Goal 1 in the Five Year Strategy and Action Plan is part of the ongoing effort and its only objective (to develop and follow a five-year strategy and action plan) has been achieved and is continually being updated as necessary, it is not included in these seven focus areas.

2011 Accomplishments

Goals, Objectives, and Action Items

The following goals were identified to assist in the development and ongoing operation of the Colorado Plateau Native Plant Program. Objectives and action items to meet objectives are time-dependent and are included as a means to meet those longer term goals. Some action items represent one-time events, while others are ongoing with regularly scheduled updates. **2011 accomplishments are noted in blue text.**

Goal 1 – Identify existing and future needs for native plant materials for restoration purposes on the Colorado Plateau

Objectives

1.1 Develop and Follow a Five-Year Strategy and Action Plan.

Action Item 1.1.1: Update the 5-year strategy and action plan annually in accordance with the BLM's Budget Planning System (BPS) in order to establish and maintain the program's annual operating budget needs.

2011 Actions: The 5-Year strategy and action plan was updated in March 2011 and is available on the CPNPP web page (*http://www.blm.gov/ut/st/en/prog/more/CPNPP.html*). It will continue to be updated on an annual basis and will be formatted similar to those Focus Areas identified in the 2011 CPNPP Operation Plan.

Action Item 1.1.2: Identify Partners for this program and develop a Memorandum of Understanding (MOU) that outlines the cooperation among Federal, State, Tribal, and local governments, and non-governmental partners and stakeholders in the development and implementation of an ecoregion-wide program (CPNPP) for the development of native plant materials for ecosystem restoration. Current and potential partners will be updated as necessary. A list of potential partners is included in Appendix A.

2011 Actions: A draft MOU has been prepared and will be distributed to various agencies and partners in early 2012 for their review. It is anticipated that at least some federal partners will sign the MOU in 2012 and we are hopeful that others will as well.

Action Item 1.1.3: Identify current and future native plant materials needs on the Colorado Plateau. Update annually. Appendix B within the 5-Year Strategy and Action Plan includes a list of species identified for development for this ecoregion.

2011 Actions: This species list has not only been updated, but an evaluation of the availability of germplasm for seed growers was completed. This is included in Appendix A of this document.

Action Item 1.1.4: Evaluate existing and potential facilities for evaluation and increase of native species.

2011 Actions: Existing sites on the Ashley, Dixie, Fishlake, and Manti-LaSal National Forests continue to provide important diversity of site conditions and elevations for conducting common garden studies. Potential new research and seed increase sites have been identified at The High Lonesome Ranch, a private corporation-owned facility in northwestern Colorado. In addition, an agreement has been signed with the University of Utah, Rio Mesa Center that will allow for this to occur as funds become available. Via, the USGS, the CPNPP is leasing a greenhouse in Flagstaff, AZ, from the USFS for use in

evaluating propagation protocols, establishing quantitative genetics experiments, and growing out field collected seed for marker-based genetic studies. This site also has substantial outdoor space with adequate watering that is completely secure. In addition, the NSF has recently funded an infrastructure grant requested by NAU researchers to set up common gardens across the extreme elevation gradient of the Flagstaff, AZ, area. It is anticipated that this common garden array will greatly facility the evaluation of native plant germplasm, and the research goals of the CPNPP in general.

Action Item 1.1.5: Annual work plans will be competed in coordination with the BLM's budget system and prior to the beginning of each fiscal year, which begins on October 1. These plans will be coordinated between the CPNPP and the established working groups (See Action Item 1.1.7 below).

2011 Actions: An annual workplan is in draft for FY2012 and has not yet been completed

Action Item 1.1.6: Establish a network of growers in the Colorado Plateau.

2011 Actions: A group of growers not only in the Colorado Plateau, but also in adjacent ecoregions participated in the CPNPP Annual Meeting in Moab, Utah in March 2011. These growers have been added to the general CPNPP mailing list and are contacted regularly regarding information that may relate to private industry. In addition, the CPNPP Coordinator has participated at the December 2011 Intermountain Native Plant Growers Association meeting held in Farmington, Utah and will continue to build on these relationships.

Action Item 1.1.7: Identify needed "Working Groups" to focus on a variety of tasks such as: 1) Grants and Agreements; 2) Web development and maintenance; 3) Outreach and Education; 4) Seed Certification and Increase; and 5) Liaison with private industry. Working group members will be selected from interested individuals associated with this program. No previous experience in any of the focus areas is required, but could be beneficial to completing associated tasks. Working group team members will determine the appropriate means for working on their tasks, including the number and timing of meetings, how meetings are to be conducted (e.g. in person or via conference calls). They will work closely with the CPNPP Coordinator to identify tasks, priorities, and expected completion dates.

2011 Actions: Working groups were established at the March 2011 Annual CPNPP meeting, and while they participated in activities at that meeting, have not been actively involved since then. It is apparent that, because the CPNPP is not a primary job for any individuals included in these working groups, that other priorities take precedence.

GOAL 2 – FOLLOW THE NATIONAL NATIVE PLANT MATERIALS DEVELOPMENT PROGRAM PROTOCOL[2] TO DEVELOP AN ADEQUATE SUPPLY OF DIVERSE, ECONOMICAL, AND REGIONALLY-ADAPTED NATIVE PLANT MATERIALS FOR RESTORATION EFFORTS ON THE COLORADO PLATEAU.

OBJECTIVES

2.1 Native Seed Collection – Annually collect seed from each of the four states included in the Colorado Plateau.

Action Item 2.1.1: Work within the agencies and with partners to set criteria in order to establish a list of priority *Target Species*.

[2] The National Native Plant Materials Development Program protocol includes six steps: 1) Native Seed Collection; 2) Evaluation and Development; 3) Field Establishment; 4) Seed Production by Private Growers; 5) Seed Storage; and 6) Restoration of Native Plant Communities. The CPNPP will not actively be involved in Restoring Native Plant Communities (Step 6), but will concentrate on following Steps 1-5 of this strategy and report accomplishments in each category annually.

2011 Actions: Progress has been made on developing this priority Target Species list and is included in Appendix A. Criteria have been included for prioritization of species and include contributions toward 1) improved biodiversity; 2) watershed health and protection; 3) wildlife habitat (especially for rare species such as sage grouse); 4) forage or browse for wildlife and livestock; 5) habitat for pollinators; and 6) pioneer (or early seral) species that may be able to compete with non-native invasive plant species. In addition, the availability of germplasm for commercial production has been listed.

Action Item 2.1.2: Utilized Chicago Botanical Garden interns as well as other sources to collect *Target Species* in the Colorado Plateau.

2011 Actions: Chicago Botanic Garden interns were not used by CPNPP in 2011. CPNPP, however, funded interns through the Northern Arizona University's (NAU) Landsward Institute, as well as through the University of Utah's Red Butte Garden and Arboretum to collect native seed in the 2011 field season. A total of 64 collections were made by NAU, but Red Butte Garden and Arboretum numbers for Colorado Plateau have not been identified (these interns collect throughout Utah and made over 50 total collections in 2011). In addition, in New Mexico supported three native seed collection teams from Farmington, Las Cruces, and Los Lunas. The Farmington team made 54 collections of 46 species from locations within the Colorado Plateau ecoregions. The Los Lunas team made 36 collections of 28 species in the Colorado Plateau.

Action Item 2.1.2: Inventory existing native seed materials, maintain information on species collected using the SOS collections form, and establish an on-line database of seed availability, location, and quantity.

2011 Actions: A database has been developed to hold this information, but the data has been difficult to gather. More effort will be put into this in FY2012.

Action Item 2.1.3: Work within the agency and with partners to establish a permitting process for improving the ability to allow needed wildland seed collections on public lands that: 1) is simple to implement; and 2) allows for monitoring where seeds are being collected; and 3) monitors the amount of seed being collected from each site.

2011 Actions: No progress was made on this in FY 2011

Action Item 2.1.4: Assure that all collections include information necessary for *Source Identified* certification.

2011 Actions: All collections made in 2011 followed this protocol.

2.2 Evaluation and Development – Begin/continue evaluation and development of priority target native plant materials.

Action Item 2.2.1: Work with the USGS Southwest Biological Science Center, Uncompahgre Partnership, NRCS Plant Material Centers, and other partners to evaluate native plant materials for future increase.

2011 Actions: Evaluations continued in 2011 through work at four US Forest Service common garden sites.

Action Item 2.2.2: Begin new genetic adaptability studies, and continue existing efforts, with focus on priority target species.

2011 Actions: Progress has been through efforts of the USGS Southwest Biological Science Center (Colorado Plateau Research Station). Work has focused on *Bouteloua gracilis*, which is a high demand species for the southern portion of the Plateau. To date, over 50 accessions have been collected for

marker-based genetic analysis from sites that reflect the physiographic diversity of the Plateau and the broad adaptability of the species. Currently, seeds from 47 accessions, including those above and some from GRIN, are being germinated in the Flagstaff greenhouse and plants traits related to phenology and fitness will be quantified and correlated with site-specific environmental variables.

In a project funded by the NPS, the USGS, in collaboration with researchers at the University of Memphis, is evaluating genetic diversity in *Achnatherum hymenoides*, *Sphaeralcea parvifolia*, and *Sporobolus cryptandus*, all target priority species for the CPNPP. This study is being conducted at a relatively fine scale—across an 800 m elevation gradient spanning Canyonlands and Arches National Parks. Despite the fine scale, the highly autogamous *A. hymenoides* shows significant geographic structure as measured by neutral genetic markers. In contrast, *S. parvifolia*, an outcrosser, exhibits abundant genetic variation, but this variation is not structured at the geographic scale evaluated. These data will be useful in evaluating seed transfer zones for these priority species.

Initial collections of priority forbs, e.g., *Ipomopsis aggregata* and *Heliomeris multiflora*, have been completed, but forb collection for genetic analysis needs to be a major emphasis of the coming field season.

2.3 Field Establishment – Increase native seed for distribution to private growers.

Action Item 2.3.1: Based on Evaluation and Development findings, establish increase fields for purposes of providing native seed to growers.

2011 Actions: CPNPP did not fund any increase fields in 2011. Increases were made through contracts between the Uncompahgre Partnership and Benson Seed in Washington.

2.4 Seed Production by Private Growers

Provide native seed to private growers in order to increase production of native plant materials. Focus on developing the program for growers in the Colorado Plateau, but use all available sources for increasing production.

Action Item 2.4.1: CPNPP will work closely with private growers to enable them to grow native plants for production of seed or other plant materials in demand for use especially within the Colorado Plateau. Assistance will be in the form of information about: 1) available native plant materials; and 2) known best management practices for the production of native plant materials; as well as through 3) workshops and field demonstrations addressing a wide variety of aspects associated with native plant materials.

2011 Actions: CPNPP has added information to its web site that lists plant materials available to growers (http://www.blm.gov/ut/st/en/prog/more/CPNPP/whats_new.html) and will continue to keep this information updated on a regular basis. An IDIQ contract that included one Colorado Plateau native seed grower (Southwest Seed) was developed through the BLM's Oregon State Office. Appendix B of this document includes all items awarded to all growers through this Contract.

2.5 Seed Storage

Use existing facilities and identify future needs to store native plant materials for use in ecosystem restoration efforts.

Action Item 2.5.1: Identify native plant materials needs for restoration efforts beyond those necessary for Emergency Stabilization and Rehabilitation (ESR) and use available seed storage facilities to help stabilize the market for these materials.

2011 Actions: Native seed continues to be stored at the Utah Division of Wildlife Resources seed storage facility in Ephraim, Utah. Most native seed is purchased through an agreement with the State of Utah for watershed restoration efforts.

Action Item 2.5.2: Identify additional seed storage needs and potential locations and partners to increase the capacity of storage facilities.

2011 Actions: An additional seed storage facility is being constructed in Delta, Colorado by the Colorado Division of Wildlife Resources. CPNPP plans to contribute approximately $10,000 per year for storage and operations of this facility.

2.6 Ecosystem Restoration

All research and development associated with this program is focused on the restoration or native ecosystems and are in support of the BLM's national Manual (1740) and Handbook (1740-2) direction.

2011 Actions: No action items are associated with this Objective because it clearly articulates that all activities of CPNPP support ecosystem restoration. CPNPP continues to function with this primary emphasis.

2.7 Purchasing Authorities

While included in the National Native Plant Materials Development Program, it is an important objective to develop ecoregion-based protocols that assist in the creation of contracts and agreements to help maximize the cost effectiveness of available funding.

2011 Actions: No specific actions have been taken in relationship to this Objective.

GOAL 3 – IDENTIFY EXISTING METHODOLOGIES AND WORK WITH PARTNERS TO DEVELOP AND TEST NEW METHODOLOGIES TO ENSURE SUCCESSFUL ESTABLISHMENT AND PERSISTENCE OF NATIVE PLANT MATERIALS.

OBJECTIVES

3.1 Identify existing information regarding technology and methods for successfully establishing native plant materials.

Action Item 3.1.1: Work with partners, such as Plant Materials Centers, universities, and Forest Service Research to provide information regarding existing restoration technologies and identify research opportunities to improve those capabilities.

2011 Actions: Dr. Troy Wood, Research Program Lead for CPNPP (USGS Southwest Biological Research Center), is developing a searchable database with this information included. Portions of the data collected to date are expected to be available starting in March 2012, with the rest of the data coming online as data entry proceeds.

3.2 Identify adaptable prescriptions for different landscapes and species.

Information regarding existing prescriptions will be compiled, evaluated, and updated regularly as new information becomes available.

Action Item 3.2.1: Develop Restoration Paradigms and Guidelines that work to meet a variety of goals and objectives on the ground, and that are cost-effective.

2011 Actions: A volunteer has been brought on to begin work on this effort as well as Action Items 3.2.2 and 3.2.3. Little progress has been made, but this and the following two action items will become a priority for 2012.

Action Item 3.2.2: Use existing site information, such as Ecological Site Descriptions, within each ecological section to assist in the development of restoration prescriptions.

2011 Actions: (see above)

Action Item 3.2.3: Adaptable management prescriptions will be developed over time as different landscapes are defined and as species are identified for restoration and rehabilitation efforts.

2011 Actions: (see above)

3.3 Ensure adequate evaluation of native plant materials for use in restoration.

Action Item 3.3.1: Develop a screening guide to assist in the determination of the feasibility of using any given germplasm for release.

2011 Actions: Evaluations are conducted through common garden studies by the USFS (Kelly Memmot) and DNA marker-based genetic studies are being conducted by USGS Southwest Biological Science Center (Troy Wood), as described above.

Action Item 3.3.2: Publish evaluation information on website as well as in hard copy format.

2011 Actions: As they become available, all evaluation information will be published on the CPNPP web site as well as in hard copy format.

GOAL 4 – COMMUNICATE WITHIN AGENCIES, PARTNERS, AND THE PUBLIC REGARDING THE ROLES, RESPONSIBILITIES, VALUES, AND PRODUCTS OF THE CPNPP.

OBJECTIVES

4.1 Establish demonstration areas, workshops, symposiums, publications, website, and other means to assist in efforts to inform individuals regarding the development and use of native plant materials for ecosystem restoration activities.

Action Item 4.1.1: Develop Outreach and Education materials focused on conservation, sustainability, restoration, and research issues related to the development and use of native plant materials. Provide information 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.

2011 Actions: In addition to the development of a brochure that illustrates the mission, vision, and goals of the CPNPP, a web site has been established and is regularly updated with information for a variety of users (http://www.blm.gov/ut/st/en/prog/more/CPNPP.html).

Action Item 4.1.2: Identify existing demonstration areas in order to showcase the successes associated with the use of native plant materials in restoration efforts (identify the need for new demonstration areas).

2011 Actions: An agreement has been signed with the University of Utah, Rio Mesa Center in southern Utah to develop a native plant garden. A design has been submitted and the CPNPP coordinator

is working with Dr. Sylvia Torti, Rio Mesa Center Director, to complete the initial design. The installation will begin in March 2012.

Action Item 4.1.3: Update the CPNPP website at least quarterly. The web site will be a "living" element in the CPNPP program. It will include direction regarding how to find native plant materials for users. In addition, it will provide information to 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.

2011 Actions: The CPNPP web site has been, and will continue to be updated at least quarterly. An effort is now in place to provide updates more frequently. New additions in 2011 include a "What's New" section and a more comprehensive "Where Can I Buy Native Seed" section. Feedback is generally requested from users to make this site more valuable to those visiting its pages.

Action Item 4.1.4: CPNPP Coordinator will attend, as well as sponsor or co-sponsor workshops and/or symposia annually. These will provide an opportunity to share information gathered through efforts of the Initiative.

2011 Actions: The CPNPP Coordinator provided a poster presentation at the annual Ecological Society of America Conference in Austin, Texas in August of 2011. This poster will be posted on the "What's New" page of the CPNPP web site.

Action Item 4.1.5: Transcripts for publications will be submitted as appropriate for inclusion in conference and symposia proceedings.

2011 Actions: While no transcripts for publications were submitted in 2011, posters and presentations were given by the CPNPP Coordinator as well as research partners, Dr. Troy Wood and Kelly Memmott. These posters and presentations will be added to the "CPNPP Research Program" site on the CPNPP web page:

(http://www.blm.gov/ut/st/en/prog/more/CPNPP/cpnpp_research_program.html)

Action Item 4.1.6: Identify other options available for communications of available information regarding the development and use of native plant materials.

2011 Actions: Communications continues to be a primary focus of the CPNPP Coordinator. While continuing to participate in both national (2011 ESA Annual Meetings) and regional (Biennial Conference of Research on the Colorado Plateau) meetings, efforts have been taken to improve the CPNPP web page and to participate wherever possible in opportunities to provide information regarding this program. In addition, two proposals were for symposia at the 2012 ESA meeting in Portland, OR, were submitted and accepted.

4.2 Identify and stimulate interest in new products (releases) as they become available.

Action Item 4.2.1: Develop a list of contacts including name, organization, location, phone, email, website, and capabilities by working group and by geographic area

2011 Actions: No progress made in FY2011

Action Item 4.2.2: Announce the availability of information on the CPNPP web page regarding available and especially new releases of native seed to those included in the mailing list identified above in Objective 4.2, Action Item 1.

2011 Actions: Information is provided as it becomes available. An updated table has been added to the "What's New" site on the CPNPP web page that shows priority species with germplasm that is currently available to native seed growers.

http://www.blm.gov/ut/st/en/prog/more/CPNPP/whats_new.html

4.3 Develop outreach materials to assist in communications efforts

Action Item 4.3.1: In addition to publications and websites, develop a brochure that illustrates the value and uses of native plant materials on the Colorado Plateau.

2011 Actions: In 2011, a brochure was created for the CPNPP and will be used for informal communications regarding the program.

Action Item 4.3.2: Complete annual reports at the end of each calendar year to discuss efforts in progress and completed, as well as any necessary updates to the CPNPP Program.

2011 Actions: This annual report fills this action item.

APPENDIX A: PRIORITY SPECIES FOR THE COLORADO PLATEAU WITH AVAILABLE GERMPLASM FOR COMMERCIAL PRODUCTION

The following species have been developed from plant materials that originated in the Colorado Plateau and are available for commercial development and for use in restoration efforts on the Colorado Plateau. Those species with a "√" are in commercial development. Both of the NRCS Plant Materials Centers (LLPMC and UCEPC) have many more species available for growers, but those listed below are from sources that originated in the Colorado Plateau. All others are from locations outside this ecoregion. More information about each of these releases can be found by linking to the Los Lunas Plant Materials Center (LLPMC), Upper Colorado Environmental Plant Center (UCEPC), and the Uncompahgre Partnership (UP) web pages.

[1] USFS common garden studies
[2] USGS genetic studies
[3] LLPMC = Los Lunas Plant Material Center; UCEPC = Upper Colorado Environmental Plant Center; UP = Uncompahgre Plateau
√ In commercial production

Scientific Name	Common Name	Biodiversity	Watershed Health and Protection	Wildlife Habitat	Forage	Habitat for Pollinators	Pioneer Species	Colorado Plateau Germplasm Available[3]
Grasses								
Achnatherum hymenoides[1,2] √	Indian ricegrass	X	X		X			Star Lake Germplasm (LLPMC 2004 release); White River (UP)
Blepharoneuron tricholepis	Pine dropseed	X	X					
Bouteloua curtipendula	Sideoats Grama (not widely used)	X	X		X			Niner (LLPMC 1984 release)
Bouteloua gracilis	Blue Grama	X	X					Two cultivars of *Bouteloua gracilis*, Hachita and Lovington, are from New Mexico, but originated outside the Colorado Plateau
Bromus marginatus √	Mountain Brome	X	X					UP Cold Springs Mountain brome
Distichlis spicata	Inland Saltgrass	X	X					
Elymus elymoides[1]	Squirreltail	X	X		X			Wapiti Germplasm (UCEPC 2007 release); UP Paradox (Pueblo germplasm originated from outside the Colorado Plateau, near Pueblo, CO)
Elymus trachycaulus	Slender wheatgrass	X	X		X			San Luis (UCEPC 1984 release)
Festuca arizonica	Arizona fescue	X	X					Redondo (UCEPC 1973 release)
Hesperostipa comata [1]	Needle & Thread	X	X		X			
Koeleria macrantha [1]√	Junegrass	X	X		X			UP Sims Mesa

Scientific Name	Common Name	Biodiversity	Watershed Health and Protection	Wildlife Habitat	Forage	Habitat for Pollinators	Pioneer Species	Colorado Plateau Germplasm Available[3]
Leymus cinerius√	Great Basin Wildrye	X	X					UP Cochetopa
Leymus salinus	Saline wildrye	X	X		X			
Muhlenbergia montana	Mountain muhly	X	X					
Muhlenbergia wrightii	Spike muhly	X	X					El Vado (LLPMC 1973 release)
Panicum virgatum	Switchgrass	X	X					(Grenville Germplasm originated in northeast New Mexico outside the Colorado Plateau)
Pascopyrum smithii	Western Wheatgrass	X	X		X			
Pleuraphis jamesii	Galleta	X	X					"Viva" Galleta (LLPMC 1979 release) originated in northeastern New Mexico near the town of Newkirk and is not a Colorado Plateau release
Poa fendleriana [1]√	Mutton grass	X	X		X			UP Ruin Canyon Muttongrass
Poa secunda [1]√	Sandberg's bluegrass	X	X		X			UP Colorado Plateau Sandberg bluegrass
Pseudoroegneria spicata	Bluebunch Wheatgrass (not so CP specific)	X	X		X			
Sporobolus airoides [2]	Alkali Sacaton	X	X					Salado (LLPMC 1982 release) originated southeast of Albuquerque, NM and is not a Colorado Plateau release
Sporobolus cryptandrus	Sand Dropseed (UP/Source?)	X	X					
Vulpia octoflora	Six-week fescue	X					X	
Forbs								
Achillea millefolium var. lanulosum√	Western Yarrow	X	X					UP Dry Fork
Aster glaucodes	Blueleaf Aster	X				X		Cimarron (UP)
Astragalus lonchocarpus	Rushy Milkvetch	X				X		
Astragalus utahensis	Utah Milkvetch	X				X		
Balsamorhiza sagittata	Arrowleaf Balsamroot	X				X		
Crepis acuminata	Western Hawksbeard	X			X			
Cryptantha flava	Yellow Catspaw	X						
Cryptantha flavoculata	Yellow-Eye Cryptanth	X						
Cryptantha tenuis	Canyon Cryptantha	X						
Erigeron pumilis	Low Fleabane	X						Log Hill (UP)
Erigeron speciosus√	Aspen Fleabane	X			X	X		UP Dry Fork Hwy (Limited Quantities in 2011)

Scientific Name	Common Name	Biodiversity	Watershed Health and Protection	Wildlife Habitat	Forage	Habitat for Pollinators	Pioneer Species	Colorado Plateau Germplasm Available[3]
Eriogonum flavum	Yellow Buckwheat	X						
Eriogonum racemosum	Redroot Buckwheat	X						
Eriogonum umbellatum ✓	Sulfur Buckwheat	X			X	X		UP Burn Canyon (Limited Quantities in 2011)
Gaillardia pinnatifida	Hopi Blanket Flower	X				X		
Hedysarum boreale ✓	N or UT Sweetvetch	X				X		in process ARS; UP Uncompahgre
Heliomeris multiflora	Goldeneye	X				X		
Ipomopsis aggregata	Skyrocket Gilia	X				X		
Lathyrus spp.		X				X		
Lepidium montanum	Mountain pepperweed	X				X		
Lupinus argenteus	Silvery Lupine	X				X		
Lupinus caespitosus	Utah Lupine	X				X		
Lupinus sericeus	Silky Lupine	X				X		UP
Mentzelia albicaulis	Whitestem Blazingstar	X					X	
Mirabilis multiflora	Colorado Four O'Clock	X				X		
Oenothera caespitosa	Tufted evening primrose	X				X		
Packera multilobata	Multi-lobed groundsel	X				X		UP Montrose
Penstemon angustifolius	Narrow Leaf Penstemon	X				X		San Juan Germplasm (LLPMC 2000 release)
Penstemon barbatus	Beardlip Penstemon	X				X		
Penstemon comarrhenus ✓	Dusty Penstemon	X				X		UP Delta
Penstemon cyanocaulis ✓	Bluestem Penstemon	X				X		UP San Miguel
Penstemon eatonii	Firecracker Penstemon	X				X		Richfield Selection (Aberdeen PMC 1994 release)
Penstemon linarioides	Toadflax Penstemon	X				X		
Penstemon strictus	Rocky Mountain Penstemon	X				X		Bandera Rocky Mt Penstemon (LLPMC 1982? Release, just southeast of Albuquerque)
Ratibida peduncularis	Red Mexican hat	X				X		
Sphaeralcea coccinea	Globemallow	X				X		UP Paradox Valley
Sphaeralcea parviflora [2]	Globemallow	X				X		
Tradescantia occidentalis	Spiderwort	X				X		
Wyethia amplexicaulis	Mule-ears	X				X		
Wyethia "Scabrethia" scabra	Badlads Mule-ears	X				X		

Scientific Name	Common Name	Biodiversity	Watershed Health and Protection	Wildlife Habitat	Forage	Habitat for Pollinators	Pioneer Species	Colorado Plateau Germplasm Available[3]
Upland Trees and Shrubs								
Amelanchier utahensis	Utah Serviceberry	X		X	X	X		
Artemisia tridentata var. *tridentata*	Basin Big Sagebrush	X		X				
Artemisia tridentata var. *vaseyana*	Mountain Big Sagebrush	X		X				
Artemisia tridentata var. *wyomingensis*	Wyoming Big Sagebrush	X		X				
Atriplex canescens	Four-wing Saltbush	X						Rincon *Atriplex canescens* (UCEPC 1983 release) is from the Carson National Forest near Canjilon, NM (just outside the Colorado Plateau)
Atriplex confertifolia	Shadscale	X						
Celtis reticulata	Netleaf Hackberry	X						
Cercocarpus intricatus	Littleaf Mountain Mahogany	X		X	X			
Cercocarpus montanus	Mountain Mahogany	X		X	X			Montane (LLPMC 1978 release)
Cercocarpus ledifolius	Curlleaf Mountain Mahogany	X		X				
Chamaebatiaria millefolium	Fernbush	X						
Chilopsis linearis	Desert Willow	X			X			Regal (LLPMC 1989 release)
Chryosthamnus viscidiflorus	Green Rabbitbrush	X		X				
Coleogyne ramosissima	Blackbrush	X		X				
Ephedra viridis	Mormon Tea	X		X				
Ericameria nauseosa	Rubber Rabbitbrush	X						
Fallugia paradoxa	Apache Plume	X		X				
Fendlera rupicola	Cliff Fendlerbush	X		X				
Forestiera pubescens var. pubescens	New Mexico forestiera	X						Jemez (LLPMC 1978 release)
Fraxinus anomala	Single Leaf Ash	X		X				
Grayia spinosa	Hopsage	X						
Krascheninnikovia lanata	Winterfat	X			X			Hatch (UCEPC 1985 release) originated near Hatch, Utah on the western boundary of the Colorado Plateau
Mahonia fremontii	Fremont's barberry	X						

Scientific Name	Common Name	Biodiversity	Watershed Health and Protection	Wildlife Habitat	Forage	Habitat for Pollinators	Pioneer Species	Colorado Plateau Germplasm Available[3]
Mahonia haematocarpa	Red barberry	X						
Prunus virginiana	Black Chokecherry	X						Colorow Germplasm (LLPMC 2009 release)
Purshia mexi-cana/stansburiana	Cliffrose	X		X	X	X		
Purshia tridentata	Bitterbrush	X		X	X	X		
Quercus gambelii	Gambel Oak	X	X	X				
Rhus trilobata	Lemonade bush	X	X	X				
Rosa woodsii	Wood rose	X	X	X		X		
Sarcobatus vermiculatus	Greasewood	X	X					
Sheperdia argentea	Silver buffaloberry	X	X	X		X		
Sheperdia rotundifolia	Roundleaf buffaloberry	X	X	X		X		
Zuckia brandegeei	Siltbush	X	X					
Riparian Trees and Shrubs								
Acer negundo	Box elder	X	X	X				
Betula occidentalis	River Birch	X		X			X	
Populus fremontii	Cottonwoods	X	X	X			X	
Rosa woodsii	Woods rose	X	X	X		X	X	
Salix exigua	Coyote Willow	X	X	X	X		X	
Salix goodingii	Goodings Willow	X	X	X			X	

APPENDIX B. INDEFINITE DELIVERY/INDEFINITE QUANTITY (IDIQ) CONTRACT AWARDS FOR PRODUCTION OF NATIVE PLANT SEED

IDIQ contracts awarded to growers for species and services are listed below. States where grower operations occur are listed below the grower's name. Not all species are those of the Colorado Plateau and only one grower (Southwest Seed) has operations in the Colorado Plateau.

Item	Benson Farms	L&H Seeds	Western Reclamation	Rainier Seed	Clear-water Seed	Oregon Wholesale Seed	E & S Restoration	Southwest Seed	Hedgerow Farms	S & S Seeds
	Location									
	WA	WA	WA	WA	WA	OR	OR	CO	CA	CA
Container Production and Field Transplants		X							X	
Small Lots - Grass & Forb Species - Each	X	X	X	X	X	X	X*	X	X	X
Large Lots - Grass & Forb Species - Each	X	X	X	X	X		X	X	X	X
Annual Grasses	X	X		X				X	X	X
Indian Ricegrass (*Achnatherum hymenoides*)	X		X	X				X		
Lemmon's needlegrass (*Achnatherum lemmonii*)	X	X				X				
Western Needle Grass (*Achnatherum occidentalis*)				X		X				
Desert Needle Grass (*Achnatherum speciosum*)				X				X		
Thurber's Needle Grass (*Achnatherum thruberianum*)				X		X				
Purple Threeawn (*Aristida purpurea*)				X						X
Side Oats Grama (*Bouteloua curtipendula*)	X			X				X		
Black Grama (*Bouteloua eriopoda*)	X			X						
Blue Grama (*Bouteloua gracilis*)	X			X				X		
California Brome (*Bromus carinatus*)	X	X		X	X	X	X		X	X
Woodland Brome (*Bromus laevipes*)	X	X				X	X			
Mountain Brome (*Bromus marginatus*)	X			X	X	X	X	X		
Columbia Brome (*Bromus vulgaris*)		X		X		X	X			
California Oat Grass (*Danthonia californica*)	X			X		X				
Tufted Hairgrass (*Deschampsia cespitosa*)	X	X		X		X				
Slender Hairgrass (*Deshampsia elongata*)	X	X		X		X				
Squirreltail (*Elymus elymoides*)	X		X	X				X		X
Blue Wildrye (*Elymus glaucus*)	X			X	X	X	X	X	X	X
Thickspike Wheatgrass (*Elymus lanceolatus*)	X	X	X	X	X	X		X		
Slender Wheatgrass (*Elymus trachycaulus*)	X			X	X	X		X	X	X
California Fescue (*Festuca californica*)		X		X		X	X			

Item	Benson Farms	L&H Seeds	Western Reclamation	Rainier Seed	Clear-water Seed	Oregon Wholesale Seed	E & S Restoration	Southwest Seed	Hedgerow Farms	S & S Seeds
					Location					
	WA	WA	WA	WA	WA	OR	OR	CO	CA	CA
Idaho Fescue (*Festuca idahoensis - eastside***) or Roemer's Fescue (***Festuca idahoensis* ssp. *roemeri***)**	X			X	X		X		X	
Western Fescue (*Festuca occidentalis***)**	X			X		X	X			X
Fowl Manna Grass (*Glyceria elata***)**	X	X		X		X				
Needle & Threadgrass (*Hesperostipa comata***)**	X			X		X				
Meadow Barley (*Hordeum brachyantherum***)**		X			X	X			X	X
Junegrass (*Koeleria macrantha***)**	X			X				X		
Great Basin Wildrye (*Leymus cinereus***)**	X				X			X		
Harford's Melic (*Melica harfordii***)**		X				X				
Bush Muhly (*Muhlenbergia porteri***)**								X		
Purple Needle Grass (*Nasella pulchra***)**		X							X	X
Western Wheatgrass (*Pascopyrum smithii***)**	X	X		X		X		X		
Janes' Calleta (*Pleuraphis jamesii***)**								X		
Tobosagrass (*Pleuraphis mutica***)**										
Big Bluegrass (*Poa ampla***)**	X			X	X					
Cusick's Bluregras (*Poa cuscikii***)**		X		X	X					
Mutton Grass (*Poa fendleriana***)**		X						X		
Sandberg's Bluegrass (*Poa secunda***)**	X		X	X	X			X		X
Bluebunch Wheatgrass (*Pseudoroegneria spicata***)**				X	X	X		X		
Alkalai Sacaton (*Sporobolus airoides***)**		X								
Sand Dropseed (*Sporobolus cryptandrus***)**		X		X				X		