



Section 2

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Based on the recommendations of the 2002 report prepared by Monsen, a more specific work plan was prepared that outlined the specific areas of research and activities related to the development of native plants for the Uncompahgre Plateau. The 2002 plan was eventually modified in 2004, (Appendix 2). This document outlines specific areas of work required to select, evaluate and complete rearing of field culture studies to grow seed of individual species required for restoration projects. In addition, it identifies studies required to extend planting trials to wildland sites for comparative evaluations and establishment of restoration projects to evaluate the success and response of planting a contingent of native species. Research and plant advancement activities during the period from 2002 to the present have followed the different areas of work identified in this plan. To date, research and development activities have been focused on three general areas:

1. Locating and collecting seed of the individual species proposed for development.
2. Establishing research plantings to investigate plant biology and seed rearing or field culture practices.
3. Establishing Seed Increase and Foundation Fields to produce seed for expanded plantings and commercial seed production.

Location and Collection of Native Seed

The most apparent area of work that required initial attention has been the location and collection of seed from the large number of species proposed for development. Seed collection by program personnel began in 2002 and has continued through 2005. This work has primarily been supported by funds received from the BLM Native Plant Program. Seed collections have primarily been located on the Uncompahgre Plateau and surrounding areas. Seed collections of perennial grasses were also made in 2004 from areas in the Intermountain Region for comparative studies. Cooperative agreements were formulated with Utah Division of Wildlife in 2004 – 2005 to extend seed collections and species for development to include areas from the Colorado River drainage that extended into Utah (Section 8, Appendix 5). Funding and support was also provided by Utah BLM in 2004 and 2005 to expand seed collections and species for study for similar areas in Utah. Funding was provided by the USDA Forest Service in 2004 to investigate and develop plants for portions of the Colorado Plateau that occurred in Regions 2 and Regions 4, Forest Service (Section 8, Appendix 5).

Life History and Cultivation Studies

A primary concern in development of a number of species is the lack of information related to seed production and plant culture. Many species proposed for development have not been grown in cultivation and, therefore, practices related to cultivation, irrigation, fertilization, pollination, and seed harvesting are not well known. In addition, the biology and related vegetative growth features, flower habitats, seed development of a number of species are not available. Consequently, as seeds have become available,

a series of Life History Studies have been established each year from 2003 – 2006 to evaluate and document plant growth. Nursery plantings and studies have been established in cooperation with Colorado State University, Rogers Mesa Center (Section 7B); Upper Colorado Plant Center, Meeker, CO (Section 7C); Utah Division Wildlife Resources (Section 6A); and Brigham Young University (Section 7A). Comparative Life History Studies and Cultivation Studies have been established at Rogers Mesa and Utah DWR centers (Fountain Green and Snow Field Station) of several species. Replicated plantings have been established at both locations. A formal agreement was developed with Brigham Young University in 2003 to investigate the growth and seed production of four different perennial herbs to evaluate a series of treatments including different amounts of irrigation and different row spacings.

Species Propagation

Beginning in 2003, a series of Seed Increase and Foundation Fields have been established at project-managed locations, with cooperating agencies, and private growers. New fields have been established each year as seed has become available to plant large acreages. Since 2003, approximately 25 species have been planted in Seed Increase or Foundation Fields at multiple locations. Through cooperation with Colorado State University, Rogers Mesa, a program has been developed to locate, train, and assist private growers in the establishment of seed production fields of some new species.

In addition to the establishment of cultivated fields required to produce seed of different species, some wildland stands of shrubs can be managed to produce seed for restoration. Existing stands of certain species can be manipulated to produce more constant and better quality crops. In addition, re-establishment of stands of certain species from areas they once existed is also a means to provide seed collection sites of specific site adapted populations. Studies were initiated in 2003 to evaluate the response of mountain mahogany and Saskatoon serviceberry to selective pruning rates and a reduction of competition.

Research Studies

Throughout the period from 2003 to 2005 seed collections were obtained of 13 native perennial grass species from the Colorado region. Seeds were collected from sites that represent the general range of conditions of each species. In addition, seeds from each species were obtained from representative locations throughout the Intermountain region. Seeds were acquired from field collections by project scientists, exchange with other scientists, and seed repositories. Transplants from the individual accessions were grown and field planted at four representative sites in Colorado and Utah to evaluate both phenological and morphological growth responses. The studies will be used to assist in determining the ecotypic and genetic differences that may occur among regional collections, including materials from the Colorado Plateau. Similar collections of representative broadleaf herbs have also been obtained from the Colorado area and will be matched and planted with materials from adjacent regions in subsequent years.

Different subspecies of big sagebrush (*Artemisia tridentate*) occupy extensive areas throughout the Colorado Plateau and many sites require restoration to restore the shrub component. Big sagebrush populations from this region exhibit quite different and important features that likely contribute to survival and areas of occurrence. Hybrid populations likely exist and may be better suited to specific sites than the parents. Developing and providing a reliable seed source of specific site adapted populations is obviously essential. Studies were conducted to identify the specific subspecies of sagebrush, including black sagebrush *Artemisia nova*, that occur in the region and map the distribution and areas of occurrence of each taxa.

Studies have been conducted to determine the areas of occurrence, distribution, and ecotypic populations of cheatgrass that also occur throughout the Uncompahgre Plateau. Studies were also completed that evaluated the long-term affects of chaining and seeding to restore native understory within the pinyon-juniper woodlands (Monsen, et al, 2005).