

View Point

Commercial Wildland Harvested Seed and the Utah Connection



By Ronald M. Stevenson

On The Ground

- The need for large-scale disturbed land rehabilitation in the west is well known but is recently receiving new attention.
- Seeding appropriate species, varieties, and ecotypes is often needed to succeed in rehabilitation of these degraded landscapes.
- Key people, organizations, and early and continuing research in Utah have been very influential in providing valuable information for degraded land rehabilitation.
- Seed from the key species and ecotypes provided by wildland seed harvests are a very important part of successful land restoration. The wildland seed industry developed in Utah and dominates the supply of wildland seed in western land restoration.

Keywords: land rehabilitation, wildland seed, seed suppliers.

Rangelands 38(5):273–277

doi: 10.1016/j.rala.2016.08.006

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Since the Mormon settlers came to Utahⁱ in 1847, human influence on Utah's land has increased over the years. Some human influences or activities have altered and degraded the natural landscapes. The most common causes of degraded landscapes include increased wildfire occurrence with associated noxious and invasive weed invasion, mineral and energy development, over-grazing, and road construction, to name a few. As a result, millions of acres in Utah and other western states are degraded to some degree, often significantly so, and are providing few if any of the multiple benefits of which productive well-functioning ecosystems are capable. New

activities or occurrences add additional acres each year of degraded landscapes. Seeding appropriate species, varieties, and ecotypes is often needed for successful rehabilitation of these degraded landscapes.

The restoration or rehabilitation of these western lands is a current hot topic, as emphasized by the recent Secretarial Order No. 3336; Rangeland Fire Prevention, Management and Restoration, 5 January 2015; The National Seed Strategy for Rehabilitation and Restoration 2015–2020; the Interagency Program to Supply and Manage Native Plant Materials for Restoration and Rehabilitation; the greater sage-grouse issue and others. Beyond discussions and plans, actual important land rehabilitation projects are underway but are limited by less than adequate funding.

What is Wildland-Collected Native Seed?

Most people know little of the interesting and important wildland seed industry. In two presentations I gave at the 2013 National Native Seed Conference, I provided a significant amount of information concerning the wildland seed industry. In this article I summarize the highlights.

What is Native Wildland Seed Harvesting?

Simply defined, wildland seed harvesting is the collection of seed produced by a native plants or populations of plants from a noncultivated field setting. It usually occurs in a remote wildland area but may be next to a road or a populated area. Approximately 50% of commercial wildland seed currently being harvested comes from various federal and state lands and 50% from private land. Wildland seed is almost always collected by hand methods because of regulatory or physical constraints, but in some cases mechanical harvesting is utilized.

Commercial wildland seed collection usually involves larger scale seed harvests for planting directly onto rehabilitation projects, not the small amount of 10,000 to 20,000 individual seeds normally collected for research or plant germplasm preservation. Depending on the species, yearly demand, yearly production, and other factors, commercial wildland seed collection can involve a relatively small amount for a species like Indian paintbrush to over 1,000,000 lbs per year for a species like big sagebrush. An estimate for the average yearly total amount of native wildland seed collected over the last 5

ⁱ The 70th Annual Society for Range Management Annual Meeting will be held in St. George, Utah 29 January–2 February 2017. This article highlights Utah range science and management. For more information on SRM Red Rock & Rangelands 2017, see <http://rangelands.org/srm17/>.

years would be 1,250,000 to 1,750,000 lbs per year, but the actual amount can vary significantly each year.ⁱⁱ Most large-scale harvests are for shrub species seed, but a number of forb species and some grass species are also collected. Any native species that is desired can be collected, but on a normal year an estimated 200 or more different species are collected for commercial use and many are collected from multiple locations. The number of different species collected on a regular basis is also increasing.

Seed Is Cheap

That commercial wildland seed is always expensive is a common belief and sometimes is true just because what is involved in obtaining it (i.e., usually hard labor, unfavorable seed production, limitations on when and where seed can be harvested, and other limiting and costly factors). However, especially if analyzing the cost of the seed on a per seed basis, many species are not expensive and a number are a great bargain. For example, the Wyoming big sagebrush subspecies is the most highly seeded shrub species. At an estimated average cost for the last 5 years of \$75.00/lb of pure live seed (PLS) it sounds very expensive for a pound of seed. But considering that 1 lb of PLS of Wyoming big sagebrush has approximately 1,750,000 individual seeds per pound, it takes on a new perspective. The cost per individual PLS seed is 0.0043 cents. This means that one penny can buy 233 individual PLS seeds. An impressive 233 potential new sagebrush plants on a degraded landscape for a penny of investment in seed sounds like a bargain to me. Not all species are this cheap, but if one considers the large number of seeds in a pound, many are really a bargain.

Wildland Harvested Seed Only Makes up a Small Portion

There is a common belief that the amount of native wildland harvested seed used for degraded land rehabilitation or restoration is very small and insignificant in comparison to the amount of field-produced seed used. This is very incorrect. At the 2013 National Native Seed Conference, I gave a presentation in which I analyzed the seed used on four typical rehabilitation projects: the 2012 total Western States Bureau of Land Management (BLM) use; a Colorado coal mine use; a Nevada windmill farm use; and an underground 675-mile natural gas line right of way restoration seed use. Five interesting facts found in this analysis are as followsⁱⁱⁱ:

ⁱⁱ Analysis and estimates by author based on public information of seed use by major government entities (Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service, State Wildlife agencies, and other Federal and State government entities; multiple, various sources) and personal knowledge of nonpublished seed use from active participation in the business.

ⁱⁱⁱ Information compiled and analyzed by the author and presented at the 2013 National Native Seed conference in Santa Fe, New Mexico. Calendar year 2012 BLM seed procurement information obtained from Ronald Smith, Boise, Idaho, BLM National Seed Warehouse Seed procurement specialist and private, unpublished seed use of three private business projects.

1. A total of 4,529,863 lbs of seed (both native and nonnative) was requested for these four typical projects (lack of funding reduced the actual amount planted by the BLM, but the seed was needed).
2. Of the total pounds, 73% are native and of the native species, 39% are available almost exclusively through wildland seed collections.
3. Of the total 115 different species used, 59 are wildland harvested, which is 51%.
4. On the Nevada windmill site, 82% of the pounds of seed used were from wildland-harvested seed.
5. Of the total pounds (both native and nonnative), 1,306,582 lbs were native wildland collected, which is 39%.

A presentation given by Paul Krabacher, former BLM national seed coordinator, showed that his data indicated that between 2009 and 2013, 33% of the total seed that the BLM used in their land rehabilitation programs comes from wildland harvested seed.¹

From these examples it is easy to see that the total pounds of seed currently used are a significant percent of the total usage in degraded land restoration, making it an important contributor. When including the increased number of important species and ecotypes from wildland collecting for rehabilitation, it is doubly important.

The Utah Connection

Key people, organizations, and research in Utah both early and ongoing have provided very important specific methods, equipment, materials, and guidelines for successful western lands rehabilitation or restoration. Beginning in 1912 with the establishment of the Utah Experiment Station, later renamed the Great Basin Research Station/Center in 1918, well-known scientists and station directors such as Dr Arthur Sampson, often referred to in world literature as “the father of range management,” and later A. Parry Plummer and others recognized the need for research and were very influential in establishing valuable information on how best to accomplish degraded land rehabilitation and other research.

A. Parry Plummer, the greatly respected and productive range and land restoration U.S. Forest Service (USFS) scientist from 1936 to 1979, has been credited as making a statement similar to this: *I spent the first half of my career learning how best to get rid of sagebrush and the second half of my career learning the best way how to re-establish sagebrush.* Although humorous, this is a very insightful statement showing one aspect of the evolution of range management and land restoration over the years. A. Parry Plummer’s 1968 publication “Restoring Big Game Range in Utah”² was known as “the bible” of range restoration in the interior west for three decades,³ a great tribute to his significant contribution to western land rehabilitation. Other important research sites and facilities located in Utah include the USFS Shrub Science Lab in Provo, Utah, constructed in 1975. Dr Durrant McArthur, project leader for this shrub research unit

for many years, was another very influential Utah research scientist. Many others (too many to name) have worked in Utah at the various facilities and have also provided valuable contributions. I was fortunate to learn from and get to know both Mr Plummer and Dr McArthur as I worked for them as a seasonal technician from 1970 to 1974. This experience helped me develop my passion for native plants, seed, and degraded land rehabilitation and dedication to work and learning.

Ownership of the original Great Basin Research Station located in the mountains at 8,900 ft was transferred to Snow College in 1992. Now called the “Great Basin Environmental Education Center” it has a different mission of providing a setting for learning about nature. In 2004, a new facility designated as the “Great Basin Research Center and Seed Warehouse” was constructed in Ephraim, Utah, to modernize and increase capacities. This facility is owned and operated by the Utah Division of Wildlife Resource and continues the traditions of land rehabilitation research and provides a conduit for the funding, technical information, equipment, and seed for actual land improvement or rehabilitation. This organization rehabilitates an impressive approximately 100,000 acres each year of degraded land in Utah under the Utah Watershed Restoration Initiative. They also work closely with the USFS Rocky Mountain Research Station Shrub Lab in Provo, Utah, and others, continuing over 50 years of a productive, cooperative relationship between the Utah Division of Wildlife Resources and the USFS Experiment Station and other research organizations.

Development of the Wildland Harvested Seed Industry

Seed for land rehabilitation or restoration comes almost exclusively from private industry with the exception of some mostly small, specialized projects. There are two sources of this seed: cultivated fields planted specifically for seed production and wildland seed harvests in which seed is harvested from populations of native plants growing in the wild in nonagricultural settings.

Probably beginning slowly in the 1950s and 1960s and then accelerating and continuing today is a more prevalent recognition of the fact that most often, “good” land rehabilitation/restoration involves more than just establishing grass species to provide cover for erosion control and forage. Good land rehabilitation/restoration of degraded lands, depending on funding and goals, involves the planting of a mix of grass, forb/legume, and shrub seed. All three of these vegetative types are usually needed to maximize the potential productive uses of western wildlands and rangelands. In my experience, selecting genetically and ecologically appropriate species, varieties, and ecotypes are important to achieve sustained, successful land restoration.

Wildland harvested seed is needed because a number of key species seed, especially shrubs, some native forbs, and a few grass species, have not been, and will likely not be in the near future, successfully produced economically or agronomically in

agronomic seed production fields. In contrast, many of these desirable species not being produced agronomically can be, and are, made available through wildland seed harvesting, often very reasonably priced. Big sagebrush (*Artemisia tridentata*) and especially the subspecies Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) is a good example. This species/subspecies seed can be successfully obtained by wildland seed harvests in an amount of over 1 million or more pounds of clean seed per year with many source origins available to provide genetic and environmental compatibility of the seed source with the planting site(s).

Utah-Based Seed Companies Dominance of Wildland Seed Supply

Currently there are 12 Utah-based seed companies varying in size, experience, and capabilities that regularly sell native wildland harvested seed. For the majority, these wildland seed products are a major part of their business. Even though these seed companies are all based in Utah, a number of them obtain wildland harvested seed from up to 20 western states from many different specific locations so the environmental and genetic requirements for excellent quality sustained restoration is possible. These 12 Utah-based seed companies supply the vast majority (in total pounds) of the seed that is wildland collected and used for a variety of land restoration or rehabilitation projects throughout the majority of western United States, excluding the west coast area.^{iv}

An example of Utah-based seed dealers’ dominance in supplying native wildland harvested seed for rehabilitation of degraded lands in western states comes from a 2015 BLM seed purchase example.^v The BLM is the largest single user of wildland harvested seed in the western United States. The total amount used by the BLM can vary significantly year to year because of wildfire rehabilitation needs, but the major species used and major seed vendors remain about the same.

For the 2015 calendar year, 97% of the wildland harvested seed purchased on the consolidated (large) BLM seed buys came from Utah-based seed companies.^{vi} Only 3% came from all other states combined seed dealers.

A significant amount of wildland-harvested seed is used by private entities, but no published information exists to give exact percentages like with the BLM. However, being very active in the private land market use, I feel confident that the percentage supplied by Utah Seed dealers is very high, though not as high as with the BLM. It is also important to note that

^{iv} Personal evaluation by the author based on published public information from multiple sources as available and from creditable author’s estimates based on very active participation in the native restoration seed market, both public and private entity use.

^v Published results of the three consolidated BLM seed buys for calendar year 2015. Public information available from Ronald Smith, BLM National Seed Warehouse procurement specialist, Boise, Idaho.

^{vi} Author’s analysis of the seed purchased by the Boise BLM National Seed warehouse, BLM seed buys for 2015. Information provided by Ronald Smith, Boise BLM National Seed Warehouse procurement specialist.

Utah seed dealers wholesale a considerable amount of seed to out-of-state seed dealers who then supply their customers.

Why Is Utah the Core of the Wildland Seed Industry?

Utah-based seed companies' dominance in the western United States wildland seed supply can be attributed to a number of factors:

1. Most importantly, the previously mentioned Great Basin Research Station's Utah location, research, and related influence.
2. The Utah Division of Wildlife Resources (formerly Utah Fish and Game Department), which was one of the first organizations—and perhaps the very first—to purchase any significant quantity of seed from the species produced by wildland harvesting for its ongoing Wildlife/Big Game habitat restoration projects in Utah, beginning in the 1950s and 1960s. Four of the oldest and most established wildland harvested seed producing companies have had founders or owners who worked for or had a close relationship with the Great Basin Research Station and the Utah Division of Wildlife Resources in Ephraim, Utah. For these individuals and organizations, this relationship has existed for over 40 years. This includes myself, as I worked as a technician there for five summers while attending Snow College and Utah State University, and for 45 years I have continued a good working relationship with these organizations.
3. Utah's diverse landscapes and subsequent plant species available for seed collection.
4. The species specific, correct seed collection methods, processing/cleaning procedures, and associated factors for commercial market-scale wildland seed production developed by the early Utah pioneer seed companies.
5. The Utah Crop Improvement Association with long-time manager Dr Stan Young and associate Wayne Anderson. In 1994, Stan Young developed the standards, protocols, and requirements to implement a class of certified seed called the Source Identified class. The Association of Official Seed Certification Agencies soon after adopted this class of certified seed. This certified class of seed recognizes that knowing and verifying the source of wildland seed is very important, enabling environmental and genetic factors to be used to select the best match of seed source to the planting site. The Utah wildland seed dealers readily accepted the program and have supported and used it extensively, to the benefit of improved land rehabilitation throughout the west.
6. The Utah BLM State Office, which in 2008 was the first state BLM office to approve and implement a specific well-defined statewide policy (No. UT2008-045) with rules and guidelines for issuing permits on BLM land for wildland seed collecting. Although seed

collecting was allowed previously, this was a major accomplishment as it showed that BLM managers recognized the importance of wildland-collected seed and that seed collecting could be done in harmony with other land uses. With the Utah state BLM policy as a good working model, not long after a similar National BLM Wildland Seed Collection Policy was approved and implemented.

The USFS, the second largest federal landowner in the west, has no national or regional policy. Therefore, each ranger district has its own policy, which unfortunately creates many problems. For various reasons, most USFS districts do not allow wildland seed harvesting or have rules or policies too strict to feasibly follow. This situation continues to limit the availability of greatly needed seed for disturbed land restoration.

Who Harvests Wildland Seed?

In my 45 years of experience with wildland seed collecting, I have seen the enjoyment and especially the needed income benefit the lives of many. Almost anyone can collect wildland seed if they do their homework so they do things right. Over the years, I have seen many people from all walks of life—high school and college students, school teachers, law enforcement officers, everyday men and women with almost every occupation imaginable—all with self-motivation and a hard work ethic, find a source of extra income to pay bills, have an outdoor experience, or make some extra money for Christmas. I personally collected seed to help me through my college and university education, as others have. Most of these individuals collect seed part time as opportunities arise, but some collect seed as a full-time occupation—if they are willing to travel, they can actually do so at least 9 to 10 months out of the year. Recently, larger, organized crews do a lot of the wildland seed harvesting, but many opportunities still exist for individuals.

Work While Enjoying Mother Nature and Get Paid for It!

Commercial wildland seed collecting sounds like an enjoyable, easy, live in harmony with Mother Nature job, but it is usually not. The overriding fact is that you get paid for the amount you harvest, not the number of hours you spend in the wild. This means you must be able to work hard, locate good seed producing populations of plants, do your homework, and get lucky to earn reasonable money.

Mother Nature is not always enjoyable. Seed collectors must tolerate heat and cold; rain, wind, and snow depending on the season; biting insects; snakes; itchy seed; primitive camping facilities; and competition from sheep, cows, wildlife, and other seed collectors. A typical story from an experienced seed collector would include a multitude of frustrating experiences. One such common example would be, "We had 3 days' worth of seed laid out on a tarp to dry, and a big wind came and blew the tarp and seed into the next county." I have personally been there and done that. Another experience: "I

had a full hopper (seed collection container) of seed and I nearly stepped on a rattlesnake, so I threw the hopper and seed in the air, losing it all, and ran." Many of the stories are humorous, some are frustrating, and some are quite sad.

After the seed is field harvested it often must be dried. Commercial seed dealers then process or clean it to industry or customer specifications. The seed is then sampled and sent to a registered seed laboratory for testing. The seed is tested for purity, germination, weeds, other crops present, and other factors. If the lot of seed meets all the state and federal laws and customer specifications, it can then be sold.

Challenges

Currently the wildland seed industry faces some important challenges and opportunities. There is a significantly increasing awareness of the need to be doing more and a better job of disturbed land rehabilitation or restoration. The funding is not nearly adequate but increasing. This assures the continued need for wildland seed.

Some of the factors that challenge wildland seed dealers include the following:

1. Demand for wildland collected seed varies greatly each year, which greatly influences the supply available and prices. This important unknown creates a huge business challenge. How much seed of each species is needed and from what ecological or geographical location should it be obtained? Obviously it is not possible, physically or economically, to get it "all" and have it "all" just in case it might be needed. This means "best guesses" are used, and they are not always correct.
2. Significant new research may require new ways of doing things that may well be challenging. This is a great unknown factor currently on everyone's mind.
3. Obtaining authorization from both government land managers and private property owners to allow wildland seed harvesting may be difficult. This is and will

continue to be a challenge but with increased awareness of its importance, I believe it will improve.

4. Lack of good communication and cooperation between researchers, land managers, and private industry result in challenges.
5. Inadequate and always changing budgets for degraded land restoration or rehabilitation has always been a challenge and will likely continue to be. However, I am hopeful that more dollars will be allocated to this important work.

What Does the Future Look Like?

Despite the challenges and frustrations of the wildland seed industry, those of us in the business love our jobs. Working with Mother Nature to help rehabilitate or restore degraded landscapes is rewarding. Western landscapes are diverse, fantastic, and a great place to spend time, even if you are working. Most of us in the wildland seed business are eternal optimists. If things are bad they will get better. If things are good they will still get better. With an attitude like that, the future looks bright.

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