Howard F. Schwartz, Colorado State University, Bugwood.org

# SEED SOURCE MATTERS WHEN

*By Kristina Hufford*

After buying your new rural home, you are now contemplating a large bare area of disturbed soil. A site visit by folks from your local UW Extension or conservation district office leads you to decide you'd like to reseed the area to get it back to a more natural state. Now you wonder, what should I seed? A further question, which you may not initially consider, is where will that seed come from?

You wouldn't be the only one asking those questions. Over the past few decades, federal and state agencies have shifted revegetation policies from the use of non-native plant species to favor planting native grasses, forbs, and shrubs in areas needing reclamation.

This shift represents an understanding that native – or indigenous – plant species promote native pollinators, help create high-quality wildlife habitat, and are more likely to survive and thrive in local environments.

## Reclamation Can Be Challenging

Whatever your choice of plants, reseeding arid landscapes in the western United States is often challenging, and reclamation failures are not uncommon. Some risks are inevitable when seed germination is dependent on unpredictable seasonal temperature and moisture in the form of snow and rainfall.

Despite these inherent limitations, scientists and reclamation professionals are working to improve reclamation success. To this end, they are studying the effects of the geographic origin of seeds for each plant species and how the distance at which those seeds are collected affects the success of revegetation projects.

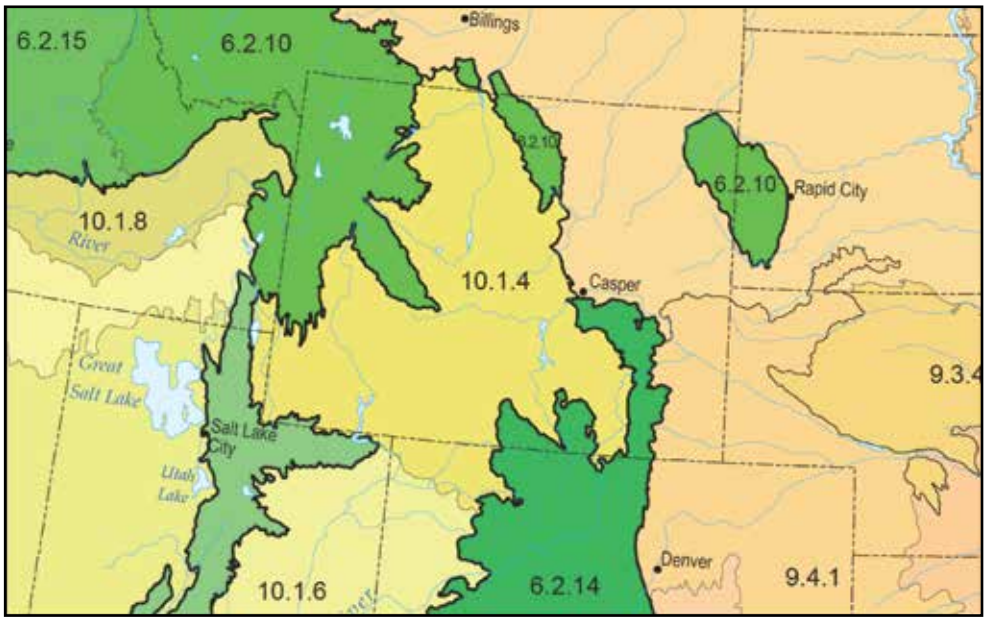
Common plant species often grow across a wide geographic range. Populations of each plant species within that range grow in a variety of environmental conditions, such as different cold hardiness zones, and are in contact with diverse soil types and plant and animal communities. As a result, those individual populations within a species are often adapted to local environmental conditions (including temperature, soils, rainfall patterns, levels of disease resistance, etc.).

## Local Adaptation can Improve Success

Genetic differences in germination requirements, growth forms (tall or short, large or small), and flowering time are common among populations that grow along elevational and latitudinal (north-south) gradients. It is because of this local adaptation that the source of seeds selected for planting may affect revegetation success. For example, in Wyoming, plants often need to be adapted to cold winters, low levels of precipitation, and nutrient-poor, saline or alkaline soils.

Foresters first noticed that individuals of the same tree species, when replanted after harvest, had different success rates (in survival and reproduction) depending on the site of origin of the seeds. If seeds originated within the same region and elevation, those saplings were more

# RECLAIMING LAND WITH NATIVE SEED




*Level III Ecoregions (areas defined by similar climate, soils, and vegetation) for Wyoming might be useful as approximate seed transfer zones. There are four level III ecoregions that define landscapes in Wyoming. Seeds planted in these areas are more likely to survive and grow if they were originally derived from similar environments.*

likely to survive not only the average climate conditions for that site, but also the uncommon extremes in temperature or rainfall.

In contrast, if seeds were collected from long distances and/or very different environments, some plantations were wiped out when disease, a rare cold snap, or seasonal drought affected the planting site.

In response to these discoveries, most commercial forest tree species are now sourced within established planting or "seed transfer" zones. Seed zones represent regions within which we can expect the transferred seeds to germinate and grow with greater rates of success.

Seed zones are established for many tree species, but very few zones are defined for native grasses, forbs, and shrubs. Research is underway to improve our knowledge of the geographic and environmental distances (also called "habitat matching") that correspond to seed zones for common reclamation species. Most likely, some species will have wide transfer zones, while others will be very limited to the land area in which those seeds can be moved and planted successfully.

## What Should You Keep in Mind?

The availability of commercial seeds of many native species can vary widely. This is both the result of the demand for those seeds (which can increase dramatically, along with cost of the seed, in heavy wildfire years), and the ability of the seed industry to effectively harvest seeds and offer them for sale. Whatever your options, considering the site of origin of seeds available for purchase is useful.

The Plant Materials Centers of the Natural Resources Conservation Service have documented the site of origin of many cultivated native plant species grown by seed producers. While the geographic site of origin is not always the best predictor for adaptation, it is a reasonable measure by which to determine the seed source more likely suited for your site. Plants that were first collected in New Mexico, for example, are likely to represent different adapted traits than plants that were originally collected in South Dakota regardless of where they were later grown for commercial seed production. Some seed companies now offer wild-collected seeds from Wyoming, and these seed sources are usually well-suited to the local and regional environmental conditions near their collection sites. These seeds may be more costly than cultivated seeds of the same species because of the labor needed for their

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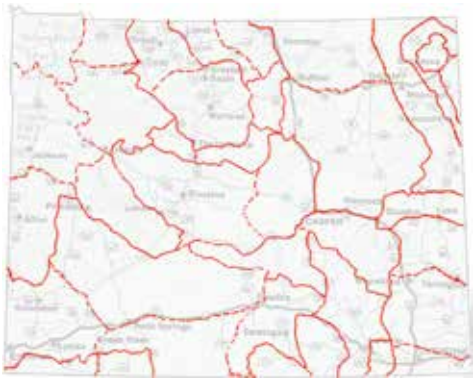
*Cultivars are often derived from few seed sources. Of the four common cultivars of blue grama offered for sale within a large area of recommended planting, three have origins in New Mexico and one is originally from South Dakota. Considering precipitation and elevation differences between the two states, which cultivar would be best for Wyoming? That's an important question in reclamation seed sourcing.*



*Provisional seed zones for forest trees in Wyoming. Seed zone boundaries are defined by superimposing climate data (dotted lines) on land resource regions (solid lines).*

*(Modified from U.S. Forest Service map R2-2470 -15b)*

collection, but might also result in higher rates of establishment at your site and make them a more economical choice.

If your planned reclamation project is small, you may be able to collect seed locally. There may be opportunities to collect wild seeds on your land or to collect wild seeds on nearby public lands for use in revegetation. If local seed collections are feasible, keep in mind several requirements.

- If the plants do not grow on your land, you'll need permission to make collections. Permission may be obtained from federal and state land agencies and private landowners.
- Locate sites where 100 or more plants of the species you are interested in collecting occur. This number of plants will support small collection activities without negatively affecting the source populations, either by reducing the total number of seeds for the next generation or by reducing the genetic diversity at that site.
- Be sure to correctly identify the plants and make certain that weeds (such as cheatgrass) are not collected along with the desired plant seed.
- An understanding of the site and seasonal climate conditions will be important for successful collections. You must collect seeds when they are ripe but before the seeds fall to the ground or blow away in the wind. Seeds should be collected from multiple plants across the collection site to represent a range of genetic diversity (and therefore adaptation) of plants at that site.
- Lastly, seeds should be stored in paper or cloth bags in a cool, dry environment prior to cleaning and planting. This will prevent rotting and maintain seed quality.

If desired, the Wyoming Seed Testing Laboratory in Powell can determine the germination rate of collected seeds, and those facilities might also clean the collections to remove debris. While local seed collections represent additional steps for reclamation, they are suited to local site conditions and provide an important resource when desired species are not available via commercial production.

In all cases, local extension educators as well as the folks at nearby weed and pest and conservation districts can provide guidance as to which species are native to the area and available for either collection or sale for use in reclamation.

Some taxa (groups of related plant species) are very similar in appearance and yet have very different growth patterns. With guidance to identify the plants native to your site, you can avoid surprises and select appropriate native species and adapted seed sources for your area.

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