



# COLORADO STATE PARKS STEWARDSHIP PRESCRIPTION



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Author: Rita Berberian  
Parks Affected: All

## Native Plant Revegetation



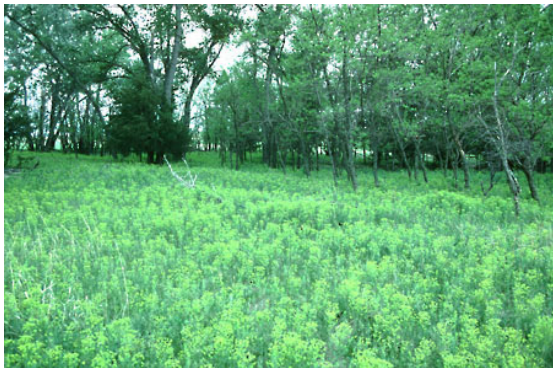
*Adapted in part from CNAP Native Plant Revegetation Guide for Colorado*

### INTENT

To provide park managers with the guidance necessary for successful completion of a revegetation project in accordance with Department of Natural Resources, Division of Parks and Outdoor Recreation Administrative Directive B-302, *Use of Native Vegetation in State Parks and Recreation Areas*.

### ISSUE

Natural or man-made disturbances can create areas where the natural vegetative cover is degraded or eliminated entirely. These bare areas are subject to soil erosion and invasion by noxious weeds.



Noxious weeds like leafy spurge may invade disturbed areas and harm the environment in many different ways. Once established, leafy spurge can spread into undisturbed areas.

Photo from University of Nebraska-Lincoln Cooperative Extension

Establishment of noxious weeds can further increase soil erosion, decrease wildlife habitat, reduce the quality of recreational activities, and threaten the survival of sensitive plant and animal species. ***Proactive revegetation of disturbed sites should therefore be a consideration in all development projects.***

Natural revegetation of bare areas generally does occur, even in the absence of human assistance, because of viable seed already present in soil or due to seed transported to a site via wind or water. In weedy areas, however, the seed bank may be composed primarily of

undesirable species, including noxious weeds well adapted to disturbed sites. Thus, *the decision to allow natural revegetation should be considered only for pristine areas with little or no weed infestation, where there is no imminent threat of soil erosion, and where non-native weeds that do appear can be effectively monitored and controlled.* ***Because of the heavy use they receive, their relatively small size, and the common presence of noxious weeds, proactive revegetation is generally the most suitable approach in state parks and recreation areas.***

## Native Plant Revegetation in State Parks

According to Colorado State Parks Administrative Directive No. B-302, Use of Native Vegetation in State Parks and Recreation Areas (Appendix 1),

**“The Division's primary goals are to use vegetation native to Colorado for park landscaping, reclamation and restoration projects, when appropriate; to protect, maintain, restore or enhance the full complement of Colorado's native ecosystems occurring within state parks and recreation areas; and, to limit the use of non-native vegetation in state parks.”**

Colorado State Parks defines ‘native vegetation’ as those plants and plant communities known to occur in Colorado prior to European settlement beginning in 1840. Plants not known in Colorado prior to 1840 are called non-native, or exotic species. *Noxious weeds typically are very aggressive exotic species.*

***This prescription does not apply to areas with turf grass species or other “hardened” amenities.*** Non-native turf grass or other vegetation tolerant to foot traffic may be desirable in high-use areas in specific parks. In general, however, native plant species should be used in landscaping and for revegetation projects whenever possible. ***Invasive species (even those not on noxious weed lists) should not be used.*** The common pasture grass, smooth brome, for example, can be highly invasive and may decrease plant diversity in intact habitats. Its use is therefore discouraged.

***Whenever feasible (and when relevant), native plant material used for revegetation projects should be collected on site.*** When this is impossible or economically unfeasible, then selected plant material should come from a source as close to the revegetation site as possible. Local species are genetically adapted to a site and consequently are typically better equipped for local conditions. The consequences of not planting with the appropriate seed source can include poor survival and poor growth, increased susceptibility to insect and disease problems and long-term contamination of native gene pools (Mahalovich 1999).

Concerns about maintaining the genetic integrity of the local vegetation in the park prompted Rocky Mountain National Park to implement and enforce a policy prohibiting the use of nursery grown stock or seed not collected in the park unless approved. In state parks where the vegetation consists primarily of relatively intact plant communities, locally adapted material should be used whenever possible. In parks with greater disturbance and where non-native vegetation has largely replaced the native flora, there may not be native plant material sources on site, but there might be sources nearby.

Colorado columbine



Photo courtesy of Gerald and Buff Corsi, California Academy of Sciences

## GUIDELINES FOR REVEGETATION PROJECTS

**PLAN AHEAD!  
PLAN AHEAD!  
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### 1. Keep in mind the goals of pre-development and revegetation planning:

- to ensure that existing native communities are minimally disturbed
- to control erosion
- to conserve native plant materials through salvage where practical
- to use revegetation techniques that re-establish appropriate, functioning native plant communities that meet land use and regulatory objectives
- to identify rare and sensitive plants and plant communities and consider strategies for their conservation
- to identify and address concerns with existing populations of problem plant species
- to have sufficient appropriate materials available

### 2. Budget

Before engaging in any activity that disturbs soil, make sure there is a revegetation budget. Weeds won't wait for you to revegetate. Save the time and expense of later needing to control weeds AND revegetate by ensuring that **any project budget includes funds and a plan for immediate revegetation**. If such funds are not immediately available, postpone the project until they are available.

### 3. Plan for salvage of existing native plant materials and topsoil

This should be considered in the planning stages prior to disturbance and **should be considered only in intact areas dominated by native plant species** and not areas dominated by weeds. **Examples of materials that can be salvaged from a site and replaced** to enhance native revegetation of a disturbed site include:

- Seeds, cuttings, etc.
- Native sod
- Native hay at the seed stage
- Topsoil (housing microbes and plant propagules)

### **Plant salvage considerations:**

Plant salvage provides locally adapted plant material and is free except for the labor costs involved. If plentiful volunteer labor cannot be used, then labor costs may be fairly high. If plants are kept over a season, storage and maintenance costs must be added to the labor costs for collecting plants.

- ***Plan for plant salvage in early spring or late fall.*** Salvage operations should occur when plants are dormant and replanting should occur as soon as possible to maximize plant survival. A suitable location must be found to store plants and keep them watered until they can be replanted. Expect a fairly high mortality rate—approximately 30% greater than with container grown stock.
  
- ***Some native planting stock is more easily and cheaply produced from cuttings.*** Material collected for cuttings should come from dormant donor trees/shrubs. This technique is used primarily with cottonwood, poplar, and willow propagation for riparian stabilization and restoration.
  
- ***Seed collection times vary by species*** and some collected seed will not germinate unless pre-treated. Consult the Native Plant Network at the website below for plant propagation protocols for specific plant species. This multi- agency sponsored website provides information about when to harvest seed, when to sow, and how to treat the seeds for germination:

Go to <http://nativeplants.for.uidaho.edu/>

#### **Seed collection guidelines**

Useful techniques for collecting seed:

- Cut stems as close as possible below the seed head
- Wear gloves and pull along seed heads to dislodge seed into a container
- Shake branches to dislodge seeds onto a tarp

Separate collected seed or seedheads by species, place in **paper** bags and label. Dry bags in sun for about a week (if temperature is not over 90° F), stirring every few days; or dry in a protected area indoors or outside by spreading plant material in a thin layer on tarps, screens, wood, or cardboard. Bring seed under cover on moist or cool nights and cover with screens (if necessary) to protect from wind or birds.

Clean seed by rubbing seedheads over a piece of 1/8 inch hardware cloth mounted in a wood frame. Dry again for another week in trays lined with newspaper.

Cleaned seed may be used immediately for revegetation, or it may be sent to a facility to be increased for later use. If the seed will be used in a drill seeder, further cleaning will likely be required. Many seed vendors will provide this service.

Adapted from Native Plant Revegetation Guide for Colorado

- **Evaluate the project site to determine if salvaged material will provide sufficient plant cover** to compete with weeds, retard erosion, and meet other management goals following completion of the project.
- **If sufficient plant material is not available, plant material may be purchased and/or seed may be obtained from a seed increase program (see below).** Plan ahead and do not wait until the last minute to contact native plant vendors.  
If plant material must be purchased, refer to the revegetation list attached to the park natural resource stewardship plan as an appendix. This revegetation list suggests native species suitable for use in each of the park's native plant communities. CNAP's *Native Plant Revegetation Guide for Colorado* also lists dominant species for Colorado's native plant communities.

***Make sure you will have the plant material you need when it comes time to revegetate***

#### **4. When purchasing native plant material, select appropriate species and plant size.**

In high use areas where disturbances tend to occur repeatedly, the dominant climax species found in revegetation lists may not succeed because they may be adapted to less disturbance. In such cases, consider using native species with a propensity for growing in disturbed areas in addition to the climax dominant species found in revegetation lists. Disturbance adapted native species may better compete with exotic annual weeds and will help develop a native seed bank.

Though it is tempting to try and save money by purchasing the smallest size plants available, be aware that **the smallest available plants may be less likely to survive**. A vendor may have these plants because they are growing them up to a larger, more vigorous stage, but avoid buying them. In the long run, you may save money by having increased survival rates. In addition, some vendors will not guarantee the survival of their smallest seedlings.

Contact native plant material vendors for assistance in choosing appropriate plants and/or seeds for your particular needs.

#### **Regarding the use of non-native species in revegetation:**

**The use of non-native species for revegetation purposes should typically be restricted to areas that are already dominated by non-native species.**

- Sterile non-native grass species may be added to seed mixes

- ***Invasive species should NOT be used***

***Avoid using the following species:***

- Smooth brome (*Bromus inermis*)
- Crested wheatgrass (*Agropyron cristatum or desertorum*)
- Yellow sweetclover (*Melilotus officinale*)
- Reed Canary grass (*Phalaris canariensis*)

*IF the area to be disturbed is **already** dominated by these species, they may be used. But **do not use them near intact ecosystems.***

## **5. Consider future seed needs and seed increase programs**

Often managers complain of the high cost and low availability of seed from some native plant species. While commercially grown seed often is expensive, and availability may be unreliable, it is possible to greatly increase the variety of species and amount of native seed available for use in parks by participating in **seed increase programs**. Seed increase programs involve collecting seed on site (thereby using locally adapted plant material), and then sending the seed to a facility that will grow out the plants and harvest seed from the plants specifically for the use by the original park. Several for-profit nurseries provide this service, as does the Upper Colorado Environmental Plant Center in Meeker Colorado. The Upper Colorado Environmental Plant Center is a non-profit organization run with assistance from the USDA Natural Resources Conservation Service.

Obviously, **lead time of more than a year is typically required for such programs**, but if park staff know that a project will not occur for a couple of years, there will be time to generate sufficient native seed and/or plants for revegetation purposes upon completion of the project.

## **6. Consider using both plants and seeding in revegetation projects**

The advantages of using plants include the following:

- Best means of providing instant aesthetic or erosion control
- Offers the best resiliency to environmental perturbation
- Can be planted at any time during the growing season

Plantings may be especially useful in harsher areas where seeding has previously failed, where sufficient moisture for seed germination cannot be expected and/or where weeds threaten to establish before the native seed can germinate and get established. Seeding can still be done, but interplanting with more mature plants may provide more immediate erosion control and ground cover for resisting weeds.

## 7. Successfully plant seeds and/or other plant materials

CNAP's Native Plant Revegetation Guide for Colorado provides details on most of the following components of revegetation.

Because ***every site and every situation is unique***, consult native plant material vendors, county extension agents, USDA Natural Resources Conservation Service, and Region landscape architects for specific planting/seeding information. Many of the vendors listed under contacts will also do the seeding and/or planting as required.

**If you opt to hire a contractor for your revegetation project, the contract should explicitly *require* that weed free materials be used. The contractor should be responsible for weeds not previously present in revegetated areas and they should guarantee the identity of native species they are providing**

### ✓ When seeding, choose the appropriate method

#### Primary seeding methods

- Drilling
    - Requires special equipment
    - Most successful on flatter areas
    - Leaves “rows” of plants
    - Proven high revegetation rates
  - Hydroseeding
    - Requires special equipment
    - Can reach areas inaccessible by drilling methods
    - Results are less satisfactory than with drill or broadcast methods because the seed does not make good soil to seed contact.
  - Broadcasting
    - May be used on steep slopes, rocky, or inaccessible area
    - Typically requires double or triple the seeding rate of drill seeding
    - Seedbed preparation critical before and after seeding.
    - Results in more natural distribution of plants than drilling
- ✓ **Determine whether pre-treatment of seed is necessary and the best time to seed**

Some seeds must be scarified and some must be stratified in order for germination to occur. **Scarification** is the process of cutting or softening a seed coat to hasten germination. **Stratification** uses cold temperatures to activate germination in species that must experience a cold phase.

Seed when there is:

- A period of adequate moisture for seed germination
- A period of adequate moisture for early seedling growth and establishment
- Adequate soil temperatures for seed growth

Consult the Native Plant Network <http://nativeplants.for.uidaho.edu/> and native seed vendors for specific pre-treatment and best seeding time information.

#### ✓ **Post-seeding**

Mulch immediately after seeding to protect seed and to avoid disturbing germinating seed. Commonly used **mulch types** include:

- ✓ Hay (approved native grass, weed free)
- ✓ Planted stubble mulch crops
- ✓ Hydromulch
- ✓ Bonded fiber matrix
- ✓ Erosion control mats or blankets

#### ✓ **Planting salvaged or containerized plants**

- Consult CNAP's Native Plant Revegetation Guide for Colorado for detailed information on caring for and planting cuttings
- Check transplanting stock (both salvaged and purchased) for signs of damage or disease. Do not use diseased stock!
- All temperate western plantings require **supplemental moisture** at the time of planting unless they are being transplanted into a wetland or riparian habitat.
- Dig a hole deep enough to allow roots to penetrate into the soil and wide enough so the roots will drop in at approximately their natural form.
- Place transplant quickly in to the hole to minimize drying the roots. Plant roots should not be bent or bunched up in the bottom of the hole



- Once seedling is in the hole, make sure the soil line is the same as it was when the plant was in the pot. If it was bareroot, maintain the soil just at the top of the root ball.
- Tamp down the soil firmly to avoid air pockets and irrigate the transplant.
- ✓ **Monitoring and stewardship**

Monitoring a revegetated site identifies problems that could prevent or interfere with a successful outcome of the project. Stewardship ensures that site management alleviates these problems and maintains desired site conditions.

- If a contractor provided native plant seed, evaluate the site following plant establishment to confirm that what was supposed to be planted was planted.
- Protective fencing and/or signs may discourage people from entering newly revegetated areas. A study at Rocky Mountain National Park concluded that 93% of visitors avoid restoration areas when a sign is erected, and 97% of visitors are dissuaded from entering an area with both a sign and some sort of fencing. Fencing may also protect new plantings from local wildlife, giving the plant time to get established.
- Weed monitoring and control is an important part of any revegetation project

**Revegetation: Keeping costs down:**

- Collect your own seed
- In seed mixes, use less expensive species in greater amounts and seed the more expensive species in lesser amounts
- Salvage plants and cuttings from on site
- If not available on site, collect cuttings from neighboring property (with owner's permission)
- Try started plants instead of seed in areas where seeding is not likely to be successful
- Plant stock plants in arrangements sometimes termed "bio-islands", separated by areas of seeding (interseed)

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## CONTACTS



### **State Parks Region Landscape Architects**

*Species selection, local vendors, horticultural practices*

West Region: Gail Palmer

North Region: Ed Holmberg

South Region: Bob Pick

Metro Region: Bob Bruce

### **County Extension Agents and Weed Supervisors**

*Plant identification, soils issues, horticultural practices, weed management*

### **Upper Colorado Environmental Plant Center, USDA NRCS**

*Seed increase program will grow out your collected seed to increase the amount available for your revegetation projects*

P.O. Box 448

5538 Rio Blanco County

Meeker, CO 81641

Phone: 970-878-5003

Fax: 970-878-5004

<http://plant-materials.nrcs.usda.gov/pmc/COPMC/describe.html>

### **The Native Plant Network**

*Plant propagation protocols, seed treatment information, when to seed, when to harvest for seed collections*

<http://nativeplants.for.uidaho.edu/>

Next year the site plans to post a current list of vendors of native plant material

## **Native Plant Material Vendors**

*Species selection, seed increase programs, native seed and/or plant material, seeding and/or planting assistance*

### **Aquatic and Wetland Company\***

1830 17<sup>th</sup> St, Suite 100  
Boulder CO 80302  
<http://www.aquaticandwetland.com/>

### **Arkansas Valley Seed**

P.O. Box 16025  
Denver CO 80216  
303-320-7500

### **Country Lane Wholesale Nursery**

2979 N. Highway 83  
Franktown CO 80116  
303-688-2442

### **Dean Swift Seed Company**

P.O. Box B  
Jaroso CO 81138  
Phone: 719-672-3739  
Fax: 719-672-3865

### **Green Acres Nursery**

North:  
4990 McIntyre St  
Golden CO 80403  
Phone: 303-279-8204  
Toll Free: 888-279-8204  
Fax: 303-278-1832  
gacres@araptech.net  
[www.greenacresnursery.com](http://www.greenacresnursery.com)

South:

9010 S. Santa Fe Drive  
Littleton CO 80125  
303-791-3420  
gacres@araptech.net  
[www.greenacresnursery.com](http://www.greenacresnursery.com)

### **Little Valley Nurseries, Inc.**

13022 E. 136<sup>th</sup> Avenue  
Brighton CO 80601  
Phone: 303-659-6738  
Toll Free: 800-221-3241  
Fax: 303-659-6886

### **Pawnee Buttes Seed Company**

P.O. Box 100  
605 25<sup>th</sup> Street  
Greely CO 80632  
Phone: 970-356-7002  
Fax: 970-356-7263  
pawneeseed@ctos.com  
[www.pawneebutteseed.com](http://www.pawneebutteseed.com)

### **Rocky Mountain Native Plants\***

3780 Silt Mesa Road  
Rifle, CO 81650  
970-625-4769  
970-625-3276  
native@aspensinfo.com  
[www.rmnativeplants.com](http://www.rmnativeplants.com)

### **Sharp Brothers Seed Company**

101 E. 4<sup>th</sup> St Rd.  
Greely CO 80631  
Phone: 970-356-4710  
Fax: 970-356-1267  
buffalo.gxy@sharpseed.com  
[www.sharpseed.com](http://www.sharpseed.com)

### **Western Native Seed\***

P.O. Box 188  
Coaldale CO 81222  
Phone: 719-942-3935  
Fax: 719-942-3605  
westseed@chaffee.net  
[www.westernnativeseed.com/](http://www.westernnativeseed.com/)

\*Preferred Vendors

## SELECTED REFERENCES

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Alberta Agriculture, Food and Rural Development. 2001. Native Plant Revegetation Guidelines for Alberta.

Central Rockies Society for Ecological Restoration. 2001. Native Plant Propagation Workshop—the Keys for Success (Workshop Notebook). Chapter by Randy Mandel, Rocky Mountain Native Plants, Rifle, Colorado.

Colorado Natural Areas Program/DPI, Dept of Agriculture. 2000. Creating an Integrated Weed Management Plan.

Colorado Natural Areas Program. 1998. Native Plant Revegetation Guide for Colorado.

Colorado Natural Areas Program. 1996. Best Management Practices for Wetlands within Colorado State Parks.

State of Colorado, Department of Natural Resources, Division of Parks and Outdoor Recreation, Administrative Directive No. B-302. 1995. Use of Native Vegetation in State Parks and Recreation Areas.

Mahalovich, Mary Frances. USFS. 1999. Seed Transfer Rules and Expert Systems. Guidelines for Managing Seed Production Areas.

Weber, W.A. and Wittmann, R.C. 1996. Colorado Flora: Eastern Slope. University Press of Colorado, Niwot, CO. 524 pp.

Weber, W.A. and Wittmann, R.C. 1996. Colorado Flora: Western Slope. University Press of Colorado, Niwot, CO. 496 pp.

McLendon, Terry and Edward Redente, Department of Rangeland Ecosystem Science, Colorado State University. 1994. Vegetation Restoration Management Plan, Rocky Mountain National Park.

Genetic Guidelines for Restoration Projects. Rocky Mountain National Park.

Appendix 1

STATE OF COLORADO  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF PARKS AND OUTDOOR RECREATION

Administrative Directive No. B-302

SUBJECT: USE OF NATIVE VEGETATION IN STATE PARKS AND RECREATION AREAS

I. PURPOSE

To provide for the use and management of native vegetation in state parks and state recreation areas in landscaping, restoration and reclamation projects within park boundaries.

II. GOAL

The Division's primary goals are to use vegetation native to Colorado for park landscaping, reclamation and restoration projects, when appropriate; to protect, maintain, restore or enhance the full complement of Colorado's native ecosystems occurring within state parks and recreation areas; and, to limit the use of non-native vegetation in state parks.

III. DEFINITIONS

- A. Native vegetation - those plants and plant communities known to occur in Colorado prior to European settlement beginning in 1840.
- B. Non-native vegetation - those plants accidentally or intentionally introduced into Colorado since 1840.
- C. Ecosystem - the living organisms and the non-living environment within which interrelationships and interactions contribute to a functioning biological community over time.

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Administrative Directive No. B-302 is approved this \_\_\_\_\_ day of \_\_\_\_\_, 1995, by:

\_\_\_\_\_  
Laurie A. Mathews  
Division Director

#### IV. GUIDELINES

Landscaping, restoration and reclamation projects in state parks and state recreation areas may include some or all of the following goals: provide wildlife habitat, improve recreational environment (shade, wind protection or aesthetics), provide durable ground surfaces in heavy use areas, erosion control and visual screening. Availability, purchase cost, maintenance requirements and costs, growth characteristics and requirements and enhanced visitor experience are considered in selecting plant species for landscaping or revegetation projects.

The Division of Parks and Outdoor Recreation will use native vegetation in landscaping, reclamation and restoration projects where appropriate. Native vegetation includes trees, shrubs, forbs and grasses. Use of native vegetation is intended to reduce degradation of native ecosystems within and adjacent to the managed parks and recreation areas, to reduce the need for chemical (herbicide) use, to conserve water resources and promote public understanding of the role and utility of native vegetation in the developed and undeveloped landscapes of Colorado.

##### A. Species Selection

Park managers will consult with the Region landscape Architect or the Colorado Natural Areas Program for advice and recommendations on appropriate trees, shrubs, forbs and grasses for use in parks' landscaping, reclamation and restoration projects. Park managers will prepare a list of desired species for use in each park.

##### B. Use of Available Native Seeds and Stock from Local Sources

Intended use, cost, ecological requirements, commercial availability of native seed or stock and local conditions will determine appropriate use of native and non-native vegetation. Locally propagated stock or local seed sources are preferred for use where available. Use of local plant material will help to preserve the genetic diversity of native ecosystems by not contributing to hybridization or genetic contamination of local flora by plants which are not adapted to local conditions. Hybridization and genetic contamination can have unforeseen short-term and long-term biological and ecological consequences.

The Region Landscape Architect and the Colorado Natural Areas Program will maintain current information on native species available to Division staff for use in parks and recreation areas.

C. Use of Non-native Vegetation

Non-native vegetation which is not known to colonize, dominate or eliminate sensitive or fragile wetlands, riparian areas or rare plant habitats may be used where appropriate. Tamarisk, (*Tamarix* spp.), Russian-olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*) and purple loosestrife (*Lythrum salicaria*) will not be planted in state parks and recreation areas due to the ability of these species to spread into and colonize riparian and wetland areas to the detriment of native species and resulting degradation of biological communities (for example, increasing the vulnerability of breeding songbirds by reducing nesting habitat).

D. Wildlife Plantings and Windbreaks

Wildlife plantings and windbreaks in state parks using perennial vegetation will be native species where appropriate. Wildlife food plots in state parks using agricultural (cultivated) crops consisting of annual (short-lived) species are appropriate where agricultural uses have occurred traditionally.