

# The How To's of Pollinator Friendly Seed Mixes

2012 Colorado Native Plant Society



United States Department of Agriculture  
Natural Resources Conservation Service

# Overview



- ❖ **Overview of who NRCS is and what we do**
- ❖ **Why Pollinators**
- ❖ **Pollinator Selection**
- ❖ **Pollinator Considerations**
- ❖ **Pollinator Seeding/Planting**
- ❖ **Pollinator Sources**

# Evolution of a Program

❖ Born out of the Dust Bowl Era.....



# The Plant Materials Program

- ❖ We select plants and develop plant technology for the successful conservation of our nation's natural resources.
- ❖ We provide vital information to private landowners who need assistance in addressing critical land management problems.
- ❖ We are a network of Plant Materials Centers and Plant Materials Specialists strategically located throughout the United States.



# Plant Materials Centers & Specialists



On Center Research & Development is Working Toward

- ❖ Technical Documents
- ❖ Plant Releases



Technology Transfer from Centers to:

- ❖ Primary Contact for Field Office Assistance
- ❖ Education and Outreach
- ❖ Linkeage to NRCS Programs

# Plant Materials Program

- ❖ Selects plants for conservation uses and release plants to the commercial sector.
- ❖ Develops technology for:
  - the agronomics and production of conservation plants
  - the use of plants for conservation practices





# Conservation Practices

- ❖ 160 Conservation Practices total
- ❖ 35 are vegetative practices - 15 of these are key vegetative practices, examples:
  - Conservation Cover (327)
  - Cover Crop (340)
  - Critical Area Planting (342)
  - Filter Strips (393)
  - Herbaceous Wind Barriers (603)
  - Riparian Forest Buffer (391)
  - Streambank and Shoreline Protection (580)

# Critical Areas

- Soil erosion and sediment control (327)
- Drought & Post-Irrigation critical area seeding (342)
- Streambank stabilization (580)



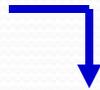
# Management Practices

- **Buffer strips (332)**
- **Soil bioengineering (580)**
- **Waste management (601)**



# Restoring Habitats

- Wetlands
- Riparian corridors
- Disturbed areas
- Fire Rehab



# Environmental Concerns

- Native plants
- Noxious/invasive plants
  - Yellow starthistle
- Carbon Sequestration
- Habitat for threatened and endangered species



# National Action Plans

- ❖ Pollinators
- ❖ Energy Conservation
- ❖ Air Quality
- ❖ Climate Change
- ❖ Transition to Organic Production
- ❖ Plant Data Collection



# Pollinators

- ❖ Plant species diversity in a mix
- ❖ Pollinator-specific plants



# Natural Disasters

- ❖ Fires
- ❖ Storms
- ❖ Drought



# Technology Transfer

Direct Technical Assistance  
Training  
Demonstration  
Public Field Days



Publications  
Plant Fact Sheets  
Plant Guides  
Technical Notes  
Research Reports



## ANTELOPE BITTERBRUSH *Purshia tridentate* (Pursh) DC. Plant symbol = PUTR2

Contributed by: Upper Colorado Environmental  
Plant Center



Photo by Steve Parr

Alternative Names:  
Antelopebrush, Buckbrush, quinsabrush

**Uses:**  
Antelope bitterbrush is one of the most important perennial native shrubs in the western United States. It provides high quality, important spring and winter browse for domestic livestock, muledeer, deer, and elk. Its seed is an important source of food for small mammals and birds. It is considered a medium quality coverage for sage-grouse. The shrub is also used for seed collection and genetic conservation of named strains and has the potential for use as a living snow fence, roadside beautification, and revegetation planning.

## Plant Guide

**Status:**  
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and federal noxious status).

**Description:**  
Antelope bitterbrush is a dwarf growing shrub that is indurate to very deep rooted with wide ecotypic variations. It is normally 3 to 6 feet in height and up to 5 feet in width with wide shaped, dense lobed leaves (some are pruned in winter). Leaves can vary in color from gray green to bright green. Some plants have branches near the soil that grow (branches that touch the soil develop roots) providing additional rooting for the plant. Flowering occurs in late spring to early summer with yellow to white blossoms. The spindle-shaped seed clusters easily at maturity.

**Distribution:** Antelope bitterbrush is an important native browse shrub in the intermountain Western United States. It occurs from New Mexico south to Colorado, Wyoming, Montana, and British Columbia, west to Idaho and Washington, south to Oregon, California, and Nevada.

**Habitat:** Antelope bitterbrush occurs most often as part of a mixed shrub community, but occasionally is found in sandy grass meads. It is associated with a variety of underlying grasses and forbs. It can also be an understorey plant in association with other growing trees.

**Adaptation:**  
Antelope bitterbrush is adapted to wide ranges of soils with 0 to 24 inches of annual precipitation. It is normally found at elevations of 4000 to 9500 feet, but has been noted at 11,000 feet in California. The shrub has good tolerance to drought and cold.

**Establishment:**  
Normal establishment of antelope bitterbrush occurs in years with good seed production when rodents reduce seed and do not eat all of the seeds. Maximum success is achieved the first few years of seedling growth for establishment. Late fall or winter seeding is recommended and competition can be a problem for establishment. Seeds should be drilled about 1 inch deep at a rate of 10 to 2 pounds per acre. There are doubts if broadcasting and seed do need to be covered. Plant should not be used for the first four years and seedlings need protection until they are 8 to 10 inches tall. Rodents normally eat seeds within

# Why Pollinators



# Tools to Help You choose Species

- ❖ Ecological Site Descriptions
- ❖ USDA NRCS Technical Notes
- ❖ USDA NRCS Plant Materials Information
- ❖ USDA Plants Database
- ❖ Local Resources (CSU Extension, County and City, Local Field Offices)
- ❖ Colorado Heritage Program
- ❖ SeinNet
- ❖ Xerces



# Tools to Help You choose Species

<http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD&mlra=067B&state=CO>



## Reports

- > Approved ESD Reports
- > Approved Reference Sheets

## Data Access

- > Data Edit/Entry, Download, Reports
- > GSAT Downloads

## Welcome to the Ecological Site Description (ESD) System for Rangeland and Forestland Data

Anyone may view reports of approved Ecological Site Descriptions. To view the various reports select a State or MLRA or both and Submit. From the subsequent list, select the ESD you wish to view.

Major Land Resource Area framework utilized by the planning, design, implementation management activities. Most of landuse, elevation, topography, vegetation, and soils.

If you need assistance in link below The MLRA ESD USDA Agriculture Handbook can:

- (1) search for your MLRA
- (2) search for LRRs and and textual queries.

[MLRA Information](#)



## Data Access

- > Return to Reports Selection Screen

## Report Selections

- General
- > Physiographic Features
- > Climate Features
- > Water Features
- > Soil Features
- > Plant Communities
- > Site Interpretations
- > Supporting Information
- > Rangeland Health Reference Sheet
- > Complete Report
- > HTML Printable Format

## UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

### ECOLOGICAL SITE DESCRIPTION (Old Format Report)

#### ECOLOGICAL SITE CHARACTERISTICS

**Site Type:** Rangeland

**Site Name:** Loamy Plains

**Site ID:** R067BY002CO

**Major Land Resource Area:** 067B-Central High Plains, Southern Part



# Where to find information

- ❖ Colorado NRCS: <http://www.co.nrcs.usda.gov/>
  - <Technical Resources:  
<http://www.co.nrcs.usda.gov/technical/index.html>
  - <e fotog Colorado <select Colorado<select county:  
<http://efotg.sc.egov.usda.gov/treemenuFS.aspx>  
drop down menu <choose Section I
  - <Technical Notes
  - <Plant Materials< Plant Materials Technical note 59  
[http://efotg.sc.egov.usda.gov/references/public/CO/COPMTN\\_59.pdf](http://efotg.sc.egov.usda.gov/references/public/CO/COPMTN_59.pdf)

# Tools to Help You choose Species

Browser navigation and address bar showing <http://www.co.nrcs.usda.gov/technical/index.html>. Includes search bar with "NRCS Colorado Technical Resources" and utility icons for home, RSS, email, and print.

## Search

Colorado  
Enter Keywords

## NRCS Colorado Technical Resources

NRCS Colorado's Technical Resources provide access to scientific resources, tools, models, and data.

### Technical Resources

- Conservation Engineering
- Colorado Ecological Sciences/ECS
- eFOTG - Colorado
- Geographic Information Systems/GIS
- National Resources Inventory/NRI-Colorado/
- Snow Survey
- Soil Survey
- State Technical Committee
- Technical Service Providers (TSPs)
- Water Resources

Find a Service Center

Regional Boundaries, State Offices & Centers



The [Conservation Engineering](#) provides timely, economical, and environmentally sound solutions to natural resource plans, operations, and issues...[more](#)



The [Ecological Sciences](#) are comprised of multiple disciplines. The staff is responsible for ensuring the latest scientific technology and technical information and data are integrated into the agency's conservation programs and activities...[more](#)



The [Geographic Information Systems](#) staff provides GIS information, data and products as well as technical support for Colorado NRCS personnel, partners, and the general public.



The [Snow Survey Program](#) provides mountain snowpack data and streamflow forecasts used for conservation planning, water supply management, flood control, climate modeling, and recreation...[more](#)



The [Soil Survey Program](#) applies the knowledge of soil science to natural resources conservation by providing quality soil, GIS, and resource information...[more](#)



The [State Technical Committee](#) provides recommendations for establishing technical guidelines and program criteria and priorities necessary to carry out conservation provisions of the Farm Bill...[more](#)

# Tools to Help You choose Species

The screenshot shows the USDA NRCS PLANTS Database website. At the top, the USDA logo and "United States Department of Agriculture Natural Resources Conservation Service" are on the left, and the NRCS logo is on the right. Below the logos is a banner with the text "PLANTS Database" and a row of various plant images. A navigation menu includes "Home", "About PLANTS", "Team", "Partners", "What's New", "NPDT", "Help", and "Contact Us".

**Search**  
Name Search

Scientific Name

- State Search
- Advanced Search
- Search Help

**PLANTS Topics**

- Alternative Crops
- Characteristics
- Classification
- Cover Crops
- Culturally Significant
- Distribution Update
- Documentation
- Fact Sheets & Plant Guides
- Introduced, Invasive, and Noxious Plants
- Links
- Threatened & Endangered

You are here: Home/

The PLANTS Database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories.

**Plant of the Week**



**Crownvetch**  
*Securigera varia* (L.) Lassen

Click on the photo for a full plant profile.

**Spotlights**



**2012 National Wetland Plant List**  
The new National Wetland Plant List is now in PLANTS as a table linked to species profile pages. This list is to be used for Federal

**I Want To...**

- See a list of the plants in my state
- Learn about the wetland plants in my region
- Learn about all the endangered plants of the U.S.
- Learn about noxious and invasive plants
- Search for and view images of plants
- Read and print abstracts about important conservation plants
- Download data or posters
- Contribute plant distribution information to PLANTS
- Get ecological descriptions of sites from around the country
- View the USDA Plant Hardiness Zone Map

Using the NRCS PLANTS Database – Advanced Search Download

<http://plants.usda.gov/java/>

# Tools to Help You choose Species

## Electronic Field Office Technical Guide EFOTOG

The screenshot displays the EFOTOG website interface. At the top, the United States Department of Agriculture logo and 'Natural Resources Conservation Service' are visible. The navigation bar includes 'FOTOG', 'Search/Index', and 'About'. A sidebar on the left contains a 'FOTOG Tree Menu' with categories like 'Section I', 'Table Of Contents', 'Transmittals', 'Colorado CNMP Workbook', 'Cost Data', 'Erosion Prediction', 'Laws', 'Maps', 'Reference Lists', 'Technical Notes', 'Agronomy', and 'Biology'. The main content area shows a technical guide titled 'Pollinator Biology and Habitat'. The text discusses the importance of pollinators in agriculture, mentioning that they are integral to 35% of global crop production and that native bees are the most important crop pollinators in temperate North America. It also notes that the non-native European honey bee (*Apis mellifera*) is the most important crop pollinator in the United States. A photograph of bees on a flower is included. The bottom of the page features the 'FOTOG' logo and the text 'a component of SmartTech'.

[http://efotg.sc.egov.usda.gov/efotg\\_locator.aspx](http://efotg.sc.egov.usda.gov/efotg_locator.aspx)

# Additional Resources

**SEINet**  
Southwest Environmental Information Network

Log In

New SEINet Account

Help

**Welcome to SEINet**

The Southwest Environmental Information Network was created to serve as a gateway to distributed data resources of interest to the environmental research community in Arizona and beyond. Through a common web interface, we offer tools to locate, access and work with a variety of data.

SEINet is more than just a web site - it is a suite of data access technologies and a distributed network of departments, museums and agencies that provide environmental information. Initially created to integrate databases within the Arizona State University, SEINet is growing to extend this network to other partners within the Southwest.

To learn more about the features and capabilities available through this site, read Making Good Use Of SEINet or visit the Symbiota Help Pages. Join SEINet as a regular visitor and please send your feedback to [seinetAdmin@asu.edu](mailto:seinetAdmin@asu.edu). Visit the Data Usage Policy page for information on how to cite data obtained from this web resource.

**Local Experts**  
**Colorado Native Plant Society**  
**CSU Extension**



## Colorado Natural Heritage Program

Connecting Conservation and Science

Search CNHP Google



Documents/Reports & Web Projects » Map Products » Request Data » Submit Data »

### of Services

Natural Heritage Program  
comprehensive  
ation on the status  
olorado's rarest and  
species and plant  
share information  
e of stakeholders in  
work to ensure the  
ersity resources are  
NHP has an enormous  
vation in Colorado  
rtnerships.



ranks Colorado's rare  
cies and habitat and provides scientific information and expertise  
onservation of Colorado's wealth of biological resources.  
79, the CNHP is a non-profit scientific organization affiliated with  
ge of Natural Resources at Colorado State University.

### Current Events

Below are the most recent articles from the [CNHP Blog](#); where CNHP staff, our partners, and the public discuss current events about CNHP and conservation in Colorado.  
[Andy Kratz Retirement Celebration!](#)  
[The connection between butterflies, plants and beer](#)  
[Rare Plant Conservation Initiative Event at Pateros Creek Brewery](#)  
[This Weekend: Drink a beer, help a rare plant!](#)

### Collaborations & Partnerships

[Landscape America](#)  
[Colorado Bat Working](#)

about programs publications news invertebrates our work get involved

news

- xerces news
- press releases
- newsletters
- archive

**Pollinator Value of NRCS Plant Conservation Plantings**

The Plant Materials Program of the USDA-Natural Resources Conservation Service has been involved in the

**DONATE**  
to protect invertebrates!

**Newsletter**

Sign up for our newsletter to receive up to date information about our programs and events.

do for you? [Click here for our brochure.](#)

# Pollinator Considerations

- ❖ Goals
- ❖ Flowering time
- ❖ Flower type
- ❖ Diversity in structure
- ❖ Annual/perennials
- ❖ Grasses
- ❖ Shrubs





# Pollinator Considerations

<http://plant-materials.nrcs.usda.gov/>

Technical Information

<http://www.co.nrcs.usda.gov/>

Plant Materials Technical Note 59 and  
ECS-5

"Everything should be made as simple as possible, but not simpler."  
Albert Einstein

# Tools to develop your mix

- ❖ EFOTOG
- ❖ Select CO
- ❖ Select a County
- ❖ Section IV
- ❖ Planning Forms
- ❖ CPA ECS and SSC
- ❖ ECS-5

The screenshot displays the eFOTOG web application interface. On the left, a file tree under 'FOTOG' shows various planning forms, including 'CO-CPA-50 SSPEW', 'CO-ECS-13, Compliance Review', 'CO-ECS-14, Wetland Id Record', 'CO-ECS-2, Apparent Trend', 'CO-ECS-2, Inventory Worksheet', 'CO-ECS-2, Similarity Index', 'CO-ECS-4, Feed and Forage', 'CO-ECS-5', 'CO-SSC-1', 'CO-SSC-2', 'CP33 Whistle Count Form', 'CPA-52 Package', 'NRCS-CPA-1', 'NRCS-CPA-52 Excel Version', and 'NRCS-CPA-52 PDF Version'. The main area shows a Microsoft Excel spreadsheet titled 'Grass Seeding Planned and Applied' for 'Colorado Aug 2011'. The spreadsheet contains the following data:

Grass Seeding Planned and Applied							Colorado Aug 2011
<b>Grass Seeding:</b>		<b>PART I - Planned</b>					
Planner:		Date:					
Producer:							
Primary soil type:	Contract/Agreement #:		Item Num:				
Seeding Operation:	Acres to be seeded:	12	Program:	Pollinator			
	Seedbed Prep:		Rate:	non-irrigated drilled			
	Planting Dates:		Drill Type:				
	Planting Depth (in.):		Drill Spacing (in.):				
Fertilizer:	Pounds per acre recommended			<a href="#">Attach completed Nutrient Management (590) Job Sheet</a>			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O				
Weed Control:	Dates:	<a href="#">(may require completion of Pesticide Mitigation Worksheet / IPM 595 Job Sheet)</a>					
Cover / Mulch:	Description:	Amount:					
	Description:	Application Method:					
<b>Seed Recommendations:</b>							
Species	Variety/Sci. Name	PLS/Ac to use	% in mix	Rate	Acres to	Total PLS	
I = Introduced, N = Native	(table 6: PMTN 59)	(100%)		(PLS lb/ac)	be seeded		
Yellow sweetclover	I	0	3.5				

# Tools to develop your mix

<b>Grass Seeding:</b>		<b>PART I - Planned</b>			
Planner:				Date:	
Producer:					
Primary soil type:	Contract/Agreement #:		Item Num:		
Seeding Operation:	Acres to be seeded:	12		Program:	Pollinator
	Seedbed Prep:			Rate:	non-irrigated drilled
	Planting Dates:			Drill Type:	
	Planting Depth (in.):			Drill Spacing (in.):	
Fertilizer:	Pounds per acre recommended			<a href="#">Attach completed Nutrient Management (590) Job Sheet</a>	
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O		
Weed Control:	Dates:			<a href="#">(may require completion of Pesticide Mitigation Worksheet / IPM 595 Job Sheet)</a>	
	Description:				
Cover / Mulch:	Amount:				
	Description:				
	Application Method:				

Seed Recommendations:						
Species <small>I = Introduced, N = Native</small>	Variety/Sci. Name <small>(table 6: PMTI 59)</small>	PLS/Ac to use <small>(100%)</small>	% in mix	Rate <small>(PLS lb/ac)</small>	Acres to be seeded	Total PLS
Penstemon, Rocky Mtn. E	Penstemon strictus	3.0				
<b>Totals</b>		3.0	0.0	0.0	12.0	0.0

**NOTES:**

Notes: Use adapted improved varieties and cultivars in the following order of preference, when available:  
 1. certified name varieties, 2. named varieties, 3. common seed  
 PLS = Pure Live Seed  
 When bare-root stock shrubs are planned: [1. Document planting on Job Sheet 612, Tree and Shrub Establishment.](#)  
 2. Insert 0 in "% in Mix" column for calculations to function.

# Tools to develop your mix

Scientific Name	Common Name	Pounds per acre	Seeds per pound	Precip. Inches	N/I*	Bloom	Locale**	Elevation range
<a href="#">Achillea lanulosa</a>	Western yarrow	0.32	2,700,000	8-16"	N	Late Spr	Statewide	5,000-10,000
<a href="#">Adenolinum/Linum lewisii</a>	Blue flax	4.36	200,000	10-20"	N	May-Aug	Statewide	
<a href="#">Amelanchier alnifolia</a>	Serviceberry			12-140"	N	Early sum	W	5,000-10,000
<a href="#">Amorpha canescens</a>	Leadplant	4.46	195,333	20-45"	N	early sum	E	3,500-4,500
<a href="#">Asclepias tuberosa</a>	Butterfly milkweed	12.40	70,000	28-45"	N	mid sum	S	5,500-7,000
<a href="#">Astragalus canadensis</a>	Canada milkvetch	3.20	270,500	20-50"	N	mid sum	N, FR Foothills	5,000-7,800
<a href="#">Astragalus cicer</a>	Cicer milkvetch	6.00	135,000	16-60"	I	spring-early sum		
<a href="#">Balsamorhiza sagittata</a>	Arrowleaf balsamroot	14.90	58,438	8-25"	N	Late Spr	W (not S Central)	6,000-9,000
<a href="#">Callirhoe involucrata</a>	Purple poppy mallow	1.45	600,000	10-26"	N	mid spr-summer	E	3,500-6,000
<a href="#">Castilleja mexicana</a>	Paintbrush	0.18	4,900,000		N		W, C	7,500-12,000
<a href="#">Cleome serrulata</a>	Beepplant	13.61	64,000	13-55"	N	Late Spr	Statewide	3,500-8,500
<a href="#">Cornus/Spida sericea</a>	Redosier dogwood			18-60"	N	Late Spr-Summer	W,C,FR Foothills	4,500-10,000
<a href="#">Dalea candida</a>	White prairie clover	3.13	278,000	10-18"	N	late spr-Aug.	E	3,500-7,000
<a href="#">Dalea purpurea</a>	Purple prairie clover	2.75	317,000	16-24"	N	late spr-Sept.	E	3,500-7,500
<a href="#">Echinacea angustifolia</a>	Purple/Blacksampson coneflower	6.81	128,000		N	summer	E	3,500-4,500
<a href="#">Echinacea pallida</a>	Palepurple coneflower	8.22	106,000	14-40"	I	early sum		
<a href="#">Echinacea purpurea</a>	Purple coneflower	7.53	115,664	14-40"	I	early sum		
<a href="#">Engelmannia peristenia</a>	Engelmann daisy	15.02	58,000	13-35"	N	spring	SE	3,500-4,500
<a href="#">Ericameria/Chrysothamnus nauseosus</a>	Rubber rabbitbrush	1.34	652,500	6-20"	N	late sum	Statewide	4,500-9,000
<a href="#">Eriogonum umbellatum</a>	Sulfur flower	4.16	209,500	8-18"	N	early sum	W,C, FR Foothills	5,000-10,500
<a href="#">Forestiera neomexicana</a>	New Mexico Privet/Forestiera			9-24"	N	early spr	SW, WC	4,500-7,000
<a href="#">Gaillardia aristata</a>	Blanketflower	5.57	156,496	16-30"	N	spring-summer	W	5,000-9,000
<a href="#">Gaillardia pulchella</a>	Blanketflower-annual	3.66	238,144	7-18"	N	Indeterm	SE	3,500-6,000
<a href="#">Geranium viscosissimum</a>	Sticky geranium	15.77	55,238	10-19"	N	mid spr	W,C, FR Foothills	5,500-12,000
<a href="#">Hedysarum boreale</a>	Utah sweetvetch	18.81	46,313	12-18"	N	Late Spr	Statewide-not far E	4,000-9,500
<a href="#">Helianthus annuus</a>	Annual sunflower	18.57	46,919	12-60"	N	summer	Statewide	4,000-8,500
<a href="#">Helianthus maximiliani</a>	Maximilian sunflower	4.44	196,360	18-35"	N	late sum	NE	3,500-7,000
<a href="#">Heliomeris/Viguiera multiflora</a>	Showy goldeneye	0.73	1,200,000		N	sum-fall	W	4,500-11,000
<a href="#">Heterotheca villosa</a>	Hairy false goldenaster	2.59	336,500	10-26"	N	mid summer	Statewide	4,000-10,000
<a href="#">Liatris punctata</a>	Gayfeather	7.85	111,000	18-26"	N	mid sum	E	3,500-8,000
<a href="#">Lotus corniculatus</a>	Birdsfoot trefoil	2.32	375,000	16-65"	I	early spring		
<a href="#">Lupinus argenteus</a>	Silver lupine	6.91	126,000	10-45"	N	late sum	W, C	5,000-11,000
<a href="#">Machaeranthera tanacetifolia</a>	Tahoka daisy	2.14	408,000	16-24"	N	Late Spr	E	4,000-9,500
<a href="#">Medicago sativa</a>	Alfalfa	3.96	220,000	12-65"	I	spring		
<a href="#">Melilotus albus</a>	White sweetclover	3.36	258,560	17-60"	I	summer		
<a href="#">Melilotus officinalis</a>	Yellow sweetclover	3.36	258560	17-60"	I	summer		

# How to compute seeding rates for mixtures

Decrease the given Solid Stand Seeding Rate for individual species proportional to the percentage of the species in the mixture.

Example - Nonirrigated drilled seeding mixture for Range Seeding

<u>Species</u>	<u>Percent of Mix</u>		<u>Solid Stand Seeding Rate</u>	=	<u>Mixture Seeding Rate</u>
Sideoats grama	.50	X	4.5	=	2.25 lbs PLS per acre
Blue grama	.30	X	1.5	=	0.45 lbs PLS per acre
Western wheatgrass	.20	X	8.0	=	1.60 lbs PLS per acre

Example - Nonirrigated drilled seeding mixture for Critical Area Planting

<u>Species</u>	<u>Percent of Mix</u>		<u>Solid Stand Seeding Rate</u>	=	<u>Mixture Seeding Rate</u>
Western wheatgrass	.75	X	16	=	12.00 lbs PLS per acre
Streambank wheatgrass	.25	X	11	=	5.50 lbs PLS per acre

# How to compute seeding rates for mixtures

## How to calculate seeds per square foot from pounds of pure live seed:

Given: 170,000 clean seeds/1 pound of *Eriogonum heracleoides* Nutt.

If that pound were evenly spread out over one acre (43,560 ft<sup>2</sup>)...

170,000 seeds/lb ÷ 43,560 ft<sup>2</sup> = 3.9 or ≈ .... 4 seeds per square foot



Whorled buckwheat (*Eriogonum heracleoides*) seed. Photo by Derek Tiller.

## How do you take the seeds per square foot and calculate the seeding rate expressed as pounds PLS per acre?

Base your calculation on drilling 20 pure live seeds per foot for non-irrigated sites and 40 pure live seeds per foot for irrigated plantings. Thus, in our example, 20 divided by 3.9 seeds per square foot per PLS pound equals a drilling rate of 5.1 pounds PLS per acre for a non-irrigated planting. The drilling rate for an irrigated planting would be 10.2 pounds PLS per acre.

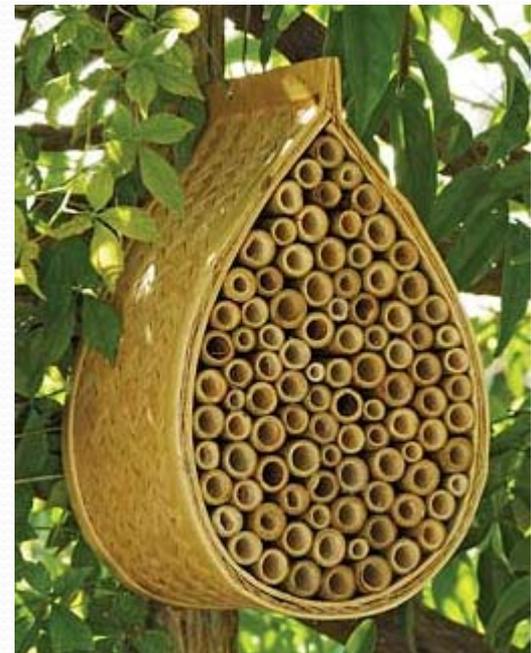
# Additional Seeding Considerations

- ❖ Seedbed Preparation (Technical Note)
- ❖ 20- 40 Seeds per square foot (dryland or irrigated?)
- ❖ Equipment
- ❖ Cover
- ❖ Weed Control
- ❖ Plant Plugs



# Additional Pollinator Considerations

## Pollinator Nest Boxes



# Local Projects

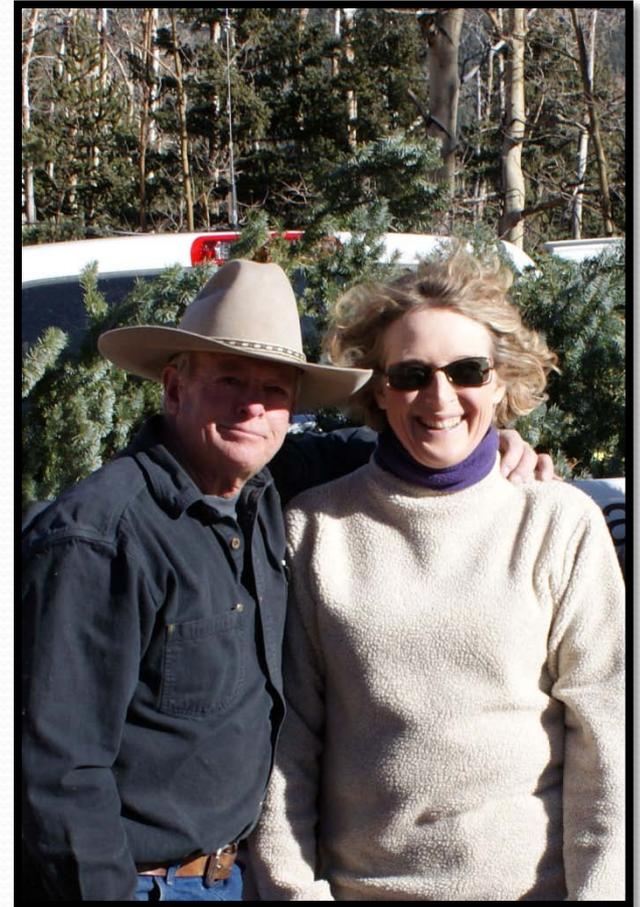
## Boulder County Demonstration Plots



Evaluate  
seeding rate of  
mixed forbs  
provided by  
Applewood  
Seed Company

# Description of the Project and Cooperator

Janet and John Fink interested in improving the area, Janet and John explored various ways to develop the farm property. Beekeeping seemed to fit in well with the irrigated alfalfa fields and pasture land.



# Seeding Plan



- ❖ Seven 5' runs, 1' apart
- ❖ 1 species per plot, 42 plots, 20 seeds/sq.ft.
- ❖ 15 forb species
- ❖ 6 tree and shrub species (may not use all that are available)
- ❖ 2 mixes
- ❖ Dormant seeding January or February 2012



# Evaluation Plan

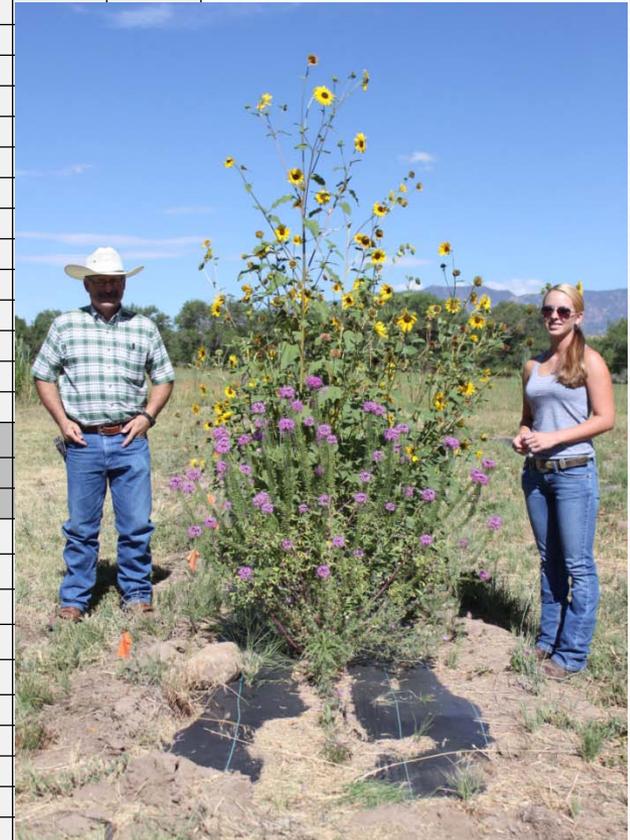
- ❖ Plants will be evaluated annually
- ❖ Emergence



# August 1, 2012 Evaluation

Evaluators: Anthony Arnhold, Kelsey Rinnenoure, Nathan Schmitz, and Christine Taliga

Plot Number	Plot	Species	Plot 1	Plot 2	Establishment	Plot 1 Pictures	Plot 2 Pictures
1 & 2	High Plains Mix				Excellent		
		Rocky Mountain Beeplant	Yes	Yes			
		Narrow Leaf Purple Coneflower	Yes	Yes			
		Greenthread					
		Dotted Gayfeather					
		Purple Prairie Clover					
		Prairie Sunflower	Yes				
		Prairie Aster	Yes	Yes			
		Narrow-leaf Penstemon					
		Prairie Spiderwort					
		Scarlet Globemallow					
		Prairie Coneflower	Yes				
		Plains Coreopsis	Yes				
3 & 4	Verbesina encelioides				Poor		
		Verbesina encelioides	Yes	Yes			
5	High Plains Mix				Excellent		
		Rocky Mountain Beeplant					
		Narrow Leaf Purple Coneflower	Yes				
		Greenthread					
		Dotted Gayfeather					
		Purple Prairie Clover	Yes				
		Prairie Sunflower	Yes				
		Prairie Aster	Yes				
		Narrow-leaf Penstemon	Yes				
		Prairie Spiderwort					
		Scarlet Globemallow					
		Prairie Coneflower	Yes				
		Plains Coreopsis					





Play Louis Schwartzberg Video about Pollinators



# Contacts

Christine Taliga  
Plant Materials Specialist  
Natural Resources Conservation Service  
Denver Federal Center  
Building 56, Room 2604  
P.O. Box 25426  
Denver, CO 80225

Phone: 720-544-2840

Cell: 303-349-3449

Email: [christine.taliga@co.usda.gov](mailto:christine.taliga@co.usda.gov)



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