

WEEDS N SEEDS

Establishing Grass Mixes and
Weed Management for Erosion Control



INTRODUCTIONS



Jessica
Clayton

Stormwater Enterprise

Key Topics:

Stormwater Construction Manual
(SCM) Requirements

New regulations from the State

Catherine
Moravec

Colorado Springs Utilities

Key Topics:

Establishing seed mixes on
unirrigated sites

Establishing seed mixes on
temporarily irrigated sites

Identifying Desirable Grasses

Nick
Daniel

El Paso County

Key Topics:

Identification of Noxious Weeds

Control and Management of Noxious
Weeds

SCM STABILIZATION REQUIREMENTS

Temporary
Control
Measures must
be maintained
until Final
Stabilization is
achieved!



FINAL STABILIZATION



Definition Pertaining to Vegetation:

After all ground surface disturbing construction activity is complete, and uniform vegetative cover has been established with a plant density of at least 70% of pre-disturbance levels.

NOXIOUS WEEDS DO NOT COUNT

The SCM states that the vegetation must be of the approved seed mixes.

Weeds do not count towards the 70% vegetation density!

APPROVED SEED MIXES



Table 5-1. El Paso County Conservation District All-Purpose Mix for Upland, Transition and Permanent Control Measure Areas

Common Name	Scientific Name	Growth Season / Form	% of Mix	Pounds PLS		
				<ul style="list-style-type: none"> Irrigated broadcast Irrigated hydroseeded 80 seeds/sq ft	<ul style="list-style-type: none"> Non-irrigated broadcast Non-irrigated hydroseeded Irrigated drilled 40 seeds/sq ft	<ul style="list-style-type: none"> Non-irrigated drilled 20 seeds/sq ft
Bluestem, big	<i>Andropogon gerardii</i>	Warm, sod	20	4.4	2.2	1.1
Gramma, blue	<i>Bouteloua gracilis</i>	Warm, bunch	10	0.5	0.25	0.13
Green needlegrass ²	<i>Nassella viridula</i>	Cool, bunch	10	2	1	0.5
Wheatgrass, western ²	<i>Pascopyrum smithii</i>	Cool, sod	20	6.4	3.2	1.6
Gramma, sideoats	<i>Bouteloua curtipendula</i>	Warm, bunch	10	2	1	0.5
Switchgrass ²	<i>Panicum virgatum</i>	Warm, bunch/sod	10	0.8	0.4	0.2
Prairie sandreed	<i>Calamovilfa longifolia</i>	Warm, sod	10	1.2	0.6	0.3
Yellow indiagrass ²	<i>Sorghastrum nutans</i>	Warm, sod	10	2	1	0.5
Seed rate (lbs PLS/acre)				19.3	9.7	4.8

Table 5-2. El Paso County All-Purpose Low Grow Mix for Upland and Transition Areas

Common Name	Scientific Name	Growth Season / Form	% of Mix	Pounds PLS		
				<ul style="list-style-type: none"> Irrigated broadcast Irrigated hydroseeded 80 seeds/sq ft	<ul style="list-style-type: none"> Non-irrigated broadcast Non-irrigated hydroseeded Irrigated drilled 40 seeds/sq ft	<ul style="list-style-type: none"> Non-irrigated drilled 20 seeds/sq ft
Buffalograss	<i>Buchloe dactyloides</i>	Warm, sod	25	9.6	4.8	2.4
Gramma, blue	<i>Bouteloua gracilis</i>	Warm, bunch	20	10.8	5.4	2.7
Gramma, sideoats	<i>Bouteloua curtipendula</i>	Warm, bunch	29	5.6	2.8	1.4
Green needlegrass	<i>Nassella viridula</i>	Cool, bunch	5	3.2	1.6	0.8
Wheatgrass, western	<i>Pascopyrum smithii</i>	Cool, sod	20	12	6	3
Dropseed, sand	<i>Sporobolus cryptandrus</i>	Warm, bunch	1	0.8	0.4	0.2
Seed rate (lbs PLS/acre)				42	21	10.3

PROHIBITION OF NONFUNCTIONAL TURF, ARTIFICIAL TURF, AND INVASIVE PLANT SPECIES



Senate Bill 24-005

- Signed 03/15/2024
- Active 01/01/2026
- Impacts:
 - Local Government
 - Commercial & Industrial
 - Institutional (Schools, Prisons, etc.)
- Does Not Impact Residential Development

After 01/01/2026 all new development and redevelopment of State, City, and County facilities, transportation corridors, commercial, industrial, and institutional facilities can only install native grass species.

No non-native or artificial turf can be planted. Sod must be native plants/grasses or those that have been hybridized for arid conditions while athletic fields may have artificial turf installed.



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GRASS SEED ESTABLISHMENT

Catherine Moravec
Water Conservation Lead

NATIVE GRASS PROJECTS CAN BE CHALLENGING.



A SUCCESSFUL PROJECT CAN BE RESILIENT.



Agenda

1. Best practices for seeding projects.
2. Desirable vs. weedy grasses.
3. Troubleshooting
4. Resources and educational events.

BEST PRACTICES FOR SEEDING PROJECTS

STEPS FOR SUCCESS

- Choosing a mix
- When to plant
- Soil preparation
- Planting methods
- Cover crops



CHOOSING A MIX

- Use All-Purpose Low Grow Mix where a shorter, more uniform appearance is desired.



CHOOSING A MIX

- Use EPC Conservation District Mix for areas where soil type, topography, or site conditions are variable.
- Will be taller with more variation in species.



TEMPORARY IRRIGATION CAN BE A KEY TO SUCCESS

- Increases germination dramatically.
- Prevents seedling death.
- Predictable germination and growth gives you greater control of the project schedule.



WHEN TO PLANT

- Irrigated projects between May 1 and August 1.
- Non-irrigated projects between November 15 and April 15.



SOIL PREPARATION

- Alleviate compaction.
- Four inches of topsoil is required.
- Add any requirements from soil test. Should be tilled into the soil.



PLANTING METHODS

- Drill seed when possible with a native seed agitation box in two directions.
- Seed 1/2 to 1/3 inches deep.



PLANTING METHODS

- Hydroseeding or hand broadcasting is possible but will not be as successful as drill seeding.
- Double the seeding rate and hydromulch with a tackifier in a separate step.



MULCHING

Typically used with un-irrigated projects.

- Crimped straw
- Hydromulching with tackifier
- Erosion blankets



COVER CROPS

- Can increase success for non-irrigated projects.
- Will catch snow, reduce wind and soil erosion.



COVER CROPS

- Want it to grow quickly and die off completely.
- Drill seed into dead stubble.
 - Quickguard
 - Sterile oats
 - Proso millet
 - Sorghum (can get tall)



GRASS IDENTIFICATION

GRASSES AND GRASSLIKE PLANTS OF UTAH (USU.EDU)

DESIRABLE GRASSES

- Blue grama



Colorado Springs Utilities

- Buffalograss



DESIRABLE GRASSES

- Western wheatgrass



- Sideoats grama



DESIRABLE GRASSES

- Big bluestem



- Little bluestem



DESIRABLE GRASSES

- Switchgrass



- Yellow Indian grass



PROBLEM GRASSY WEEDS

DOWNY BROME (CHEATGRASS)

- Annual
- Germinates in the fall.
- Creates a lot of seed in spring.
- Spreads rapidly and outcompetes native grasses for natural precipitation.
- Shows up in year 2.
- Pre-emergent is the best option (in fall).



SMOOTH BROME

- Grassy perennial weed.
- Very invasive, outcompetes native grasses.
- Forms monoculture.
- Look for light “W” halfway down leaves.



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ANNUAL GRASSY WEEDS

GREEN FOXTAIL

- Annual
- Warm season
- Loves to germinate in bare soil and gravel.
- Not competitive in dense grass stands.
- Control is optional.



[Lawn and Turfgrass Weeds: Yellow Foxtail and Green Foxtail \(psu.edu\)](http://psu.edu)

CRABGRASS

- Annual
- Warm season
- Very prostrate
- Noticeable seedheads
- Bare soil and edges
- Control is optional.
- Controlled by quinclorac or pre-emergent.



STINKGRASS

- Annual
- Grey-green color
- Lots of seedheads.
- 6-24 inches tall.
- Strong odor when crushed.
- Control is optional, not competitive over time.



BARNYARD GRASS

- Annual
- Prostrate at first.
- Purple coloration towards base of stems.
- Loves wet soil.
- Develops tall seedheads and can grow large quickly.
- Control is optional, cannot tolerate repeated mowing.



ANNUAL BLUEGRASS

- Annual(ish)
- Grows great in shade (under trees), loves moisture.
- Lime green leaves.
- Almost always has white flowers.
- Can germinate in the fall.
- Pre-emergent or will drop out in dry conditions.



RESOURCES AND EDUCATION EVENTS

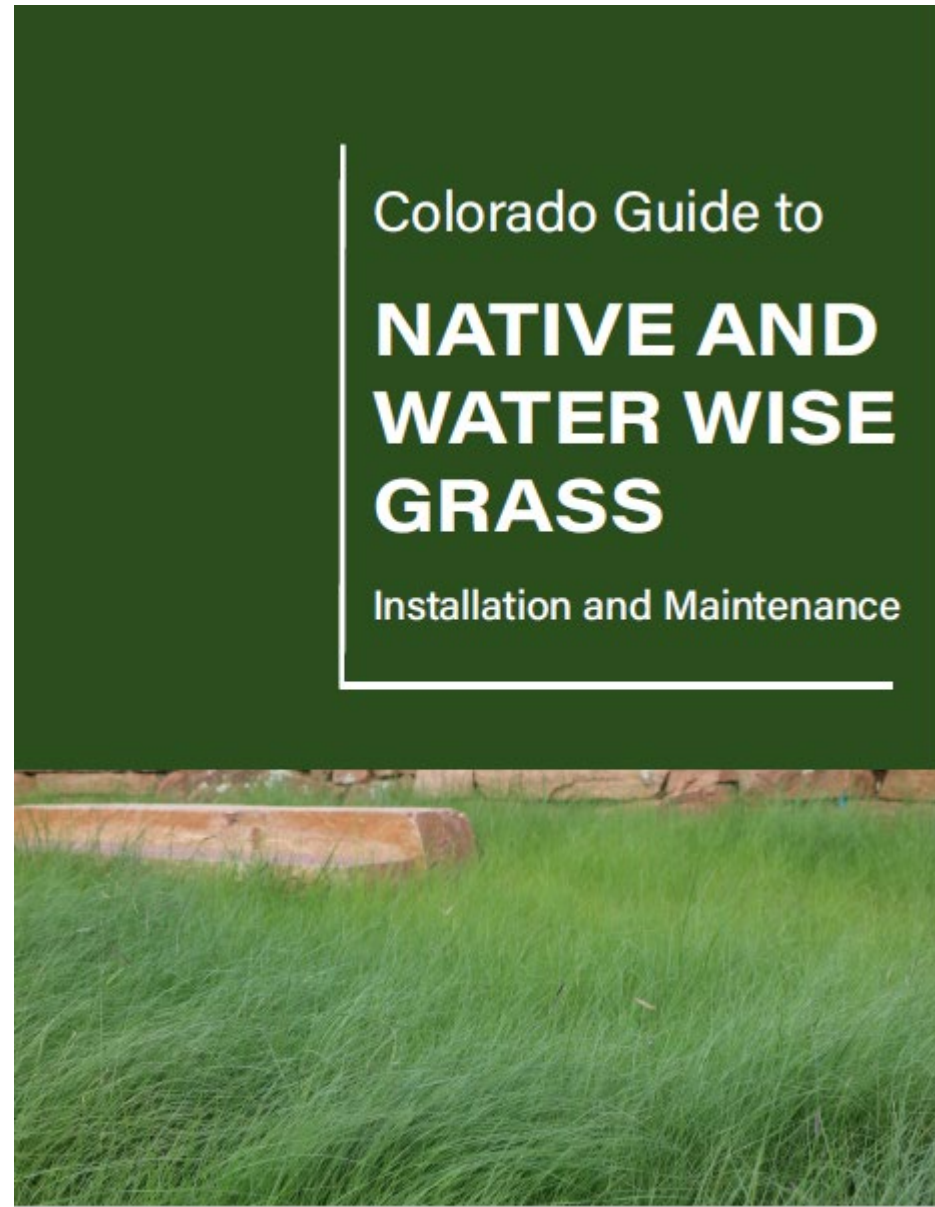
NATIVE GRASS WORKING GROUP FORMED IN 2022.

- Document best practices and fundamental principles of successful projects.
- Consulted with professionals.
- Gathered case studies.
- Guide and resources at coloradonativegrass.org.



LEARNING TO BE SUCCESSFUL WITH NATIVE GRASS.

- Available for free at coloradonativegrass.org.
- Join the email list.
- Templates you can use.



WHAT'S IN THE GUIDE?

- Project planning
- Grass selection guide
- Installation and maintenance practices
- Grass option overviews

- Resources
 - Sample SOW
 - Irrigation schedule
 - Maintenance plan
 - Responsibility matrix



JULY 26 NATIVE GRASS WORKSHOP

Save the date!

Educational sessions
and project site visits.





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INVASIVE PLANTS OF DISTURBED DEVELOPMENT SITES

NICK DANIEL
EL PASO COUNTY NOXIOUS WEED SPECIALIST



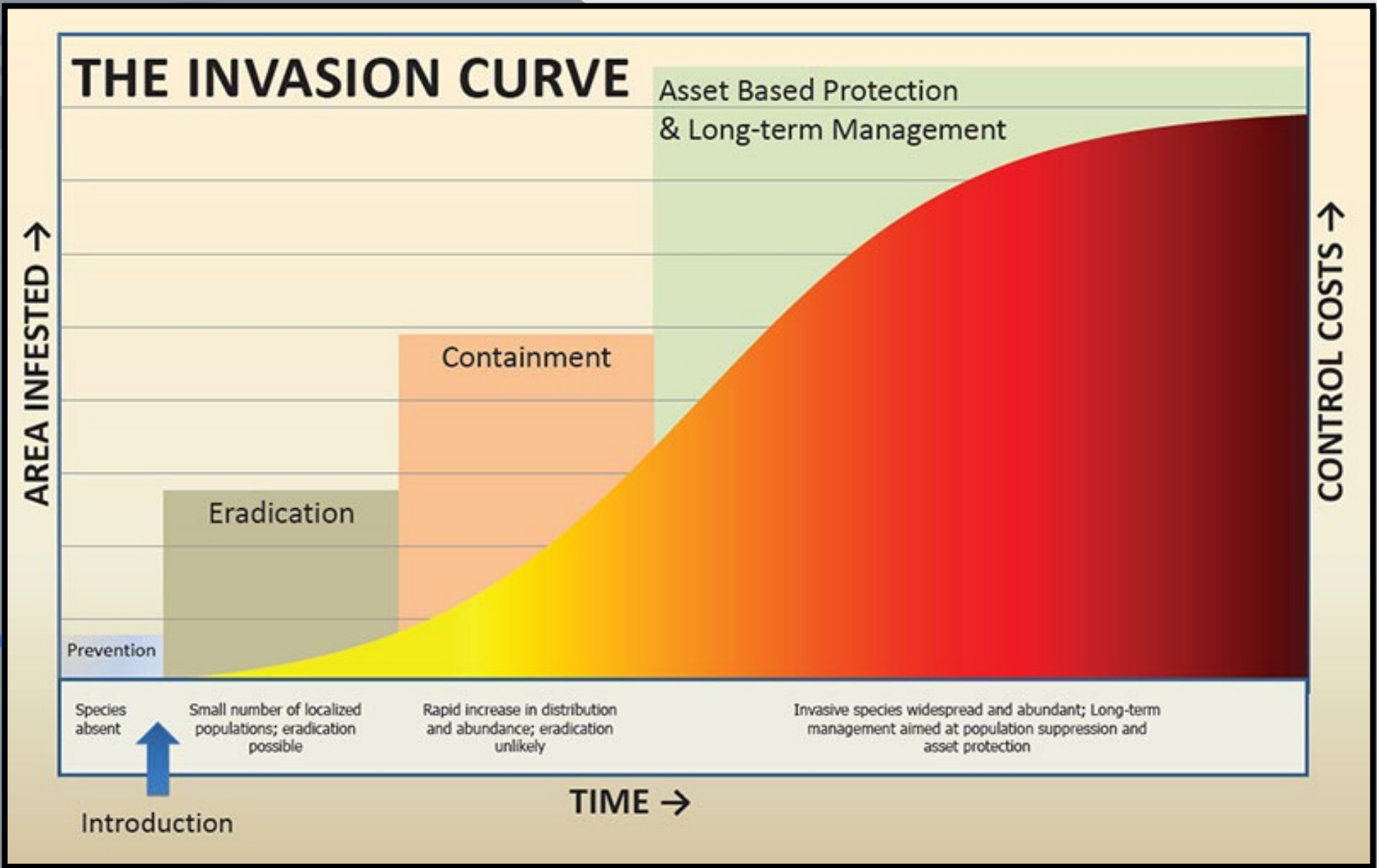
“Invasive plant species are estimated to have an economic cost to agriculture of approximately two billion dollars annually in the United States.”

“The U.S. Bureau of Land Management (BLM) states on their [website](#): “the BLM manages 245 million acres of public lands primarily in the Western United States, including Alaska. 79 million of these acres are infested with noxious and invasive weeds.”

“The total of all invasive species (including plants, arthropods, and vertebrates) has an estimated annual cost to the united states of \$120 billion annually (Pimentel, Zuniga, & Morrison, 2004). **The cost to the US economy of invasive plants alone is in the billions.** Worldwide the cost of all invasive species has been in the trillions of dollars.”

“In 2011, the U.S. Department of the Interior spent \$120 million on invasive species management (US Fish & Wildlife, January 2012).”

Data synthesized by: Dr. Delena Norris-Tull, July 2020. [Management of Invasive Plants in the Western USA.](#)



Currently in the US, more than 100 million acres are infested with noxious weeds and this is growing by a minimum of 8% per year. (USDA)

Prevention is the cheapest, easiest way to manage invasive plant species.

THE POWER OF BEING PROACTIVE VERSUS REACTIVE

- Save time
- Save money
- Stay in compliance with local, state, and federal regulations.
- Protects ecosystems, biodiversity, native species, soils, and water.
- Keeps your site aesthetically pleasing and leads to good community relations.



Land developers have unique challenges and opportunities:

Disturbed sites are easy and ideal for invasive plant species to invade and establish.

Equipment and personnel coming and going and moving from site to site rapidly and efficiently spreads invasive plant species.

Sites being developed can already have established populations of invasive plant species creating an opportunity to eradicate these plants as development advances.

A 56% INCREASE IN WATER RUN-OFF AND A 192% INCREASE IN SOIL EROSION WERE NOTED ON LAND INVADED AND DOMINATED BY SPOTTED KNAPWEED. (DR. DELENA NORRIS-TULL, PROFESSOR EMERITA OF SCIENCE EDUCATION, UNIVERSITY OF MONTANA WESTERN, JULY 2020.)



THAT'S ALL GREAT, BUT HOW DO WE PREVENT INFESTATION ON A "CLEAN" SITE?

- Ensure all equipment is cleaned before moving from site to site.
 - Trucks; Tractors; Tools; Trailers; Boots; Machinery
- Erosion Blankets: if made from straw should be certified weed free.
 - Erosion blankets will help keep seed germination low to some extent but won't prevent germination...as they are designed this way to allow for desirable seed to germinate.
- Take a vegetation inventory at the site before development activities begin.
 - Continue to monitor vegetation throughout the course of the project especially near access roads, materials storage areas, waterways, and any high traffic/activity areas.
 - Prioritize control of state listed noxious weeds if present. The sooner, the better.
 - Find and treat invasive plant species before they find you.
- Find the cleanest sources of materials as possible. (Certified Weed Seed Free)
 - Mulches, composts, water, landscaping plants, fill dirt, straw, seed mixes, etc. A small increase in cost will still be cheaper than controlling run-away infestations.
- EDUCATION

If left untreated, noxious weeds will spread at an alarming rate of 4,600 acres per day nationwide. (Weed Science Society of America)

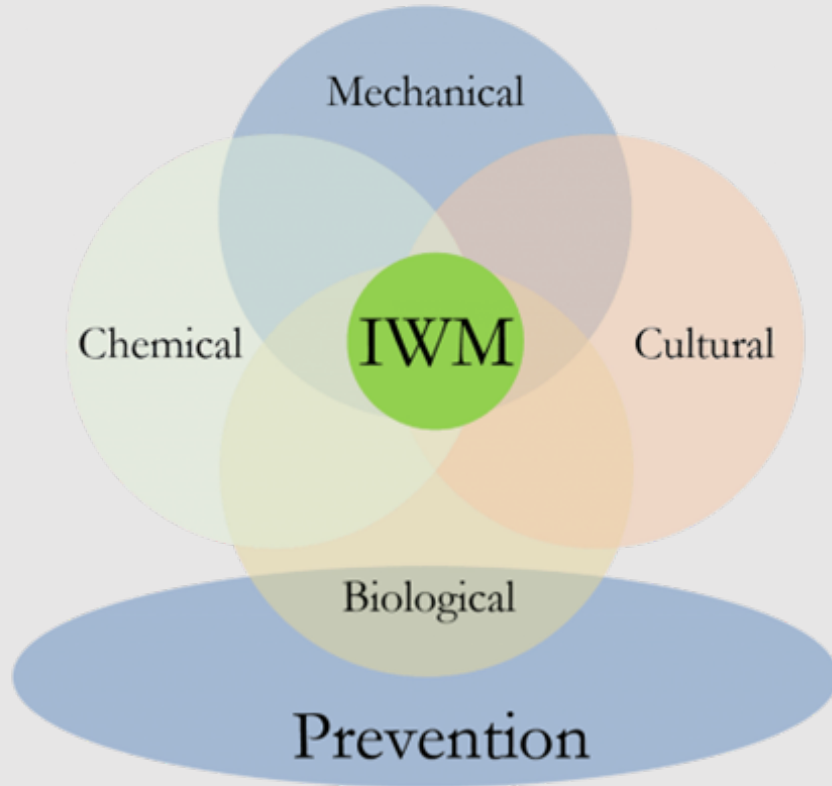
Are invasive plant species already present?

- First and foremost: **ACCURATE** identification
 - Be able to identify seedlings, vegetative phase, and reproductive phase.
 - Proper ID is critical for efficient and effective control.

Land values in the Western United States have been known to drop by over 50% if the property is severely infested with noxious weeds.

- Prioritize species
 - Anything on List A should be eradicated quickly.
 - List B species should be contained and suppressed with a goal of eradication.
 - Legal obligation.
 - Act quickly!
- Prevent flowering!
 - Controlling invasive species before they flower will save time, money, and labor as development moves forward.
 - Five Canada thistle plants per square yard can produce 121,000,00 seeds per acre or 2,777 seeds per square foot.

INTEGRATED WEED MANAGEMENT (IWM)



IWM is in, single-method control is out!

- Step 1: Identification
- Step 2: Research effective control methods.
- Step 3: Develop an invasive plant species management plan catered to the species present on your site as well as conditions at your site.
- Biological control may not be the best option for most development sites due to the length of time it takes for biocontrols to become significantly effective.
- Be persistent! Many noxious weed species may take two or more seasons to eradicate.

Identification → Prevention → Monitoring → Choose Options → Action → Evaluation

COMMON INVASIVE PLANT SPECIES OF DISTURBED SITES

- **List A** – Purple loosestrife
- **List B:**
 - Canada thistle
 - Musk thistle
 - Scotch thistle
 - Leafy spurge
 - Hoary cress
 - Yellow toadflax
 - Dalmatian toadflax
 - Russian olive
 - Tamarisk aka Salt cedar
- **List C:**
 - Common mullein
 - Common burdock
 - Puncture vine
 - Field bindweed
 - Downy brome aka cheatgrass
- **Unlisted:**
 - Kochia
 - Russian thistle
 - Yellow sweet clover
 - Common sunflower
 - Witchgrass (Native but adventitious)
 - Smooth brome
 - Green foxtail

PURPLE LOOSESTRIFE – LIST A

- Purple loosestrife costs \$45 million a year in control costs and forage loss in the US. (Pimentel et al., 2005)
- Prevent seed-set and dispersal!!!!
- Hand dig small, localized infestations. Get as much root mass as possible. Apply herbicides to plants regenerating from root pieces for efficient control.
- Herbicides for large infestations or stubborn plants that regenerate from root pieces.
- ****Always remove the flowers before applying herbicides****
- Often found growing near water/riparian areas. Use appropriate herbicides and application techniques.



CANADA THISTLE – LIS

- Deep, extensive root system that has been found to hold 1.5 years' worth of stored carbohydrates for regeneration.
- Mowing every 10-21 days combined with herbicide application is very effective. After being mowed two to three times, apply herbicides to regrowth.
- Use herbicides up to the point of flowering and in the fall.
- Seeds can remain viable for up to 20 years.
- Pulling is ineffective unless constantly repeated over the course of 2 or more years. Each ¼ inch or larger root fragment can produce a new plant.



MUSK THISTLE – LIST B

- Large plants can produce more than 100 flowers.
- Biennial; only reproduces by seed.
- Loves compacted and disturbed soil...i.e. development sites, over-grazed pastures, roadsides, etc.
- Dig, hoe, or till first year rosettes. Get taproot 4 inches below soil surface.
- Herbicides for large infestations prior to flowering and to rosettes in fall.



SCOTCH THISTLE – LIST B

- Silvery appearance from dense woolly hairs.
- Can produce up to 14,000 seeds per plant.
- Biennial; prevent seed-set
- Dig, hoe, till, or disk smaller infestations. If plants are in flower, bag them securely.
- Sever tap root 4-6 inches below soil surface.
- Herbicides are most effective in the rosette stage in spring and fall. Will also respond to herbicide treatments in the flower bud stage.



DIFFUSE KNAPWEED – LIST B

- Biennial; 18,000 seeds per plant
- Ball-shaped at maturity. Become tumbleweeds in fall.
- Flowers from July through August.
- Small infestations can be dug, hoed, tilled. Mowing can be effective right as the plants are coming into flower.
- Herbicides for large infestations. Most effective in the rosette stage in spring and fall.
- Tumbleweeds are often moved around by trucks and equipment.
- Common on roadsides, disturbed areas, and rangeland.



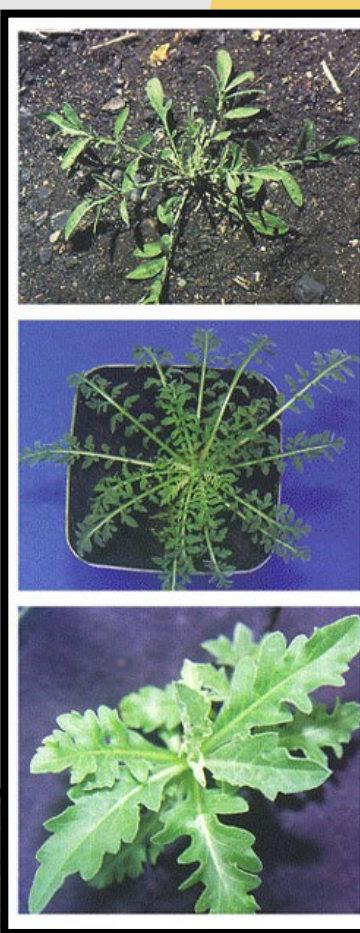
SPOTTED KNAPWEED – LIST B

- Can produce up to 900 seeds per plant that remain viable for up to eight years.
- Flowers from June to October and sets seed by mid-August.
- Biennial to short-lived perennial.
- May reproduce from lateral roots.
- Not picky about site conditions.
- Can hybridize with diffuse knapweed.
- Dig when soil is moist removing the crown and 2-4 inches of taproot and lateral roots.
- Mowing when in flower bud can control seed-set but typically won't kill.
- Herbicides are most effective in the rosette stage in spring or fall. Herbicides can help in very early flower.



RUSSIAN KNAPWEED – LIST B

- Deep-rooted perennial that spreads by rhizomes and seed.
- Stems covered in short grey hairs.
- Flowers from June to August and sets seed from late summer to early fall.
- Allelopathic – inhibits growth of other plants near it. Creates massive monocultures.
- Very toxic to horses.
- Mowing several times before flowering stresses the root system. Apply herbicides after mowing 2-4 times for higher kill percentage.
- Do not till or disk, you'll create a nightmare.
- Herbicides in early spring up to flower bud formation or fall.



LEAFY SPURGE – LIST B

- Deep-rooted perennial spreading by roots and seed.
- Roots can go as deep as 30 feet.
- One plant can produce 130 thousand seeds.
- Toxic, milky sap that will irritate skin and eyes.
- Flowering from May-June.
- Mowing will reduce seed production if done every 2-4 weeks, but no long-term control.
- Herbicides are effective in spring up to flowering and fall.
- Very persistent and hard to control. Prevention is key. Attack new, small infestations aggressively.



HOARY CRESS – LIST B

- Perennial that spreads via creeping root system and seed.
- One plant can produce up to 4,800 seeds.
- One of the first plants to emerge in spring. Flowers from May through June and sets seed by mid-summer.
- One plant can spread over an area of 12 feet in diameter in one season.
- Likes alkaline soil.
- Prevention, early detection and aggressive management are critical.
- Mow repeatedly from spring through summer, then apply herbicides in the fall.
- Herbicides are effective at flowering or immediately post



COMMON MULLEIN – LIST C

- Biennial with very hairy leaves.
- Deep taproot with fibrous secondary roots.
- Flowering stem can range from two to six feet with yellow flowers.
- 100,000 to 250,000 seeds per plant.
- Flowers and sets seed simultaneously from June through August.
- Hand pull or dig rosettes when soil is moist prior to flowering.
- Remove flower stalks and securely bag and dispose of.
- Herbicides are effective at the rosette stage in spring or fall.
 - Surfactants are critical for herbicide penetration due to hairs.



Puncture vine – List C

- Summer annual that spreads into a mat.
- Yellow flowers occur from July through October leading to hard, spiked seed capsules often referred to as “goatheads”.
- Transported site to site by boots, tires, tools.
- Easily dug up and bagged.
- Prevent seed-set and distribution.
- Herbicides are effective for large infestations.
- Apply herbicides in spring when the plants are emerging and throughout the growing season.
- Pre-emergent herbicides are a wise choice for areas known to have the plant.





Kochia - Unlisted

- Extremely invasive plant of disturbed sites and roadsides.
- Classic tumbleweeds.
- Herbaceous, summer annual to 6 feet.
- Flowers are small and green.
- Tolerant of extreme drought and saline soils.
- Mechanical control is best while the plants are immature and small. Hoeing, disking, and tilling.
- Herbicide resistance is a major problem with kochia.
- Herbicides mostly effective while the plants are small.
- Some populations in Colorado have shown resistance to 2,4-D; glyphosate, dicamba, and sulfonylureas. Combine herbicides.

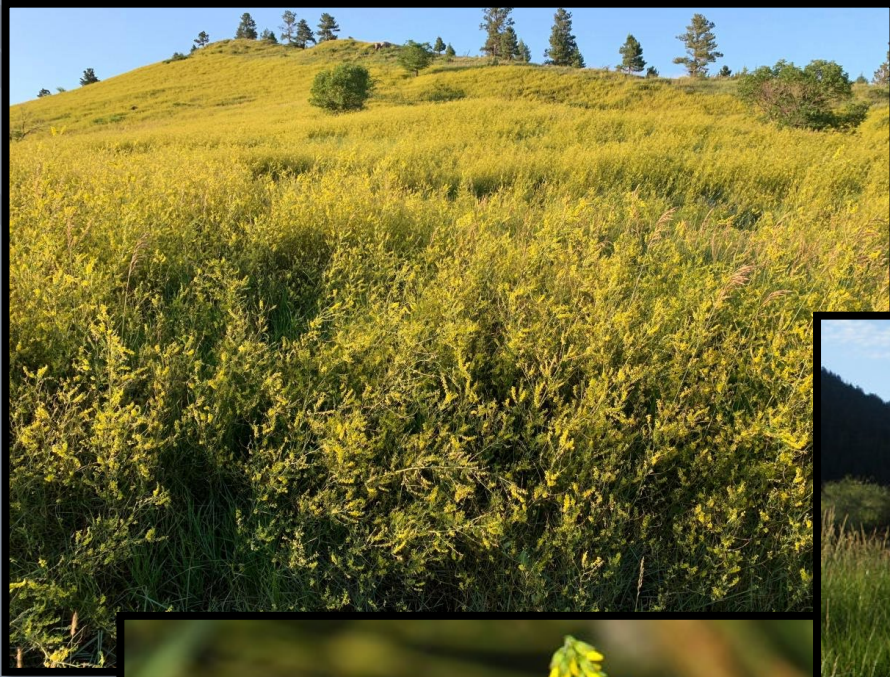
Russian thistle - Unlisted

- Not actually a thistle.
- Classic tumbleweed.
- Branches are herbaceous and tender when young but become woody with age.
- Mowing young plants can be effective.
- Tilling will help with young and middle-aged plants...but disturbs the soil and can bring more seeds to germination depth.
- Hand pulling works with young plants, but older plants are tougher and very spiny.
- Pre-emergent herbicides are helpful in areas known to already have RT.
- Herbicide treatment is best when plants are young and tender.



Yellow Sweetclover - Unlisted

- Very aggressive invader of roadsides, disturbed areas, and open spaces.
- Originally used as forage and may still be found in some commercial seed mixes.
- May be found in hay/straw that is not Certified Weed Free.
- Biennial heavy seed producer.
- Hand pulling is an effective option for small, isolated populations.
- Mowing is effective if done right before flower initiation. (May have to be repeated once)
- Broadleaf herbicides are effective, especially on young plants up to flower initiation.



A NOTE ON LISTING OF INVASIVE PLANT SPECIES

- State of Colorado Lists A, B, C are regulatory categories:
 - List A species must be eradicated state-wide on public and private land.
 - List B species must be contained and suppressed state-wide with some local jurisdictions requiring eradication.
 - List C species *should* be controlled but are so widespread that eradication is likely impossible. Some local jurisdictions may require containment and suppression of List C species.
 - Just because an invasive plant species is not listed, does not mean you should ignore it. There are many unlisted invasive plant species that wreak havoc on our ecosystems, communities, recreational areas, etc. Often, unlisted species are unlisted because they are so widespread that even containment and suppression is almost impossible, but if every landowner/developer tried to control them, maybe we could get close.

Weeding the garden is like
dusting the furniture.

No one notices
unless you
don't do it.



someecards
user card

THANK YOU

Nick Daniel

Noxious Weed Specialist – El Paso
County

NicholasDaniel@elpasoco.com

[https://communityservices.elpasoco.com/
environmental-division/noxious-weeds/](https://communityservices.elpasoco.com/environmental-division/noxious-weeds/)

[https://ag.colorado.gov/conservation/noxi
ous-weeds](https://ag.colorado.gov/conservation/noxious-weeds)

[https://ag.colorado.gov/conservation/pali
sade-insectary](https://ag.colorado.gov/conservation/palisade-insectary)