KEY NATIVE GRASSES ADAPTED FOR RECLAMATION IN WYOMING
Definitions

- Native: Original flora; generally considered as present prior to European settlement of a given area in US – local or regional

- Adaptation: any change in structure or behavior of a species which helps it to become better fitted to survive and reproduce in its environment

- Reclamation: the process of re converting disturbed lands to their former uses or other productive uses vs bringing back to original state (restoration)
Why Native?

- Resilient to climatic variability if adapted to that ecosystem and therefore has perpetuity

- Inherent diversity for ecosystem function and health including expanded plane of nutrition for livestock and wildlife value

- ...and a BLM executive order on federal lands in WY
Physiographic, Edaphic and Climatic factors Determine Plant Communities

Physiographic: Topography (landscape position, aspect, and slope), elevation, water tables (internal drainage)

Edaphic: soil type incl texture, structure, depth, pH, OM, and chemistry (sodium salts, calcium carbonates, etc.)

Climatic: – annual precipitation and timing; temperature max, min, growing season length, snow vs rain, wind, evapotranspiration, etc.
Many species used in reclamation are selected or bred for attributes such as...

- Germination quality
- Seedling vigor
- Drought tolerance
- Winter hardiness
- Salinity tolerance
- Productivity
- Palatability
GERMINATION and SEEDLING VIGOR

- Vigor plays strategic role in establishment of any given species within a mixture.
- Rapid emergence and establishment highly desirable
- Capturing short-lived favorable moisture conditions for rapid root development very advantageous
Caused by conditions such as embryo dormancy and/or impermeable seed coats.

Dormancy delays germination and resulting plant establishment.

Erratic germination can be common with wild land collections but less common in commercial seed production fields.
ADVANTAGE OF DORMANCY IN WYOMING

- Can aid in natural establishment of a species.
- Prevents seed from germinating at times when chance of survival is poor.
- Dormant seed stockpiling over time can develop seedbanks until favorable conditions for germination occur.
DROUGHT TOLERANCE

• Soil moisture conditions at time of seedling emergence is critical

• Survival of the plant during growing season dependent on drought tolerance, growth rate, and ability to compete successfully with other plants, including weeds
WINTER HARDINESS

- Seedlings may get off to a great start the first year but must survive over winter.
- Cold hardiness attribute in WY is critical. Dry subsoil, sub-zero air and soil temps, and no snow cover combine for the extreme survival test.
- Know the general winter hardiness and climatic area of adaptation of a species, whether it’s a wildland collection or a cultivar.
SALINITY TOLERANCE

Species that already demonstrate some level of tolerance to salinity can be selected or bred to capitalize on that attribute (as well as others)

Salinity problems a frequent factor in many Wyoming soils for establishing new seedlings (ie. Saltbush Desert and Greasewood communities)
ANOTHER CONSIDERATION FOR SELECTING RIGHT SPECIES/DESIGNING THE MIX IS THE SOIL PROFILE

Was topsoil salvaged and re-spread? How thick was that topsoil layer?

Or is the seedbed actually the underlying material? Have a soil test?
Good Seedbed & Proper Range

Drill w/ depth control and seed box to handle fluffy seed and also surface-applied seed.

Firm seedbeds = good seed to soil contact.
Same site about 12 years later
About Cultivars

Cultivars (also called varieties) are released when certain traits are proven from generation to generation and are clearly distinguishable from the general population.

Their performance must be generally predictable – not erratic or highly variable.
SOME CULTIVARS IN WESTERN US
Deciding on the Right Mix

Objective for seeding plays a crucial role

Restoration
Reclamation
Erosion Control
Forage Production
Wildlife habitat
Key Cool Season Grasses

Western wheatgrass
- Rhizomatous mid-grass; saline, cold, and moderately drought-tolerant; very widely adapted across Intermountain West
- Loams to heavy Clay soils (min 10” precip)
  - Arriba – Kit Carson Co, CO
  - Rosana - Rosebud Co, MT
  - Recovery – Rosana genetics and central CO collections

Thickspike wheatgrass
- Rhizomatous mid-grass; saline, cold, drought-tolerant
- Sa to SiCL soils (min 6-8” precip)
  - Critana – Hill Co, MT
  - Bannock, Bannock II – OR, WA, ID composite
Key Cool Season Grasses

Slender wheatgrass
- Mid Bunchgrass; wide adaptation; establishes fast; short-lived; saline and moderately drought tolerant
- SyL to SiCL (10” min. precip),
  Revenue – Saskatchewan, CAN
  Pryor – Carbon Co, MT
  First Strike - CO and WY
  San Luis – Rio Grande Co, CO

Bottlebrush squirreltail
- Mid Bunchgrass; establishes fast; pioneer species; short-lived; saline and very drought tolerant;
- LySa to SiCL (8” min. precip)
  Toe Jam Creek – Elko Co, NV
  Fish Creek – Blaine Co, ID
  Pueblo – Pueblo Co, CO
  Wapiti – Rio Blanco Co, CO
Key Cool Season Grasses

Bluebunch wheatgrass

- Mid Bunchgrass; adapted to wide range of sites; mod salinity tolerance; drought-tolerant
- SyL to CL soils (min 8-12 in precip)
  - **Columbia** – 8 in precip; Adams Co, WA
  - **Anatone** – 10 in precip; Asotin Co, WA
  - **Goldar** - 12 in precip; Asotin Co, WA

Snake River wheatgrass

- Mid Bunchgrass; very similar to Bluebunch in appearance but more drought-tolerant
- Sa to CL soils (min 8 in precip)
  - **Secar** – Nez Perce Co, ID
  - **Discovery** – Asotin & Whitman Counties, OR & Idaho Co, ID
Green needlegrass
  - Tall Bunchgrass; deep root system; moderately drought tolerant
  - SiCL to Clay soils (min 12 in precip)
    - Lodorm – Burleigh Co, ND
    - Cucharas – Huerfano Co, CO

Sandberg bluegrass
  - Short bunchgrass; very drought-tolerant; early green-up
  - SyL to SiCL soils (min 8” precip)
    - High Plains – multiple locations across WY
    - UP Colorado (Sims Mesa) – Uncompahgre Plateau
    - Mountain Home – Owyhee Co, ID
    - Vale – Malheur Co, OR
Key Cool Season Grasses

Indian ricegrass
- Mid-grass Bunchgrass; very drought-tolerant; very winter hardy; much seed dormancy
- Sa to L soils (8 in min precip)
  Rimrock – Yellowstone Co, MT
  Nezpar – Idaho Co, ID
  White River – Rio Blanco Co, CO

Great Basin wildrye
- Robust Bunchgrass; 6-8 ft tall; saline and very drought tolerant; deep, fibrous roots
- SyL to CL (8 in min precip but also withstands periodic flooding
  Magnar – Saskatchewan, CAN
  Trailhead, Trailhead II
  Musselshell Co, MT
**Key Warm Season Grasses**

**Blue grama**
- Short Bunchgrass/Sod-former hybrid; prolific fibrous roots; very drought-tolerant; fair salinity tolerant; major grass of Great Plains
- Sa to C (7 in min precip)
  - **Bad River** – Haakon Co, SD
  - **Bird’s eye** – Fremont Co, WY
  - **Hachita** – Hidalgo Co, NM
  - **Lovington** – Lea Co, NM

**Side oats grama**
- Mid-grass Bunchgrass; fast establishment; moderately drought-tolerant
- LyS to C (9 in min. precip)
  - **Pierre** – Stanley Co, SD
  - **Killdeer** – Bowman and Dunn Co, NM
Key Warm Season Grasses

Little bluestem
• Mid-grass Bunchgrass; moderately drought-tolerant; deep fibrous roots
• Sa to SiCL soils (12 in min precip)
  - Badlands – Ten different locations
    incl ND & SD Badlands
  - Camper – NE & KS genetics
  - Itaska – ND, SD & MN

Prairie sandreed
• Strongly rhizomatous Tallgrass; drought tolerant; coarse stems; slow to establish but very tenacious once established
• Sa to Loam soils (10 in min precip)
  - Goshen – Goshen Co, WY
Summary

Native grasses are resilient to climate flux and exhibit ecological diversity

Native upland grasses adapted to Wyoming’s harsh climate and challenging soils share common attributes of drought tolerance, winter hardiness, seedling vigor, and frequently possess elevated pH/salt tolerance.

Cultivars have been developed which have demonstrated superior, desirable traits for reclamation.

Best to select cultivars adapted to WY site conditions
Key Cool Season Grasses widely adapted and frequently used for reclamation in WY include:

- Western wheatgrass
- Thickspike wheatgrass
- Slender wheatgrass
- Bottlebrush squirreltail
- Bluebunch wheatgrass
- Snake River wheatgrass
- Green needlegrass
- Sandberg bluegrass
- Indian ricegrass
- Great Basin wildrye
Summary (cont)

Key Warm Season Grasses frequently used for reclamation in WY include:
- Blue grama
- Side oats grama
- Little bluestem
- Prairie sandreed

The take-away:
Know the soil type you’re planting into and species best adapted for that site.