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Using Native Grasses for Erosion Control Stabilization

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Request

Presentation on native species uses/availability in NC for sod/reseeding and generally in erosion control/construction. Include, where applicable, their use and limitations for more widespread use.

Key Plant Attributes for Erosion Control

- Fast-growing
- Drought-tolerant
- Extensive, fibrous root system
- Low-maintenance
- Dense canopy/foliage to intercept rainfall
- Year-round persistence


COMPOST
BARE SOIL
307
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Big bluestem
Eastern gamagrass
Indiangrass
Little bluestem
Purpletop grass
Redtop Panicgrass
Sideoats gramagrass
Switchgrass

Virginia wildrye
Red fescue

Big bluestem

Photo: Roger Samson
Switchgrass for Habitat Facebook

Eastern Gamagrass

Photo:dsfamilyfarm.com


Indiangrass

Little Bluestem

Sideoats grama

Switchgrass

Photo: Albert Lea Seed

Photo: Patrick Keyser, Center for Native Grasslands Management

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USDA NC Native Plants

Are nativars, native?

Scientific Name	Common Name	Planting material	$/plant & $/# seed
Ammophila breviligulata Fernald	American beachgrass	veg	1.89
Andropogon gerardii Vitman	**big bluestem**	either	1.59 / 17
Andropogon glomeratus (Walter)	bushy bluestem	veg	1.59
Andropogon ternarius Michx.	splitbeard bluestem	veg	1.59
Andropogon virginicus L.	broomsedge bluestem	either	1.59 / 100
Axonopus fissifolius (Raddi) Kuhlm.	common carpetgrass	either	NA / 25
Bouteloua curtipendula (Michx.) Torr.	**sideoats grama**	either	1.55 / 35
Bromus inermis Leyss.	smooth brome	seed	NA / 3
Calamagrostis canadensis (Michx.) P. Beauv.	bluejoint	veg	1.75
Chasmanthium latifolium (Michx.) Yates	Indian woodoats	veg	1.25
Chasmanthium laxum (L.) Yates	slender woodoats	veg	1.79
Deschampsia cespitosa (L.) P. Beauv.	tufted hairgrass	veg	2.25
Deschampsia flexuosa (L.) Trin.	wavy hairgrass	veg	1.65
Elymus canadensis L.	Canada wildrye	seed	NA / 25
Elymus hystrix L.	eastern bottlebrush	veg	1.72
Elymus virginicus L.	Virginia wildrye	seed	NA / 15
Eragrostis elliottii S. Watson	field lovegrass	veg	2.25
Eragrostis spectabilis (Pursh) Steud.	purple lovegrass	veg	1.62
Festuca rubra L.	red fescue	seed	NA / 8
Muhlenbergia capillaris (Lam.) Trin.	hairawn muhly	veg	1.69
Panicum virgatum L.	**switchgrass**	either	2.01 / 15
Panicum rigidulum Bosc ex Nees	redtop panicgrass	seed	NA / 50
Paspalum notatum Flueggé	Bahiagrass	either	Sod / 20
Paspalum vaginatum Sw.	seashore paspalum	either	Sod / 22
Phalaris arundinacea L.	reed canarygrass	seed	NA / 15
Poa arachnifera Torr.	Texas bluegrass	seed	NA / 10
Poa pratensis L.	Kentucky bluegrass	either	Sod / 15
Schizachyrium scoparium (Michx.) Nash	**little bluestem**	either	2.12 / 25
Sorghastrum nutans (L.) Nash	**Indiangrass**	either	1.75 / 12
Sporobolus heterolepis (A. Gray) A. Gray	prairie dropseed	veg	2.79
Stenotaphrum secundatum (Walter) Kuntze	St. Augustinegrass	veg	Sod
Tripsacum dactyloides (L.) L.	**eastern gamagrass**	seed	NA / 25
Tridens flavus (L.) Hitchc.	Purpletop grass	seed	NA / 45

<u>Turfgrass Seed Cost</u>
Tall fescue, $3/lb
Bermuda, $5/lb
Centipede, $30/lb

Potential Problems

- Cost (seed or vegetative)
- Limited availability (especially, large volumes)
- Minimal choices for cool-season species
- Dormant seed percentage is high (seed bank)
- Slow germination (increased erosion period)
- Slow establishment – 2 to 3 years (long erosion period)
- Narrow planting window
- Growth habit (openness if clipped)

<u>Additional NCDOT-specific issues</u>

- Line of sight issues
- Habitat may increase car-animal interactions

Dormant seed percentage is high.

- Dormant seed rates of 70% common.
- Dormant seed may germinate after exposure to cold storage and/or pre-soaking before planting.

Slow germination (increased erosion period)

- Often, minimum germination occurs in the first 5 weeks.
- Success is considered 1 plant per square foot during the first year of seeding.

Slow establishment (erosion period) – 2+ years

- In VA study, best overall ground cover after one year was 50%, not meeting erosion control standards.
- Best case, achieve only 70% of potential growth by the end of second growing season.
- Some tall native species (VA study) did not reach 70% cover after four years.
- Invasion of non-native vegetation can be rapid during slow establishment, which may increase the need for herbicides.

Narrow planting window

- Mid-April to early-June suggested planting window.
- Late planting has been identified as a probable cause for establishment failures, although . . .
- Spring seeding may result in failure of dormant seed to germinate (since seed may need cold weather treatment to germinate).

Growth habit (openness if clipped)

- Grasses function best for wildlife with openness at the plant base.
- Low clipping/defoliation (less than 8 inches) can set back stands for a year or more.
- Openness allows greater water movement on soil surface which may increase erosion.
- Achieve a high level of erosion control with tall growth dispersing rainfall, rather than density near the soil surface.
- Suggest biomass control be accomplished primarily with burning, secondary with discing, and not with mowing.

Why Natives may be equal or better than turfgrass on roadsides

- self-sustaining vegetation (once established)
- low-maintenance (burn, don't mow)
- erosion control (best when tall, not mown)
- provides better pollinator habitat
- offers scenic beauty (?)
- Serves as wildlife corridors (may be a negative)
- federal policies increasingly favor native plants

Why turfgrasses may be better than native grasses on roadsides

- Fast Establishment in Disturbed Soils: Roadside construction often leaves behind poor, compacted subsoil. Turfgrasses are highly adaptable and establish more rapidly than native species in these disturbed environments.
- Superior Erosion Control and Stability: Turfgrasses establish quickly and form a dense, rhizomatous, and stoloniferous canopy that holds soil in place better than sparse or bunch-type vegetation.
- Density Contribution: Turfgrass density is a more effective filter for runoff, trapping sediments, heavy metals, and pollutants from the road before they enter waterways.
- Enhanced Safety and Visibility: Because turfgrass is short-statured (and responds positively to mowing), it provides better visibility for drivers compared to taller native grasses. Provides a safe, traversable surface for vehicles that need to pull off the road.
- Improved Aesthetics: They provide a uniform, green appearance.


Unmown, weed-free zoysiagrass test plot on Hwy 421 surrounded by natural vegetation

Native grasses surrounding turfgrass


NEW HOLLAND
FIRE

Best Use (When Replacing Turfgrass)

- Relatively flat areas, not prone to erosion.
  - ➢ Allows for the long establishment periods required by the native grasses.
- In extended strips on flat or minimally sloped areas to serve as travel corridors for wildlife and visual breaks from more typical turfgrass monostands.
  - ➢ Would provide textural diversity and pollinator habitat on the roadsides.
- In areas that would not result in line-of-sight issues.
- Areas that should not require mowing due to their location and their adaptation to minimum maintenance once fully established.

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