

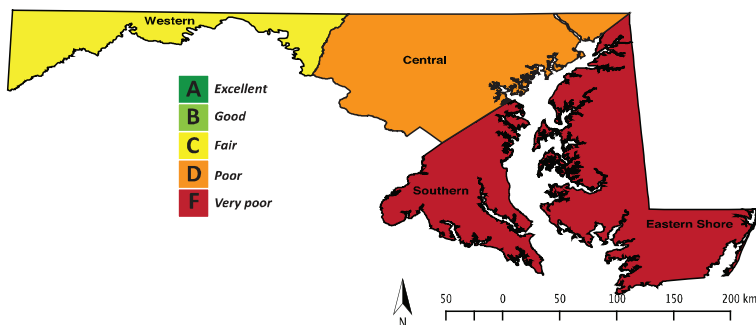
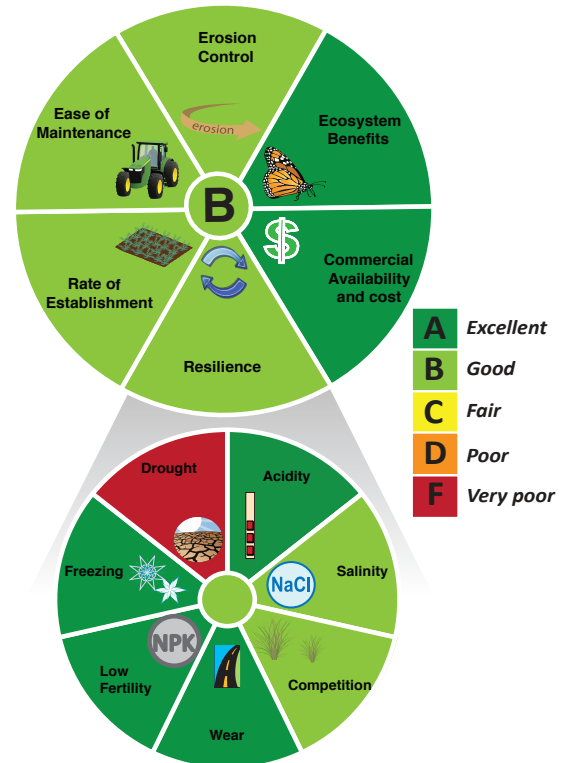
Tufted hairgrass

Deschampsia cespitosa

Tufted hairgrass is a native low-stature grass species with a wide geographic distribution. It is often used in restoration and reclamation projects because of its ability to thrive in soils with heavy metal concentrations, high acidity and low fertility. Cost of seed is affordable due to low recommended sowing rates. One major management concern, however, limits the use of tufted hairgrass along roadsides, which results in a Good rating (grade = B):



As a facultative wetland species that prefers poorly drained soils, tufted hairgrass has poor drought and heat tolerance which limits its wide spread use along roadsides.



Tufted hairgrass would not withstand the summer heat in Southern Maryland or on the Eastern Shore.



Tufted hairgrass turf type cultivars include Barcampisia, ShadeChamp, Spike, Norcoast, Humbolt Bay, and SR 6000. Nortran and Peru Creek are used for restoration and reclamation projects.

Biology: Tufted hairgrass is a native perennial cool season bunchgrass that is listed as highly state rare (S1) in Maryland (Maryland Biodiversity Project), as well as Kentucky and Massachusetts; considered rare in Indiana and is listed as being of special concern in Connecticut (USDA Plant Guide, Brede 2000). The species has been documented to occur in Maryland only in Baltimore and Cecil Counties (Maryland Biodiversity Project). Tufted hairgrass has a worldwide distribution; in the United States it can be found from Alaska to the Western United States with limited distribution in the Great Plains (USDA Plant Guide). Tufted hairgrass is also found from Minnesota to Maine, with some distribution in Iowa, Illinois, Ohio, and Georgia (USDA Plant Guide). Tufted hairgrass is considered a native wetland grass but has adapted to many different environments (Johnson 2008, Brilman and Watkins 2003) including serpentine barrens, sandy shores, and thickets (Rhoads and Klein 1993). It is a useful species for restoration of wet prairies (USDA Plant Guide, USDA Fact Sheet) and for stabilizing disturbed sites (USDA Fact Sheet). Tufted hairgrass also has reclamation applications for heavy metal mines, boreal re-vegetation work, bio swales, wetland restoration and riparian plantings (USDA Fact Sheet, Alderson and Sharp 1994). The species has potential to be used as a low-input turfgrass where heavy wear is a concern (Brilman and Watkins 2003).

Seeds per pound: 1,308,000 (Ernst Conservation Seed)

Cost per pound: \$17.64 per pound from Ernst Conservation Seed

Cost per acre: \$35.28 per acre

Suggested sowing rate: 2 pounds per acre (Chesapeake Valley Seed)

Sowing depth: >1/4 inch (USDA Plant Guide)

Germination time: In greenhouse experiments the first emergence took place within 3 to 5 days of planting under moist and warm conditions; a full stand of tufted hairgrass can take up to 12 days (Tilley 2010).

Seeding timing: Spring, late summer, or fall non-dormant seeding is recommended for low elevation regions with mild winters (USDA Plant Guide). For those areas in interior or alpine regions, a dormant planting should occur in late fall or early winter (USDA Plant Guide).

Length of growing season: Summer

Leaf height: 2-20 inches (USDA Plant Guide)

Height at seed head stage: 8-60 inches (USDA Plant Guide)

Shade tolerance: Prefers full sun but can tolerate partially shaded areas (USDA Plant Guide). Tufted hairgrass is rarely found in densely shaded areas (USDA Plant Guide, Lawrence 2005).


Suggested mowing height: Tufted hairgrass turf varieties from European sources can tolerate mowing at 1/3 to 1/2 inches (USDA Fact Sheet).


Tolerance of wet conditions: Tufted hairgrass commonly occurs on sites that are waterlogged or occasionally moist with precipitation amounts greater than 20 inches per year (USDA Plant Guide).


Humidity tolerance: Tufted hairgrass is susceptible to disease in humid environments.


Disease resistance: Tufted hairgrass has relative high susceptibility to disease (Bill Meyer personal communication). Diseases include ergot, rust, stripe smut, blind seed, leaf spot, rapid blight, and take-all patch (USDA Plant Guide, USDA Fact Sheet). Aphids, billbugs and leafhoppers are also known to affect tufted hairgrass (USDA Plant Guide, USDA Fact Sheet). During warm and humid summer months, tufted hairgrass suffered from rust disease, which greatly decreased the turf quality in low maintenance trials in Canada (Mintenko and Smith 1999).


Services:

 **Commercial availability and cost:** Some native nurseries carry this species. The seed is expensive per pound; however, small seeds lead to a low sowing rate per acre. The cost is also alleviated when used in a mixture with other native grasses.

 **Rate of establishment:** Tufted hairgrass grown from seeds or plugs have high establishment rates (Lawrence 2005). The species can also be established by using sod (Walsh 1995). Dormant tufted hairgrass seeds can persist in a seedbank (Ghering and Linhart 1992). Cold storage and light assist tufted hairgrass in germination (Walsh 1995). Choosing a tufted hairgrass variety from a similar geographic region and elevation to the planting site is beneficial for a better establishment rate (USDA Fact Sheet). The quick and aggressive establishment of tufted hairgrass lends itself to use in restoration and reclamation projects (Brown et al. 1988). Despite a fast establishment rate, tufted hairgrass does not produce a dense canopy. However, it can dominate an area by year three if seeding rates are heavy (USDA Plant Guide).


 **Ease of maintenance:** Tufted hairgrass has only recently shown potential for use as a turf grass (Johnson 2000). It has a small stature and therefore does not require frequent mowing. Owing to its poor drought tolerance, however, this species may need to be irrigated along dry roadsides.

 **Erosion control:** In Montana, the root distribution of tufted hair grass was measured in the first 4 inches of soil and 45% of the root mass was found in the top 0.8 inch of soil (Weaver 1982). However, tufted hairgrass is used in restoration projects when erosion control is a concern because plants can produce a dense sward. Christopherson and Johnson (1992) note that tufted hairgrass is useful for erosion control on stream banks. Tufted hairgrass was also used in an erosion control meadow mixture in Utah (Cobourn and Skelly 2009).

 **Ecosystem benefits:** Tufted hairgrass provides a larval food source for many butterfly species in the United States and elsewhere throughout its distribution (USDA Plant Guide, USDA Fact Sheet). Tufted hairgrass has a poor to good food value rating and is sometimes foraged upon by rabbits, deer and songbirds (USDA Fact Sheet).



Resilience:

 **Drought:** Tufted hairgrass cultivars may have a difficult time surviving the heat stress of summer months in many parts of the United States (Brilman and Watkins 2003). Due to poor tolerance of summer stresses, tufted hairgrass has limited wide-scale use as a turfgrass (Watkins et al. 2014, Watkins et al. 2011). However, in higher elevations, tufted hairgrass has moderate drought tolerance (Lawrence 2005). Summer turf quality of 'Barcampsia' and 'ShadeCamp' cultivars of tufted hairgrass was not acceptable during turf trials in the Midwest (Watkins et al 2014). In trials by Watkins et al. (2007), all of the physiological parameters of tufted hairgrass that were studied (photosynthetic rate, leaf photochemical efficiency and relative water content) maintained higher levels for a longer period of time under heat stress than drought stress. In Europe, tufted hairgrass distribution is driven by temperature more so than precipitation amounts (Davy 1982). It is not typically found in areas where mid-summer temperatures are above 68°F (Davy 1982).



Low fertility: Tufted hairgrass can tolerate low fertility sites (USDA Plant Guide). Tufted hairgrass also performed adequately in shaded conditions with low fertility inputs (Brilman and Watkins 2003). In another low-input trial by Watkins et al. (2011), areas where adequate moisture and billbug damage is not a concern, tufted hairgrass performed well with minimal fertilization.



Freezing: Tufted hairgrass has a good cold tolerance of temperatures at -13°F (Lawrence 2005). Tufted hairgrass from Oregon used in low maintenance trials in Canada had substantial winterkill from exposure to freezing temperatures. This was due to snow depths that were less than average and therefore did not provide insulation from freezing temperatures (Mintenko and Smith 1999). Davy (1982) found that at least 14-19 weeks of cold temperatures were required in the field to produce one panicle. The exposure to winter temperature conditions increases the number of panicles that tufted hairgrass produces (Davy 1982).



Salinity: Tufted hairgrass generally is considered to have a low salinity tolerance but cultivars appear to vary in tolerance. However, populations in coastal areas may show an increased tolerance to salinity (USDA Plant Guide, USDA Fact Sheet). In winter deicer experiments, Dudley et al. (2014) observed that tufted hairgrass was more sensitive to magnesium-based deicer products than to those that were sodium based during germination. In the same study, tufted hairgrass was among the most tolerant species to the highest concentration (3,000ppm of a chloride solution) of pure salt (Dudley et al 2014). Brown and Gorres (2011) found that tufted hairgrass had a moderate salt sensitivity in roadside trials. In salt tolerance turfgrass trials by Friell et al. (2013), 'Humbolt Bay' and 'SR 6000' tufted hairgrass were subjected to a 14dS/m salt exposure for two weeks and had between 50% and 75% green tissue remaining at the end. Thus, tufted hairgrass performed better than Kentucky bluegrass cultivars and had similar salinity tolerance as alkaligrass and perennial ryegrass. After a salt exposure of 24dS/m for two weeks, the same tufted hairgrass cultivars had between 25% and 50% of green tissue remaining (Friell et al. 2013), which was just below the levels of alkaligrass. During these trials, 'Humbolt Bay' tufted hairgrass performed better than 'SR 6000' (Friell et al 2013).



Acidity: Tufted hairgrass is found on soil type textures ranging from gravel to clay with a pH of 3.5 to 7.5 (USDA Plant Guide, USDA Fact Sheet). Some tufted hairgrass populations tolerate heavy metal concentrations and high soil acidity of disturbed sites (USDA Plant Guide, USDA Fact Sheet, Brown et al. 1988).



Wear tolerance: Tufted hairgrass is a densely tufted grass; this increases its tolerance to trampling and grazing (Lawrence 2005). In a low-input fairway trial with six passes of traffic per week (high level of wear), tufted hairgrass 'SR 6000' did not perform at an acceptable level (Watkins et al 2010). Thus, this cultivar was not recommended for high traffic areas.



Competition: Tufted hairgrass does not compete well with volunteer seedlings, especially ryegrass (USDA Plant Guide). On disturbed sites, tufted hairgrass can colonize very quickly and aggressively (Brown et al. 1988).

Mixes: When species diversity is important in a mixture, the use of tufted hairgrass should be limited to ¼ to ½ pound per acre (USDA Plant Guide). In turfgrass germination and establishment trials where seeds were planted either with a polymer coating or without, Leinauer et al. (2010) used a mixture of Kentucky bluegrass (10%), perennial ryegrass (20%), and tufted hairgrass (70%). This mixture was the slowest to reach 50% coverage in the trials when coated seeds were used. With uncoated seeds the mix never achieved 50% coverage (Leinauer et al. 2010). In Utah, the use of different grass mixtures for erosion control is recommended around the Lake Tahoe basin; one of these low-maintenance mixtures includes tufted hairgrass (10%) as well as cultivars of sheep fescue (30%), sandberg bluegrass (30%), mountain brome (15%), and slender wheatgrass (15%; Cobourn and Skelly 2009). This mixture is a low-growing option that can be planted with hard and red fescues in order to increase ground cover (Cobourn and Skelly 2009).

Cultivars: Tufted hairgrass has eight turf variety cultivars that are available across America and Europe; 'Barcampsia', 'Shade Champ', 'Spike', 'Norcoast', 'Humbolt Bay', and 'SR 6000' are among them (USDA Plant Guide, Alderson and Sharp 1994). 'Nortran' was developed in Alaska in the mid-1980's from four plant lines; two from Iceland and two from Alaska (USDA Plant Guide, Alderson and Sharp 1994). 'Nortran' tufted hairgrass tolerates acidic soils, low fertility, and cold, wet conditions (USDA Plant Guide). It shows some resistance to snow molds and rusts, and can reseed itself on disturbed soils (USDA Plant Guide). 'Peru Creek' was developed in Colorado in 1994 and is recommended for use in areas with a low pH and a high altitude (USDA Plant Guide).