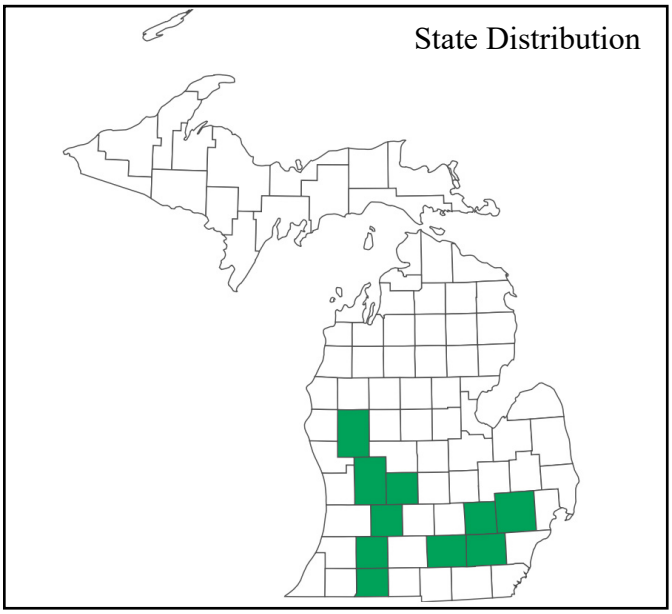
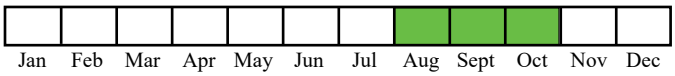
Bouteloua curtipendula (Michx.) Torr. Side-oats grama



Best Survey Period



Status: State Endangered

Global and state rank: G5 (Globally Secure) /S1 (State Critically Imperiled)

Other common names: side-oats grama grass, grama grass

Synonyms: *Andropogon curtipendulus* (Michx.) Spreng. ex Steud, *Atheropogon curtipendulus* (Michx.) Fourn., *Chloris curtipendula* Michx., *Cynodon curtipendulus* (Michx.) Raspail, *Dinebra curtipendula* (Michx.) P. Beauv., *Eutriana curtipendula* (Michx.) Trin.

Family: Poaceae (also known as Graminae; grass family)

Sub-family: Chloridoideae

Taxonomy: The vast majority of species within the large and diverse Poaceae can be divided into two major groups: the BOP clade and the PACMAD clade. *Bouteloua* is placed within the PACMAD clade under sub-family Chloridoideae and supersubtribe Boutelouodinae. The only other Michigan member of Boutelouodinae is *Muhlenbergia* (Judd et al. 2016, Soreng et al. 2017). *Bouteloua* was first named in 1805 in honor of Spanish botanists, Claudio and Esteban Boutelou (Gould and Kapadia 1964) while the specific epithet is derived from Latin (*curtus* [shortened] and *pendulus* [hanging]). Of the three recognized varieties of *B. curtipendula* (var. *caespitosa*, var. *curtipendula*, and var. *tenuis*), var. *curtipendula* is the only variety found in Michigan or the Midwest (Gould and Kapadia 1964).

Total range: This species occurs in both North and South America. Its native range north of Mexico is wide, spanning from California north to Alberta east to Maine and south to Florida. It is listed as S1 (Critically Imperiled) in Alberta, Connecticut, Florida, Louisiana, and North Carolina; S2 (Imperiled) in Georgia, Manitoba, Maryland, Nevada, New York, Ontario, and Pennsylvania; S3 (Vulnerable) in Illinois, Indiana, Mississippi, Saskatchewan, and West Virginia; and Apparently

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Secure, Secure, or Unranked in other states within its range (NatureServe 2025). It is considered non-native in Maine (Kartesz 2025).

State distribution: In Michigan, this species is known from 20 occurrences across ten counties in the Lower Peninsula; six of these occurrences are ranked as historical and two are likely planted (MNFI 2025). The historic range of this species was limited to the southern and central Lower Peninsula, from St. Joseph County north to Newaygo County southeast to Oakland and Washtenaw Counties. This plant occurs in prairie and barrens communities, but seeds of *B. curtipendula* are now commonly used in prairie mixes both within and outside of its known range including at sites that historically did not support suitable habitat (Reznicek et al. 2025).

Recognition: *B. curtipendula* is a medium-size (38-76 cm), perennial, and long-rhizomatous bunchgrass of prairies and barrens (Haines et al. 2011). The culm is glabrous with the sheaths occasionally pilose towards the center of the throat where a small (≤1 mm), fringed ligule exists. Its leaves are between 2.5 and 7 mm wide with infrequent pubescence on the underside and occasional papillose-based hairs on the margins (Wypff 2003). The axis of the inflorescence is over 8 cm long with 20 to 55 **seemingly one-sided, reflexed, and deciduous branches that each hold one to several pendulous spikelets less than 10 mm long** (Wypff 2003, Haines et al. 2011, Wilhelm and Rericha 2017, Reznieck et al. 2025).

Due to its distinct morphology, *B. curtipendula* is unlikely to be confused with other grass species when its spikes are present. **When spikes have fallen, the zig-zagging rachis is distinctive.** Two other infrequently introduced species of *Bouteloua* found in Michigan, *B. gracilis* and *B. dactyloides*, have persistent spikes on their rachises. The spikes of *B. gracilis* and *B. dactyloides* are only 1-4 per culm rather than 20-40(-55) in *B. curtipendula* (Reznicek et al. 2025).

Best survey time/phenology: *B. curtipendula* is most easily distinguished between early August and late October during flowering and fruiting.

Habitat: In Michigan, this species has always been uncommon and mostly documented in oak barrens and hillside prairie often on south- and west-facing slopes (MNFI 2025). Several occurrences of this species have been recognized as plantings along roadsides and prairie creations, including all known locations in Calhoun, Charlevoix, Ingham, Muskegon, and Schoolcraft Counties (Reznicek et al. 2025, MNFI 2025, Scott Warner, personal observation).

Among MNFI natural communities, *B. curtipendula* has been documented in dry sand prairie, hillside prairie, oak barrens, oak openings, and oak-pine barrens. This species frequently occurs on dry, sandy slopes, with southern and western aspects within the communities mentioned above or in openings within other communities.

Where present, canopy associates include *Juglans nigra* (black walnut), *Prunus serotina* (black cherry), *Quercus alba* (white oak), *Quercus macrocarpa* (bur oak), *Quercus rubra* (red oak), *Quercus velutina* (black oak), and *Tilia americana* (basswood). Woody understory associates include *Amelanchier arborea* (juneberry), *Cornus foemina* (gray dogwood), *Elaeagnus umbellata* (autumn olive), *Opuntia cespitosa* (prickly-pear), *Populus grandidentata* (big-tooth aspen), *Prunus pumila* (sand cherry), and *Vaccinium* spp. (blueberry). Herbaceous associates are diverse and include *Agalinis tenuifolia* (common false foxglove), *Andropogon gerardii* (big bluestem), *Bromus inermis* (smooth brome), *Carex pensylvanica* (Pennsylvania sedge), *Ceanothus americanus* (New Jersey tea), *Centaurea stoebe* (spotted knapweed), *Danthonia spicata* (poverty grass), *Euphorbia corollata* (flowering spurge), *Hesperostipa spartea* (porcupine grass), *Koeleria macrantha* (June grass), *Lespedeza capitata* (round-headed bush-clover), *Liatris aspera* (rough blazing-star), *Liatris cylindracea* (cylindrical blazing-star), *Lithospermum canescens* (hoary puccoon), *Melilotus officinalis* (yellow sweet-clover), *Monarda fistulosa* (wild-bergamot), *Panicum virgatum* (switch grass), *Poa compressa* (Canada bluegrass), *Pteridium aquilinum* (bracken fern), *Schizachyrium scoparium* (little bluestem), *Sorghastrum nutans* (Indian grass), *Symphyotrichum oolentangiense* (sky-blue aster), *Tephrosia virginiana* (goats-rue), *Verbascum thapsus* (mullein), and *Viola pedata* (birdfoot violet) (MNFI 2025).

Biology: *B. curtipendula* is a warm-season perennial grass species that occurs either singly or in small clusters from long rhizomes. It can reproduce via seeds, rhizomes, or tillering (the production of multiple stems originating from the same seed once the initial stem grows). This species flowers from mid-summer through early fall after which the spikes detach from the rachis (Gould and Kapadia 1964). The coarse, fibrous roots provide nesting habitat for several ant species including *Formica incerta* (uncertain field ant), *Nylanderia*


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parvula (northern crazy ant), and *Polyergus lucidus* (shining Amazon ant) (Wilhelm and Rericha 2017). The larvae of *Hesperia leonardus* (Leonard's Skipper) have been noted to feed on the foliage in other states (Scott 1986).

Conservation/management: *B. curtipendula* is of conservation concern in counties within its natural range (i.e., south of central Newaygo County). Six of 20 records are ranked H (Historical), eight as C or CD (Fair or Fair to Poor estimated viability), four as B or BC (Good or Good to Fair), and two as U (Unrankable due to the population being planted). Considering that the four highest ranked occurrences are assigned a B, the long-term viability of this species as a native element of Michigan's flora is uncertain.

In Michigan, this species is closely associated with oak openings and oak barrens which are critically imperiled, fire-dependent barrens dominated by oak species of dry-mesic loams in

the southern Lower Peninsula. Historically, these systems were cleared and developed for sand mining, unsuccessful agricultural activities, and residential/urban expansion (Chapman et al. 1995). Additionally, alteration of historic fire regimes via removal of Indigenous people and fire suppression has resulted in succession of barrens and openings to woodlands and forests (Nuzzo 1986, Bried et al. 2014). According to notes taken by the General Land Office in the 1800s, oak openings covered approximately 375,359 ha (927,512 ac) of Michigan while oak barrens covered approximately 290,986 ha (719,042 ac) (Comer et al. 1995). Today, 3.7 ha (9.0 ac) of oak openings remain across two sites that are active cemeteries and roughly 259 ha (640 ac) of oak barrens remain scattered across 14 sites (MNFI 2025). These oak barrens remnants often lack floristic diversity from the removal of frequent fire, absence of large grazers, woody species encroachment, the invasion of introduced species, reduced size, and isolation from other sites (Petersen and Drewa 2014, MNFI 2025). Conservation of *B. curtipendula* and other rare species of these communities requires restoration and management of oak barrens remnants through structural manipulation of existing canopy and returning fire where it has been suppressed (Nielsen et al. 2003, Petersen and Drewa 2014, Aschenbach and McGhan 2015, Bassett et al. 2020), prioritizing sites that contain extant indicator species before restoring sites where undesirable species have completely displaced native barrens species (Nielsen et al. 2003).

The common practice of using *B. curtipendula* in seeding applications across its range poses a threat to the genetic diversity and local adaptation of native populations. Gene flow from plants originating from commercial seed mixes potentially facilitates outbreeding depression or genetic swamping of native populations (Engstrom 2004, Bucharova et al. 2017). Additionally, native populations are small, signifying an enhanced risk of inbreeding depression and genetic drift, even in the absence of gene flow from planted populations (Engstrom 2004). The provenance of

newly discovered populations must be particularly scrutinized to distinguish naturally occurring populations from planted populations due to the growing popularity of seeding *B. curtipendula* along roadsides and within habitat restorations.

Comments: This species is rare to local in eastern states but is a widespread, abundant, and important forage grass in central and western states (Yatskievych 1999).

Research needs: The primary need is an updated status survey at extant and historic locations as presence/absence and population data were last collected at most sites before 1990. In addition, research on the impacts of fire and canopy manipulation will improve resource managers' methods for maintaining and enhancing populations of *B. curtipendula*, particularly on sites where other barrens indicator species are present. In degraded sites where opportunistic plants such as *Carex pensylvanica* have become the dominant herbaceous species, research should focus on whether herbicide and/or prescribed fire can restore floristic diversity or if other interventive action is needed.

Related abstracts: dry sand prairie, hillside prairie, oak barrens, oak openings, oak-pine barrens

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