English name Carolina Meadow-foxtail

Scientific name Alopecurus carolinianus

Family Poaceae (Grass)

Other English names Carolina Foxtail; Annual Foxtail; Tufted Foxtail

**Other scientific names** Alopecurus ramosus; A. geniculatus var. ramosus; A. geniculatus var. caespitosus; A. pedalis; A. gracilis; A.macounii

#### **Risk status**

BC: imperilled (S2); red-listed; Conservation Framework Highest Priority – 3 (Goal 3, Maintain BC diversity)

Canada: National General Status – secure (2010); COSEWIC – not assessed; critically imperilled (S1) in Saskatchewan; vulnerable (S3) in Alberta Global: secure (G5)

Elsewhere: reported from 44 U.S. States; listed as critically imperilled, imperilled, or vulnerable (S1-S3) in seven U.S. states including Utah (S1) and Wyoming (S2)

### **Range/Known distribution**

Carolina Meadow-foxtail occurs across a large portion of North America from northern Mexico to western Canada. In the continental United States, it is found in all states except Nevada (and possibly Maine, Vermont, and New Hampshire). In Canada, it is found in grassland areas from southwestern British Columbia to southern Saskatchewan. British Columbia populations are found in the Princeton area as well as on southeastern Vancouver Island and the Gulf Islands. In coastal British Columbia, populations are distributed from Mitlenatch Island (near Campbell River) south to Rocky Point. There are six known occurrences in this region.



Distribution of Alopecurus carolinianus
Recently confirmed sites
Unconfirmed or extirpated sites

#### **Field description**

Carolina Meadow-foxtail is a tufted **annual grass** with a **compact**, **pale green**, **cylindrical panicle** (cluster of flowers). Stems grow between 2 and 30 cm tall and the panicle is 1-6 cm long. Leaves are rough, 2-4 mm wide, and have open sheaths (part of leaf surrounding stem) and jagged ligules (membranous appendage at base of leaf). **Individual spikelets (clusters of grass flowers which are contained between two bracts called glumes) are less than 4 mm long (excluding the awns)** and are fringed with fine, stiff hairs on the keels (centre ridge of glume). Glumes have **awns (bristlelike appendage on tip of glumes) which attach 0.5 mm above the base and protrude 2.5 mm or more beyond the glume tips. Awns are usually abruptly bent**.

### **I**DENTIFICATION TIPS

Three other *Alopecurus* species occur in southwestern British Columbia: Meadow-foxtail (*A. pratensis*), Little Meadow-foxtail (*A. aequalis*), and Water Meadow-foxtail\* (*A. geniculatus*). Like Carolina Meadow-foxtail, all possess the dense and cylindrical panicle that characterizes this genus. They also all occur in moist to wet soils, and can be found within Garry Oak and associated ecosystems. However, these three species are perennial, are more widespread, and are larger and taller (typically greater than 30 cm) than Carolina Meadow-foxtail. Meadow-foxtail can be distinguished from Carolina Meadow-foxtail by its longer spikelets (over 4 mm). Water Meadow-foxtail\*, thought to be an introduced species in BC, has shorter awns on the glumes (extend less than 1.5 mm beyond the glumes) than Carolina Meadow-foxtail.



#### Life history

As is common among annual species, seeds can germinate either in fall or spring in response to warm temperatures and moist conditions. Seeds remain viable in the seed bank for 2-3 years, although seed viability does decline over time. Thus, persistence is somewhat dependent on successfully re-establishing a viable seed bank each year. There is potential for seeds not to germinate in a given year due to adverse conditions, but instead to germinate when conditions are more favourable. Seedling survival and causes of mortality are not known. In British Columbia, the flowering period for Carolina Meadow-foxtail is between April and June, earlier than for populations east of the Rocky Mountains (May-August). Carolina Meadow-foxtail has the potential to hybridize with other *Alopecurus* species, but the extent of hybridization in this region is unknown.

#### Habitat

Carolina Meadow-foxtail is most commonly associated with vernal pools and other seasonally wet areas with shallow soils. These unique and rare habitats are usually found embedded within larger shallow soil Garry Oak ecosystems. Because moisture availability limits competition from other species, vernally moist areas are important habitats for a variety of smallstatured annuals found in Garry Oak ecosystems, including other species at risk, such as Winged Water-starwort (*Callitriche marginata*), Muhlenberg's Centaury (*Centaurium muehlenbergii*), Kellogg's Rush (*Juncus kelloggii*), and Tall Woolly-heads (*Psilocarphus elatior*). Additional species found growing with Carolina Meadow-foxtail in coastal British Columbia include Nuttall's Quillwort (*Isoetes nutallii*), Blinks (*Montia fontana*), Scouler's Popcornflower (*Plagiobothrys scouleri*), Chaffweed (*Anagallis minima*), Tiny Mousetail (*Myosurus minimus*), Paintbrush Owl-clover (*Castilleja ambigua* ssp. *ambigua*), and Spanish-clover (*Lotus unifoliatus* var. *unifoliatus*), as well as species of shallow soil rock outcrops such as Slimleaf Onion (*Allium amplectens*).

Carolina Meadow-foxtail can also be found in some moderately disturbed moist habitats, such as roadsides, ditches, and fields. It has been found associated with disturbed areas and along well-established trails at Cattle Point in Oak Bay.

#### Why this species is at risk

The small extent and size of Carolina Meadow-foxtail populations in British Columbia means that the populations are vulnerable to extirpation. The most direct and immediate threat to Carolina Meadow-foxtail populations is human disturbance. Although many sites have some degree of protection, not all sites are specifically managed to protect rare species. Some populations in Uplands Park and at nearby Cattle Point receive heavy foot traffic. Although this trampling acts to limit competition to some

degree, increases in the frequency and/or intensity of human disturbance could also destroy these populations.

Invasive species such as the native Common Snowberry (*Symphoricarpos albus*) and the exotic Scotch Broom\* (*Cytisus scoparius*) can establish along the edges of vernal pools and have the potential to shade out small annual species like Carolina Meadow-foxtail. Increased snowberry growth in some sites is likely a result of fire suppression. Although Scotch Broom\* poses the bigger threat to Carolina Meadow-foxtail, exotic grasses, particularly bent-grass species\* (*Agrostis* spp.), Common Velvet-grass\* (*Holcus lanatus*), Canada Bluegrass\* (*Poa compressa*), and hairgrass species\* (*Aira* spp.), can establish dense mats within wet areas and out-compete Carolina Meadow-foxtail.

As an annual species, Carolina Meadow-foxtail is more likely to be affected by climate change than many other species. Climatic fluctuations which affect annual temperature and rainfall patterns may affect factors such as moisture availability, germination timing, and seedling survival, potentially leading to population declines.

#### What you can do to help this species

Management practices should be tailored to the needs of the site. Potential management tools will depend on the specific circumstances and may require experimentation prior to implementation. **Before taking any action, expert advice should be obtained, and no action taken without it. Please refer to the introductory section of this manual.** 

Public and private landowners should be made aware of new populations of this species if they are discovered, and appropriate management practices suggested. Management needs include managing human disturbance, removing invasive species, and limiting access to sensitive habitat. Existing populations should be monitored on an on-going basis to determine their viability, as well as for any negative impacts stemming from recreational uses and invasion by shrubs and non-native grasses.

#### References

MacDougall, A. S. 2003. Stewardship Account for Carolina Foxtail (*Alopecurus carolinianus* Walt.). Garry Oak Ecosystems Recovery Team, Victoria, BC.

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: www.goert.ca.



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\*Refers to non-native species.