

Aliens Amongst Us!

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Background:

Invasive alien species are the second greatest threat to global biodiversity after habitat loss. Non native plants and animals can disrupt native ecosystems to such an extent that the native species can no longer compete. Environmental management must balance the benefits and costs to both the economy and the environment. Monocultures often precede ecosystem collapse. Thus, managing for biodiversity must take priority in ensuring we all live in a healthy, shared habitat.

We need biodiversity to support the whole ecosystem. There is much more there than just the grasses, such as native birds, voles, and insects. Grasslands are important in carbon cycling, and actually use more carbon per acre than trees. Root structures of native grass are deeper than those of non native grasses, and are also deeper than those of trees. Thus erosion of non native areas is more drastic than of native areas. For example, more riverbanks were lost in the June 2005 flooding in Calgary in areas with non natives.

Purpose of Study:

Invasive alien plant species, such as smooth brome and creeping thistle, are compromising the native biodiversity of the rough fescue grassland ecosystem in Whispering Woods natural area park in northwest Calgary. If the expansions of smooth brome and creeping thistle are left unchecked, then they will devastate the natural habitats in Whispering Woods, leaving behind a monoculture of weeds.

Objectives of Study:

This study had four objectives: a) to map the extent of the smooth brome and creeping thistle in Whispering Woods, and to monitor three successive years' growth; b) to investigate the impact invasive alien species have on global biodiversity; c) to promote awareness and conservation of native prairie ecosystems; and d) to continue being a steward for Whispering Woods.

Procedure:

Objective A:

- Mapped three seasons of growth of smooth brome, creeping thistle, and creeping bellflower in Whispering Woods: 2003, 2004, 2005.
- Used base maps provided by The City of Calgary Natural Areas Department to plot the locations of the invasive plants.
- Field mapping done by hand, and by GPS coordinates for intended later digital compilation.

Objective B:

- Researched global problem of invasive alien species.
- Researched impact of smooth brome and creeping thistle on native grassland ecosystems.
- Researched control methods for smooth brome and creeping thistle in natural areas.
- Interviewed Mike Harrison, City of Calgary Natural Areas Technician, on invasive species in Calgary. Obtained digital aerial survey maps from city database. Discussed management of smooth brome and creeping thistle on Nose Hill and in Whispering Woods. Discussed role of grasslands in carbon cycling.

Objective C:

- Entered Virtual Science Fair in 2004 on the issue of invasive species in Whispering Woods.
- Entered the Calgary Youth Science Fair and Virtual Science Fair in 2006.

Objective D:

- Make observations on weeds and park use over period of thirteen years of stewardship in park.
- Pull thistles prior to flowers going to seed; this is effective for managing small thistle populations.

Observations:

- Brome occurs in the aspen understory, where it is cool and shady.
- Brome is more common at the base of hills and in slight basins where there is more moisture.
- Brome and thistle grow inward from the sides of the park, and outward from the pathways.

- Fescue grassland still exists within the newer growth of brome, but has become

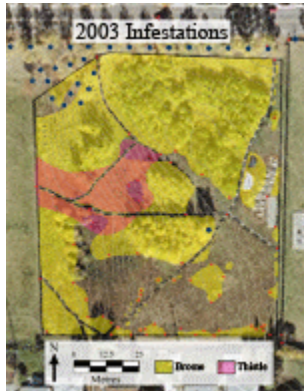


Figure 1 Extent of invasive species: 2003



Figure 2 Extent of invasive species: 2004

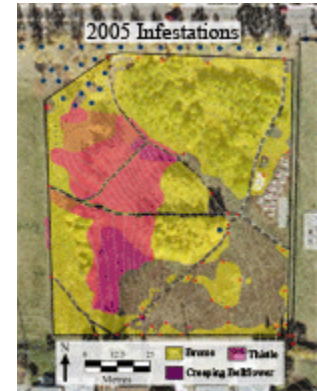


Figure 3 Extent of invasive species: 2005

Infestation Legend

- Fence or Boundary
- Major Pathway
- - - Minor Pathway
- GPS Data Point
- Street Tree

compromised.

- In older brome stands there is not as great a variety of other plants as there is within the fescue.
- In the southeast quadrant of the park there is a patch of brome that has grown considerably over the three growing seasons.
- The southern boundary of brome has been steadily advancing northward over the three growing seasons.
- Pulling goat's beard (another invasive weed) by hand seems to keep it under control.
- Thistle has grown outwards by large amounts every year, despite efforts to control it by pulling it out.
- Creeping bellflower is not yet a very big problem but there are three small patches which could become problems.
- There is a geocache in Whispering Woods that has attracted community members and school children off the paths into the willow groves.
- There are now trampled areas of healthy grassland leading to the geocache.

- The central area has recovered since the gravel pathways were put in because people no longer cut across this area.
- The dirt footpath in the southern half of the park becomes muddy in spring and after rainfalls.
- This footpath became braided after the June 2005 flooding, due to people walking beside the path instead of on the mud.
- The eastern side of the park has been disturbed by machinery and foot traffic, due to the building of the outdoor classroom, called the Prairie Amphitheatre. This area has been susceptible to brome, thistle and other weed invasions, but is being successfully managed by hand.
- The aspen groves have been extending their root systems into the rough fescue grassland.
- The buckbrush in the southeast quadrant has been growing, and does not seem to be affected by the brome grass.
- The most dominant plant that came back after the removal of the city's black and clear plastic experiments was buckbrush.



Figure 4 Extent of smooth brome: 2003-2005



Figure 5 Extent of creeping thistle: 2003-2005

Conclusions and Applications:

- Smooth brome and creeping thistle are choking out the native rough fescue grasslands in Whispering Woods.
- Smooth brome thrives in areas of moisture and in dappled shade, such as underneath an aspen canopy.
- Geocaching in Whispering Woods creates new trails, tramples native prairie, and may help spread smooth brome and creeping thistle.

- Installed pathways cause less trampling of the grassland habitat around them.
- The major dirt path should receive a gravel trail mix as soon as possible to prevent further braiding.
- Aspen groves are expanding, and are considered a weed when they encroach on the rough fescue grasslands.
- Thistle needs a more effective treatment than pulling. It should be treated with a herbicide to get it under control for future hand management.
- The City of Calgary Natural Areas Department is welcome to use my data from Whispering Woods, as they have not yet mapped the area.
- Pulling goat's beard by hand is an effective treatment when the populations are relatively low.
- The least invaded areas in the southeastern portion of the park should be preserved as rough fescue grassland. Any plant invading this grassland habitat should be removed, including aspen and extensive buckbrush.
- A management program should be created for the park that includes the elimination of thistle and brome.
- Whispering Woods could be used as an experimentation and educational site for getting rid of these invasive species.

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