



Effects of mowing on *Sphagnum* regeneration in a degraded peat bog

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INTRODUCTION

- *Sphagnum* mosses are keystone species in healthy peatlands, which are important carbon sinks
- Bog restoration is being attempted at Richmond's Garden City Lands, on the western margin of the fragmented and degraded Greater Lulu Island peat bog
- The site has historically been mowed annually to prevent invasive species from dominating
- Effects of mowing on *Sphagnum* are unknown

OBJECTIVE

- Compare *Sphagnum* growth and vigor in mowed and unmowed plots at the Garden City Lands

METHODS

- Study conducted in an area of the bog dominated by hardhack (*Spirea douglasii*) and Sitka sedge (*Carex aquatilis* var. *dives*).
- 24 paired plots (6.0 x 6.25 m) in a randomized complete block design with 12 replicates and two treatments:
 1. Mowed: Annual mowing with a flail mower in late October until 2022
 2. Unmowed: No annual mowing from 2019 onwards
- *Sphagnum* cover (%) estimated in November 2019, 2022, and 2023
 - 2019: Proportion of surface covered with green plant matter calculated from photographs (Canopeo app)
 - 2022 & 2023: *Sphagnum* patch length measured along two transects through each plot, with field estimates of *Sphagnum* cover recorded for each patch

$$S = 100 * \frac{p * c}{t}$$
 - S = *Sphagnum* cover (%)
 - p = patch length
 - c = cover estimate within patch
 - t = total transect length
- ANOVA used to test for effects of year, treatment, replicate, and year * treatment interaction on *Sphagnum* cover

Mowing inhibits *Sphagnum* regeneration in a degraded peat bog



Sphagnum hummocks beneath hardhack and Sitka sedge.



Standing water in mowed and unmowed plots, February 2022.

RESULTS

- No difference was observed between treatments in 2019
- *Sphagnum* cover increased from 6.6% in 2019 to 31.9% in 2023 in unmowed plots, but did not increase in mowed plots (Fig. 1)
- Most *Sphagnum* in mowed plots occurred near plot edges.

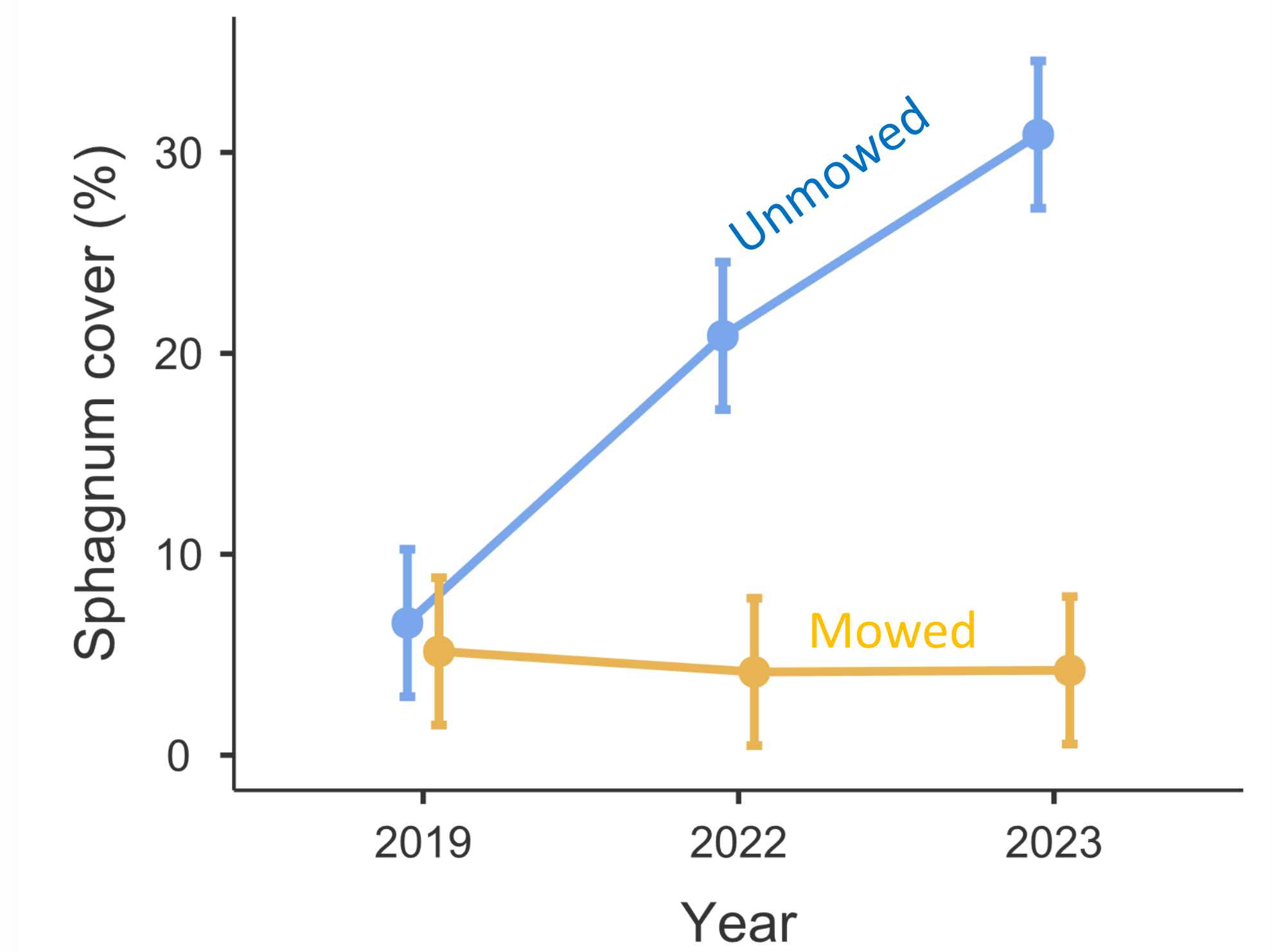


Figure 1. *Sphagnum* cover in mowed and unmowed plots between 2019 and 2023. Error bars denote standard error.

DISCUSSION

- Annual mowing clearly inhibits *Sphagnum* regeneration at the study site
- None of the plots will be mowed from 2023 onwards. Continued monitoring will determine how long the difference between the treatments persists.
- Based on this work, the Richmond Parks Department has modified its annual mowing regime (Fig. 2):
 - Areas with similar vegetation to the study site, and little to no invasive European birch (*Betula pendula*), are being left unmowed.
 - Fall mowing is timed to promote desirable bog species.

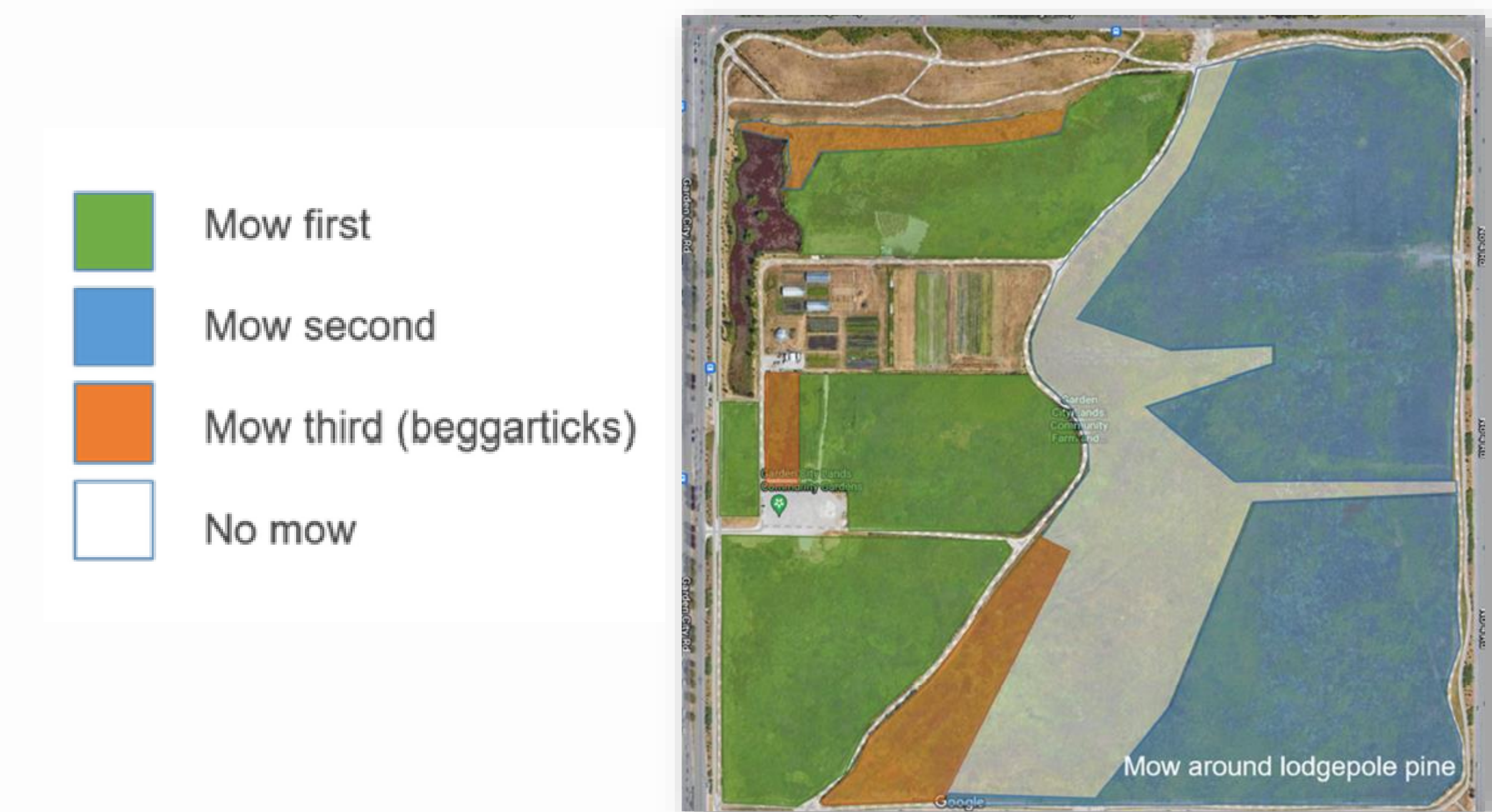


Figure 2. Fall 2023 mowing plan for Garden City Lands.

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