

**BIPOLE III TERRESTRIAL ECOSYSTEMS AND VEGETATION
ENVIRONMENTAL MONITORING**

ANNUAL REPORT -YEAR VII

**Prepared for:
Manitoba Hydro**



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Reference: Field Program Summary – Bipole III Environmental Monitoring Project/ Summer/ 2020/ Vegetation Survey (PRA)

OBJECTIVE

This season represents the final year post construction vegetation monitoring of the native grassland/prairie. The objective was to monitor the prairie over a three-year duration post-construction.

METHODS

STUDY DESIGN

A PRA monitoring survey (established 2015) was revisited in an unseeded (native) grassland opening. Surveys consist of five 1 m by 1 m quadrats spaced at 5 m increments along a 30 m transect for herbs and low shrubs ≤ 1 m tall. Tall shrubs $> 1 - 2.5$ m tall were estimated in plots 2.5 m by 2.5 m centered around the herb and low shrub plots. The first quadrat was placed at the 5 m mark. Species composition, abundance and structure were recorded following methods outlined by Redburn and Strong (2008).

DATA COLLECTION

A single grassland prairie (PRA) site was surveyed for vegetation monitoring on July 26, 2020. Data was recorded in field notebooks and photographs were taken at the site. In addition to vegetation monitoring, any noxious species were recorded, as were species of conservation concern. Mitigation measures were reviewed for this site. The field team included Karin Newman and Alanna Sutton.

RESULTS

The single PRA monitoring site (S1_PRA_900) is a dry sandy prairie, shrubby in places with regenerating aspen saplings (*Populus tremuloides*) primarily to 2 m, with very sporadic individuals reaching < 4 m. Slower growing regenerating bur oak (*Quercus macrocarpa*) is present as seedlings, generally < 1 m in height. Regenerating aspen continues to encroach into the original prairie opening, Photograph 1.

A summary of vegetation measures from pre-construction (2015) and five years throughout monitoring is shown for the single PRA site in Table 1.

Total vegetation cover for this site has increased this year (to 71%), and species richness remains similar compared to previous years (about 33 species). However, the diversity and evenness values have dropped considerably, mostly due to the domination of one grass species (Kentucky bluegrass), with no other species matching that abundance. In addition, very few other species occur with greater than a sparse amount: only seven species account for between 2% and 10% cover.

Table 1. Grassland site vegetation measures on RoW during pre-construction and monitoring, 2015 to 2020.

| | Pre-Con | Construction, Monitoring | | | | |
|--------------------------|---------|--------------------------|------|------|------|------|
| | 2015 | 2020 | 2019 | 2018 | 2017 | 2016 |
| Species Cover (%) | 62.8 | 71.0 | 58.6 | 53.2 | 74.4 | 52.8 |
| Species Richness | 38 | 33 | 33 | 26 | 33 | 30 |
| Diversity | 2.65 | 1.33 | 2.53 | 2.65 | 2.27 | 2.54 |
| Evenness | 0.73 | 0.38 | 0.72 | 0.81 | 0.65 | 0.75 |
| Number of Surveys | 1 | 1 | 1 | 1 | 1 | 1 |

Vegetation cover in the understory is composed of broad-leaved forbs (22.2%) and grasses (41.8%). Grasses are dominated by Kentucky blue grass (*Poa pratensis*, 29.0%), with big blue stem (*Andropogon gerardii*, 3.4%), sand grass (*Sporobolus rigida*, 3.0%), and nine others. The most abundant broad-leaved plants are leafy spurge (*Euphorbia virgata*, 8.8%), prairie sage (*Artemisia ludoviciana*, 6.2%), Canada anemone (*Anemone canadensis*, 1.4%) hairy-golden aster (*Heterotheca villosa*, 1.4%) and trembling aspen (*Populus tremuloides*, 1.4%) seedlings. Regeneration of trembling aspen (<2m primarily) and occasional bur oak have encroached into the original prairie opening, although encroachment appears stable compared to previous year. Regeneration is intermittently dense at this previously open site, some saplings along the transect are >2.5 m in height and were recorded in the tree canopy.

A single noxious plant leafy spurge (*Euphorbia virgata*, Tier 2) has been observed in patches in the RoW in this area since 2015 and has become a component of the RoW in and around this prairie site, now more widespread and abundant.

Evidence of broad-scale herbicide application was apparent over the width of the RoW for several miles, up to and beyond the angle towers on either side of the PRA site. Growth from woody and herbaceous broad-leaved species were widely affected (leaves brown and dry, or yellow and dying), Photographs 1 and 2. Herbicide treatment had left trembling aspen leaves brown and shriveled, while leafy spurge leaves were yellow, brown and many had dropped off the plants. The growth habitat of smaller plants (e.g., narrow-leaved puccoon) was affected by herbicide treatment, as plants were still standing, but with dead and dying vegetation. Graminoids were not affected by herbicide application.

Hairy prairie clover plants around the tower adjacent to PRA-900 were flowering (July 26, 2020), although were prematurely senescing. The leaves of most plants were yellowed, and growth of plants was less erect (Photograph 3). Hairy prairie-clover is listed as Threatened under Manitoba *The Endangered Species and Ecosystems Act* and the *Species at Risk Act*, and is listed federally as Special Concern under SARA. Hairy prairie-clover was first observed in 2010 during rare plant surveys for the Bipole III environmental assessment and has been observed each year at the same locations during monitoring (2014 through 2020).

In 2018, construction activities at the tower footing directly adjacent to this site led to greater disturbance, including vehicle tracks and soil disruption as machinery was used to erect the tower. The very sandy soil is highly susceptible to disturbance. In both 2018 and 2019 swaths of *Chenopodium* spp. and other invasive species were noted in the tower footing. In 2020, while there was still a high degree of bare soil at the footing, vegetation was for the most part made up of native species, including a native prairie grass that had not previously been noted in this location, needle-and-thread grass (*Hesperostipa comata*, S3S4), Photograph 4.

At least nine imperilled to vulnerable species were found in this area in 2020, in the RoW, and in and/or incidental to the plot at S1-PRA-900. American bugseed (*Corispermum americanum*, S3) was found off-

RoW on the roadside adjacent to the site, see Table 2. Prairie spike-moss (*Selaginella densa*, S3), has not been relocated since it was first observed prior to clearing in 2015.

Among the species of conservation concern rankings, are three imperilled species (S2 to S2S3), Schweinitz's flatsedge (*Cyperus schweinitzii*, S2), hairy prairie-clover (*Dalea villosa*, S2?), and sand millet (*Dichanthelium wilcoxianum*, S2?). Six species are vulnerable (S3 to S3S5), Table 2.

| Table 2. Species of conservation concern recorded on RoW in grassland site, 2020. | | |
|--|-------------------------|-------------|
| Species | Common Name | Rank |
| Imperilled Species (S2-S2S3) | | |
| <i>Cyperus schweinitzii</i> | Schweinitz's Flatsedge | S2 |
| <i>Dalea villosa</i> | Hairy Prairie-clover | S2S3 |
| <i>Dichanthelium wilcoxianum</i> | Sand Millet | S2? |
| Vulnerable Species (S3-S3S5) | | |
| <i>Corispermum americanum</i> | American Bugseed | S3 |
| <i>Hesperostipa comata</i> | Needle-and-thread Grass | S3S4 |
| <i>Lithospermum incisum</i> | Linear-leaved puccoon | S3 |
| <i>Lygodesmia juncea</i> | Skeletonweed | S3S4 |
| <i>Sporobolus cryptandrus</i> | Sand Dropseed | S3S5 |
| <i>Sporobolus rigidus</i> | Sand Reedgrass | S3S5 |

As part of the field report, the predicted effects on vegetation and terrestrial ecosystems were evaluated. For the Project area assessed in Section S1, the effect predictions for native grassland/prairie area were accurate for the following:

- Potential loss of plants of conservation concern
- Environmentally sensitive sites may be affected
- Loss of native forest vegetation

Vegetation monitoring determined if recommended mitigation was implemented and effective, and to identify unforeseen effects. Recommended mitigation was previously implemented for native grassland/prairie vegetation, during clearing and construction. In the absence of mitigation, site disturbance likely would have increased. Activities appeared to occur on dry ground to minimize surface damage, rutting and erosion. Existing access roads and trails appeared to be used, and tree clearing occurred within the RoW.

In 2020, the RoW continues to show a high degree of bare sandy soil near prairie monitoring site (S1-PRA-900), from previous tower construction activities but native species are returning in the area.

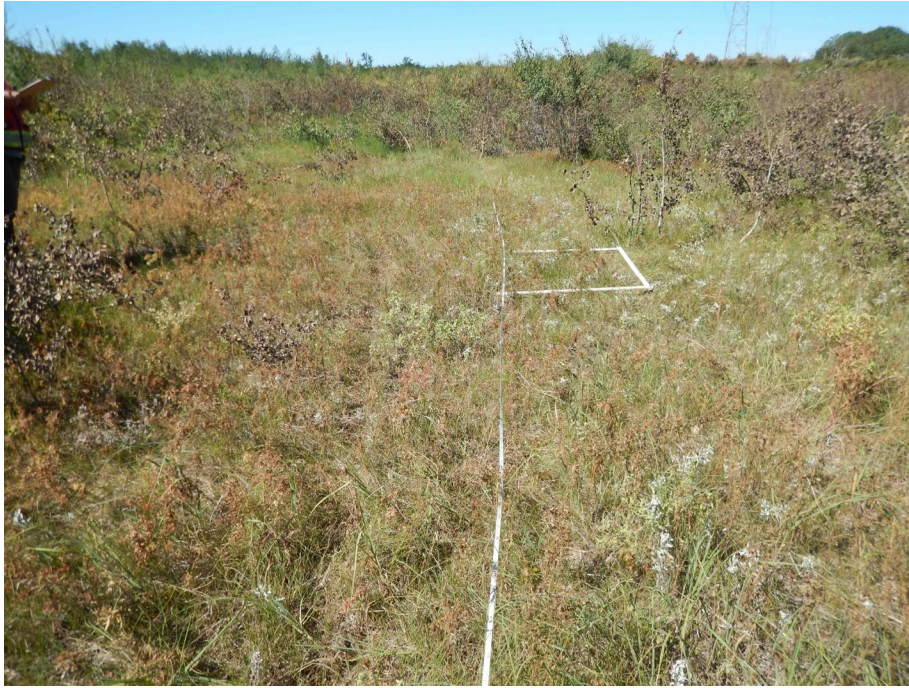
NOTABLE INFORMATION AND RECOMMENDATIONS

- Field surveys were carried out as planned and no concerns were identified with the sampling program.
- Leafy spurge (*Euphorbia virgata*, Tier 2) has been observed in patches in the RoW in the PRA area since 2015 and has become a component of the RoW in and around this prairie site, now more widespread and abundant.
- Evidence of broad-scale herbicide application was apparent over the width of the RoW for several miles, up to and beyond the angle towers on either side of the PRA site. Growth from woody and herbaceous broad-leaved species were widely affected (leaves brown and dry, or yellow and dying). Graminoids were not affected by herbicide application.
- Threatened hairy prairie-clover plants were prematurely senescing due to herbicide treatment. The leaves of most plants were yellowed.
- Tower footing at PRA-900 has few invasive plants this year, and a new native grass (needle-and-thread grass) was recorded at and around the tower base.
- This season marks the final year of vegetation monitoring for the PRA site.

REFERENCES

Redburn, M.J. and Strong, W.L. 2008. Successional development of silviculturally treated and untreated high-latitude *Populus tremuloides* clearcuts in northern Alberta, Canada. *Forest Ecology and Management*, 255: 2937-2949.

PHOTOGRAPHS



Photograph 1. Monitoring at S1-PRA-900.



Photograph 2. Vehicle disturbance and herbicide treatment on RoW.



Photograph 3. Hairy-prairie clover plants affected by broad herbicide application.



Photograph 4. Needle-and-thread grass recorded at the base of tower.