

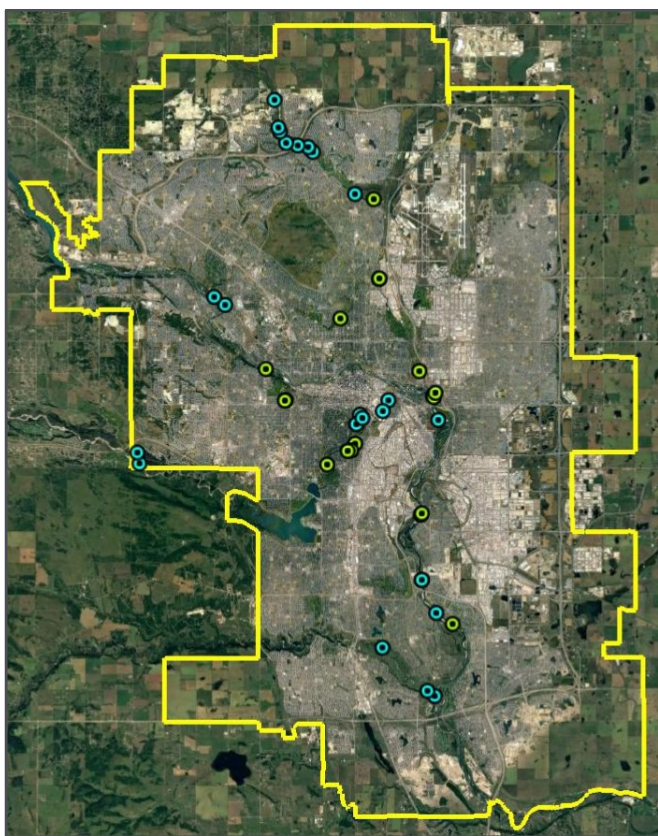


## The City of Calgary Riparian Monitoring Program 2018 Summary of Recommendations for Project Managers

May 2019

The City of Calgary (The City) Riparian Monitoring Program (RMP) is a 5-year monitoring program (2018-2022) with the goal of providing a better understanding of:

1. Long-term riparian health trends, and
2. The effectiveness, limitations, and success factors of recent and ongoing river bank bioengineering, and riparian planting projects to inform continual improvements and best practices for project managers.



2018 RMP Effectiveness  
Monitoring Sites

### 2018 Effectiveness Monitoring Sites

RMP monitoring sites were selected from a list provided by The City of 116 bioengineering bank and riparian planting projects constructed over the period of 2007 to 2018. In 2018 the monitoring sites consisted of **19 bioengineering bank sites** (shown below in green), and **23 riparian planting sites** (shown below in blue). These sites were located along the Bow River, Elbow River, Nose Creek, West Nose Creek, Fish Creek, Shaganappi Creek, and Confederation Creek. Of those sites, 4 bank and 8 riparian sites were identified as failures due to vegetation survival of less than 25% or due to unsuitability for monitoring.

### Recommendations on How to Improve Riparian Projects

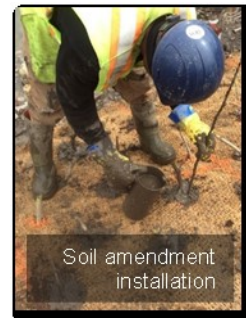
1. Improve project documentation and record keeping, and share it with the RMP team.

**Why?** Projects cannot be monitored as part of the RMP without an understanding of the design, implementation and maintenance that occurred. As-built drawings and maintenance records were particularly difficult to track down in 2018. RMP ratings for each projects are based on available documentation; projects with incomplete documentation received lower ratings.

2. Apply a soil amendment on live cuttings.

**Why?** Applying a soil amendment was found to have a statistically significant increase on leader growth and a higher total cutting survival.

**How?** Use the soil amendment shown in Guideline M of the *Design Guidelines for Erosion and Flood Control: Streambanks and Riparian* (AMEC, 2012)



- Put fences around newly installed live cuttings and rooted stock until vegetation is established.

**Why?** Sites with fencing to protect from rodents, dogs, and human disturbances were found to have higher total live cutting survivorship than sites with no fences (64% versus 25% survivorship). Lack of fencing was found to be a limiting factor to project success and a likely contributor to failed riparian planting projects.

- Avoid planting in anoxic soils.

**Why?** Anoxic soils were found to be a limiting factor for live cutting survival at several of the failure sites.

**How?** Anoxic soils are identifiable by the 'rotten egg' smell and a bluish/black colour. Test soil conditions prior to installation with a small test pit or pilot hole.

- Use the appropriate matting products and install according to best practices.

**Why?** Site observations were noted of plastic turf reinforcement matting and light duty coir matting used for timber crib wall fill containment. Plastic matting will likely last longer than the timber and result in future removal/disposal issues, in addition to impacts to wildlife. Light duty biodegradable matting was observed to have degraded prior to vegetation establishment and the fill in the timber crib is at risk of or has already washed out. Additionally, upstream and downstream keys were often observed to be insufficient. In some cases, material behind the matting was actively eroding or was at risk of erosion.

- Where appropriate, use potted plants instead of live cuttings and install according to best practices.

**Why?** Measured survivorship of potted plants was much higher than live cuttings.

**When?** Use potted plants when the intended objective is to improve cover of riparian vegetation - but not when soil stabilization is desired. Other recommendations are to use species best suited to local conditions and planting in clusters with mulch.

- Use live cuttings according to best practices described in the Design Guidelines (AMEC, 2012) including install during dormancy per the planting schedule shown below, specify minimum length of 60cm and minimum diameter between 2cm to 5cm, install at a minimum burial depth of 80% of the length, soak for 5 to 7 days prior to installation, and cover and water when in storage.

**Why?** Live cuttings will be more likely to establish and succeed. The most successful sites observed followed the above best practices. A photo of live cuttings installed during the recommended period (April) and a less favorable period (August) is shown below. The survival of the live cuttings was excellent for April and almost zero for August.

Alternative Approach: Rooted live cuttings can be installed in August-September. Trials of this technique are underway in Calgary.



- Improve maintenance practices including controlling weeds (esp. invasives), irrigation, fencing repairs, minor erosion repairs, replacing dead vegetation, re-seeding poorly established areas, and documentation.

**Why?** Vegetation establishment typically takes 2-3 years. Maintenance is especially required in this period to keep fencing in good shape to limit damage by wildlife and humans, provide adequate moisture for plants to grow, limit competition from aggressive weeds, and document that the above occurred.

Table 1. Recommended Planting Schedule for Bioengineering and Riparian Planting Projects in Calgary

Vegetation Type <sup>1</sup>	January	February	March	April	May	June	July	August	September	October	November	December
Native Plant Seeding <sup>2</sup>				*	*	*	*				+	+
Container Plants <sup>3</sup>											+	+
Live Cuttings - Harvest <sup>4</sup>												
Live Cuttings - Installation <sup>5</sup>												

Notes:

\* after ground thaw.

+ before ground freeze.

<sup>1</sup> Recommended schedule is subject to change as new information is collected.

<sup>2</sup> Spring native seeding period: after ground thaw to mid June at the latest (May is preferred). Fall native seeding period: October to ground freeze. **Source:** The City of Calgary. 2018. The City of Calgary Seed Mixes.

<sup>3</sup> **Source:** Smreciu, A., Sinton, H., Walker, D., and Bietz, J. 2003. Establishing Native Plant Communities; NRCAN. 2017. A Guide to Planting: Timing, Microsites, Techniques, and Monitoring.

<sup>4</sup> All live cuttings to be harvested during the dormancy period - typically October to March. **Source:** AMEC. 2012. Design Guidelines for Erosion and Flood Control Projects for Streambank and Riparian Stability Restoration.

<sup>5</sup> Live cuttings harvested in October to March to be installed either immediately or no later than the third week of June. Live cuttings harvested over the previous October-March period shall not be stored over the summer and planted in the following installation period. **Source:** Smreciu, A., Sinton, H., Walker, D., and Bietz, J. 2003. Establishing Native Plant Communities

**For more information on the Riparian Monitoring Program, please contact:**

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