



Flin Flon & Creighton

Green Project News

Volume 5 April, 2005

Introduction

- 2005 will be the sixth year for our community-based project.
- Our purpose is to accelerate the re-vegetation of barren areas in and around our communities by the application of crushed limestone.
- Because of the ruggedness of our terrain, it is not feasible to do the work by machine, so we use people-power, namely students from local schools, and adult volunteers.
- Vegetation growth during 2004 has been very satisfactory - in some of the areas we treated in 2000 and 2001, birch trees are now more than two metres tall.
- The scientific and organizational background to our project are explained in Appendices 1 and 2 - below.

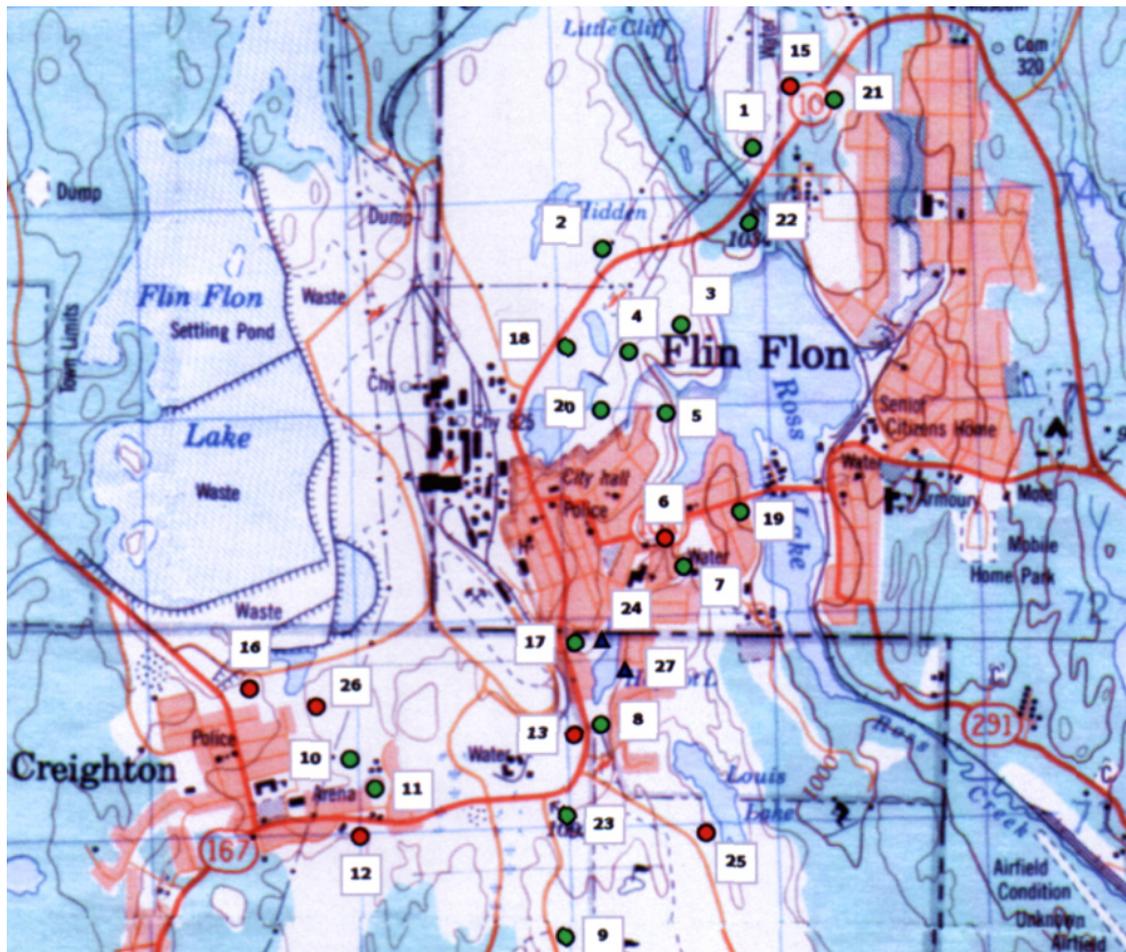
Our Partners

We gratefully acknowledge that our project has been made possible through the generosity of our partners. Major funding for the work in 2004 came from Manitoba Conservation - Sustainable Development Innovation Fund, the Northern Neighbours Foundation Inc. (Flin Flon), and Hudson Bay Mining and Smelting Company Limited. The City of Flin Flon and the Town of Creighton hauled the limestone to the areas to be treated. Flin Flon School Division and its Youth Mentor Program, and Creighton School Division supplied the

bulk of our workforce. Manitoba Industry, Economic Development and Mines, and Hudson Bay Exploration and Development Company Limited supplied us with air photographs. Kelly Gilmore supplied us with birch seed from his lot at Bakers Narrows. Edgar and Mary Wright supplied some of the plants for the transplant project. Flin Flon and District Environment Council helped us with project administration. Home Hardware donated supplies.

Area Treated

During a field season lasting from May 12 through September 29, 64.4 yards of crushed (dolomitic) limestone was spread in 7 areas for a total of 3.86 hectares (9.54 acres). The total area covered to date (2000-2004) is 22.6 hectares (55.8 acres). The map shows the locations of the treated areas.



Red circles indicate areas treated in 2004. Blue triangles are new areas for 2005. (Area names are as follows: 1: Balsam, 2: Rock Cut, 3: Second Valley

North, 4: Second Valley West, 5: First Avenue, 6: Hiawatha, 7: Grandview, 8: Hapnot, 9: Phantom, 10: Knight North, 11: Knight, 12: Pizza, 13: South Main, 15: Esso, 16: Creighton North, 17: Super K, 18: Triple Seven, 19: Market, 20: Reservoir Hill, 21: Lancaster, 22: Railroad, 23: Phantom North, 24: Hapnot North, 25: Louis, 26: Creighton East, 27: South Hudson.

Personnel

The work was carried out by 519 individuals during 30 sessions (450 students in 18 sessions, and 69 members of the general public in 12 sessions). Some of our workers are shown below. On the left are grade three students from Creighton School at our Creighton North area in June, and on the right are community volunteers at our Hiawatha area after an evening session in July.



New Growth in Treated Areas

The areas we are treating are either totally barren, or have a few scattered tufts of the metal-tolerant grass *Agrostis stolonifera*, and a few stunted 'relict' poplars, birches, and willows. Original organic topsoil is commonly entirely absent, or where present is thin. The ground surface is a combination of bare rock outcrop, and sandy or silty gravel with a variable content of pebbles and boulders. Areas treated in May and early June of each project year have generally shown some signs of life (typically Manitoba maple) within a month. By August, seedlings of birch, aspen, balsam poplar, and a variety of willows appear. Although the maples tend not to over-winter well, the others flourish, and in the second season grow to about half a metre. Birches in some of the areas we treated in 2000 and 2001 are now

over two metres tall (the picture shows coordinator Dave Price with some of these in the Knight area in September). A few scattered spruces tend to



appear in the second year. Flowering plants such as Bicknell's geranium, fireweed, corydalis, etcetera are found here and there. Although the grass *A. stolonifera* is metal-tolerant, it does far better in treated than in untreated areas. While all areas treated to date have responded positively, the results in some areas are more spectacular than in

others (see Appendix 3) - this is one aspect of the project being looked into by our consultant, Professor Winterhalder.

Planting and Seeding

Although we are depending primarily on the natural 'seed rain' to do the re-vegetating for us, over the past several years we have done some small-scale experimental planting and seeding. In the spring of 2004, we scattered locally collected alder and birch seeds in several of our 'slow' areas, and pine cones in these as well as in some of our 'good' areas. Because of the cooler and wetter than normal season, the cones were still tightly closed in the fall. The birch seeds had germinated in one area (Reservoir Hill) by late August. We will continue to monitor these areas through 2005.

Understory plants - forbs and small shrubs - are generally sparse in our treated areas, so in July, at the suggestion of Professor Winterhalder, we set up a number of plots containing a variety of species transplanted from locations in and around Flin Flon. These included fireweed, rose, blueberry, prairie lily and so on. We will monitor the plots through 2005, and do additional transplanting of species that take well, and show signs of spreading.

Pine and spruce cones were scattered in eleven of our areas in 2002 and 2003. Seedlings from these cones were noted in six of the areas in the fall of 2004 - all in Saskatchewan. Those scattered by Saskatchewan



Environment personnel in our Knight North area are doing particularly well - as illustrated in the picture to the left. The pine and spruce seedlings planted by the Cubs and Beavers in May 2003 in our Second Valley area are also doing well - almost all of the pines have recovered from the reddening noted in the March 2004 issue of 'Green project News'.

Technical Support

Botanist, Professor Keith Winterhalder from Sudbury, spent five days here in July monitoring vegetation growth and soil chemistry in some of our project areas. Copies of the technical reports on his visits here in 2000 - 2002 are available for inspection at Flin Flon Public Library. We have a preliminary report on his visit here in August 2003, and expect final reports on his 2003 and 2004 visits shortly.

Photography

During our first four project years we took 741 pictures, and in 2004 we took an additional 236. These will serve as a permanent record of the project, and are being used for public relations purposes. Pairs of 'before-and-after' pictures illustrate in a dramatic way, how effective the limestone treatment is proving to be. The picture below left was taken at our Hapnot area in June 2000. To the right is the same scene in August 2004.



Public Relations

Articles in the daily 'Reminder' and the weekly 'Gazette' kept our project in the public eye again in 2004. We also had coverage from our local radio station, CFAR. 'Green Project News' comes out each spring - copies are distributed to interested parties, deposited at Flin Flon Public Library and are down-loadable from our web site. We make posters which are distributed to local schools. We plan to put up a new informational sign on the project at the Creighton Tourist office shortly. Our web site is at www.greenproject.ca

Future Plans

We aim to treat five hectares in 2005. Because ours is a low-cost project that relies on volunteers to do the heavy work of hauling limestone, areas must be reasonably accessible. They must also be visible so that our volunteers - as well as members of the general public - are able to see the results of their work. Our success in covering the ground means that by the end of the coming season, we expect to have covered pretty well all of the areas that meet the above criteria. Our committee will be meeting later this month to discuss the future of the Green Project - but it is possible that this may be our final year of operations.

Additional Information

Please contact any of the following committee members:

Heather Acres: (204) 687-4319 (home),
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or contact our technical consultant :

Professor Keith Winterhalder: (705) 674-7905,
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and check out our web site at: www.greenproject.ca

APPENDIX 1: Organizational background and procedures

In the late 1960s and early '70s, botanists at Laurentian University - among them our technical consultant, Professor Keith Winterhalder - found that the application of crushed limestone to the barren acidified and metal-contaminated soils around Sudbury led to the regeneration of vegetation. A major program of limestone application since then has led to a transformation of the Sudbury landscape.

In the early 1990s, Rena Gummerson and later Cathy Hynes of the Creighton /Denare Beach Economic Development Committee contacted Professor Winterhalder to see if he might be interested in helping to set up a re-vegetation program in our area. This resulted in his first visit up here in 1994. In 1999, Heather Acres and Clarence Pettersen of Flin Flon School Division thought that re-vegetation would be a good project for their Youth Mentor Program. Hudson Bay Mining and Smelting Company Limited and the Flin Flon Economic Development Commission provided funding to bring Professor Winterhalder up here in October 1999. He spoke to a number of groups and generated a high level of interest and enthusiasm. As a result, the decision was made to establish the Green Project. A committee was formed, and planning meetings were held in March and April 2000. Through the generosity of McKeen's Trucking - who donated 130 yards of crushed limestone - we were able to start work in May 2000. Since then, the Green Project has become an affiliate of the Flin Flon and District Environment Council.

Present members of the committee are: Flin Flon School Division - Youth Mentor Program, Creighton School Division, City of Flin Flon, Town of Creighton, Flin Flon and District Environment Council, Hudson Bay Mining and Smelting Company Limited, Manitoba Industry, Economic Development and Mines, and Saskatchewan Environment.

The first stage in planning our field operations involves checking out maps and air photographs. From these we get a general idea as to which areas might be suitable for treatment. We then walk over the ground, and once we

decide on our areas, we divide them into 50 x 50 metre squares. The crushed limestone is then trucked in and dumped as close as possible to the squares. We mark out the sides of the squares with rope. Our volunteers fill their pails at the dump then spread the limestone in a strip between a pair of 'moving ropes'. As each strip is filled, we move the ropes and continue in this way until the whole square is covered.

APPENDIX 2: Environment and Science

In and around the communities of Flin Flon and Creighton¹, there are large areas with little or no vegetation. Old tree stumps show that these areas were once forested.

In the 1920s and '30s when our communities and the smelter complex were first established, many trees were cut for fuel and lumber. Others were cut to make fire breaks, or were burned in forest fires. As production from the Flin Flon and other mines increased, so did the amount of sulphur dioxide smoke from the smelter. The smoke is harmful to vegetation, so the forest was not able to recover. The increasing acidity and metal content of the soil meant that only a very few hardy types of plant were able to survive. As the plants died, the thin topsoil washed away.

High levels of metals such as copper and zinc in the soil are toxic to plants². This toxicity is accentuated by acidity, which makes the metals more soluble, and therefore more accessible. When seeds germinate in metal-contaminated soil, growth stops immediately on contact with the toxic soil solutions. The carbonate ion in the limestone tends to neutralize soil acidity, thus making the metals less soluble, and less toxic. Another component of the limestone, calcium, contributes to reducing soil toxicity by competing with zinc ions for uptake by plant roots. Calcium ions also have a strengthening effect on the plasma membranes in the root cells. This membrane is responsible for determining what is absorbed by the roots.

¹ *Flin Flon and Creighton are situated on either side of the Manitoba/Saskatchewan boundary about 600 kilometres north of the Canada/US border. A large copper-zinc ore body was discovered at Flin Flon in 1915, and production - which started in 1930 - continues to the present day.*

² *This paragraph is from information supplied by Professor Winterhalder.*

Since the early 1970s, Hudson Bay Mining and Smelting Co., Limited has spent hundreds of millions of dollars to improve technology at the smelter complex, with the result that emissions of sulphur dioxide and metal oxide dust are now significantly reduced. The natural vegetation is slowly starting to recover. Our project will accelerate this recovery.

APPENDIX 3: Vegetation-cover score card - fall, 2004

Area (& Distance)*	Year Treated	A	B	C	D	E	F	Total Score
Balsam (1.9km)	'01	1	-	2	1	1	0	5
Rk Cut (1.1km)	'01	1	1	-	0	0	0	2
SecV-N (1.1km)	'00-'02	1	-	2	1	1	0	5
SecV-W (0.9km)	'00,'01	1	0	-	0	0	0	1
FirstA (1.0km)	'00	1	-	2	0	0	0	3
Hiawa (1.1km)	'02	1	-	2	0	1	0	4
Grandv (1.3km)	'01	1	-	2	0	0	0	3
Hapnot (1.6km)	'00-'02	1	-	2	1	1	1	6
Phant (2.5km)	'01-'03	1	-	2	1	1	1	6
KtNor (1.7km)	'01	1	-	2	1	1	1	6
Knight (1.8km)	'00	1	-	2	1	1	1	6
Pizza (2.0km)	'01,'03	1	-	2	1	1	1	6
SoMain (1.6km)	'02,'03	1	-	2	0	1	0	4
Esso (2.2km)	'02,'03	1	-	2	0	1	0	4
CrtNor (1.6km)	'02,'03	1	-	2	1	0	1	5
Sup-K (1.2km)	'02	1	-	2	0	0	0	3
TripSev (0.6km)	'02	1	0	-	0	0	0	1
Markt (1.4km)	'02	1	-	2	0	0	0	3
ResHill (0.7km)	'02,'03	1	-	2	0	0	0	3
Lanc (2.3km)	'03	1	1	-	0	0	0	2
RailRd (1.7km)	'03	1	1	-	0	0	0	2
PhantN (1.9km)	'03	1	-	2	0	1	0	4
Louis (2.3km)	'04	1	1	-	0	0	0	2
CrtEast (1.4Km)	'04	0	0	-	0	0	0	0

A: Improved grass cover/quality.

B: Two to four bushy seedlings noted per 50x50m. square (score 1).
C: Five or more bushy seedlings noted per 50x50m. square (score 2).

D: One or more bushy seedling 50cm. or more high.

E: Two or more understory varieties present.

F: Self-seeded spruce/pine seedlings present.

- *Approximate distance of area from HBMS Co. stack.*

