



Agricultural Business Profiles

Turfgrass Production on Organic Soils

This Agricultural Business Profile was designed to incorporate existing documentation specifically relating to turfgrass production on peatland soils. The intent of this paper is to provide the reader with an awareness of the industry in order to further investigate turfgrass production as a viable business venture. The reader should be cautioned that this article is not a substitute for a business plan, but rather an information source for interested producers to use as a starting point. While every effort has been made by the author to ensure the accuracy of the information collected, it should be noted that some information may become dated over time. Prices quoted are reflective of current 2002 market prices and are subject to change.

Abstract

In Newfoundland and Labrador, peatlands comprise approximately 1.3 million hectares in areas where the peat exceeds 30 ha. Peat bogs are complex natural ecosystems which require severe changes to the bogs in order to bring them to sufficient production levels. In recent years, beginning in the mid-eighties, turfgrass production on organic soils has emerged as a viable option to complement existing farming operations or as an alternative for new entrants into the agrifoods industry. The sod industry is labour intensive requiring high levels of inputs in order to ensure economic viability. Successful producers have been able to take advantage of favourable economic conditions coinciding with an increase in urban development to expand markets.

Improvements in variety selection as well as different grass types have allowed producers the ability to explore new markets. Equipment design changes better adapted for peatland development, along with continued producer training, has provided the basics for Newfoundland and Labrador producers of peatland turfgrass the ability to compete in this competitive industry. Higher inputs and producer commitments have the potential to reward the grower with a satisfactory rate of return on owner investment.

INTRODUCTION

Newfoundland and Labrador has an historical attachment to agricultural development on peat soils. Peatlands have been utilized for regional pastures, vegetable production, forage crops, turfgrass production and more recently, cranberry production. Turfgrass production in Newfoundland and Labrador has experienced significant growth and expansion in recent years. Currently, there are approximately 20 turfgrass growers with 300 acres under production. Of this acreage, 280 acres are grown on peatland soils with the remainder grown on mineral soils. The value of the nursery sod industry is estimated at 2.4 million dollars.

Opportunities exist for current growers, as well as new entrants, to enter and expand the sod production industry. New home construction, lawn restoration, commercial landscaping and recreational facilities such as sports fields, provide commercial turfgrass growers with a niche market that has experienced rapid growth in recent years.

PEAT BOG EVOLUTION

Newfoundland and Labrador's peatlands were formed between 5,000 and 10,000 years ago following the last glacial movement. Peat soils consist of 93% to 97% organic matter at a minimum depth of 40 cm of peat. On average, peat formation occurs at a rate of 0.6 to 0.7 mm per year.

SITE SELECTION

When identifying peatlands as a suitable location for nursery sod production, the

producer should investigate the location as thoroughly as possible. Two important considerations should be made. **First**, is the overall bog suitable to be developed and **second**, is the bog completely undeveloped or has there been some production on the bog in the past? When considering overall development, aspects such as road construction, ease of drainage (are there land forms that may impede drainage systems?), power supply, market proximity (nursery sods are considered perishable), availability of labour and availability of suppliers are important.

The farmer should realize that access road development is not only important for accessing the bog, but equally important is the construction of roads around the perimeter of the bog. This allows the grower to seed, maintain and harvest fields without traversing over fields already in production and causing damage to this crop.

In relation to the history of the bog, it is important for growers to understand the implications of attempting to grow nursery sod on mature peatland as opposed to virgin peatland. One of the biggest obstacles in starting sod production on previously cropped peatland, is the infiltration of weeds, most notably, reed canary grass. While start-up costs may be reduced on mature peatland, the constant struggle controlling reed canary grass will negate any financial savings gained.

Other considerations such as land ownership (crown land versus private land), location (is the bog within a protected watershed area, municipal boundary or other protected area?), and overall suitability (slope, size and depth) are important factors to be addressed.

It is recommended that the provincial Drainage Specialist be consulted before further work on land acquisition takes place. If it can be determined that the peat is not suitable for turfgrass production, it will save the producer time and money and alternate sites can be investigated.

Land Acquisition - The first step in securing peatland is to apply to the local municipality, if the land is within the municipal boundary. If the municipality grants approval for development, the next step is to apply for a Crown Lands Lease which must be accompanied with the Municipal Recommendation Form. If however, development of this particular site is rejected by the municipality, you will have to search for another site. At Government Services and Lands, the Crown Lands Application must meet the approval of ALL Agency referrals before it can be approved. If any government agency, department or branch opposes the application, it can be rejected.

Land Survey - Once approval has been granted for the crown land, it is the responsibility of the farmer to have the land surveyed. There is a 12 month time limit imposed by Government Services and Lands to complete this stage.

Land Drainage - After the survey has been completed and registered, the peat bog has to be drained. The Drainage Specialist with the Agrifoods Branch of the Department of Forest Resources and Agrifoods will make a site visit and determine the optimal drainage design. The producer can then have the site drained by a private company, request the Agrifoods Branch to do the work or they may complete the work themselves if they have the necessary equipment. More sod producers are

purchasing their own equipment so that they can better utilize their own resources.

Due to the amount of requests for drainage and ditching work along with other responsibilities of the drainage crew, a maximum of 5 acres can be drained/ditched on a per farm basis in a year by the Agrifoods Branch.

Prospective growers must realize that the time frame from site identification to seeding could take up to two years depending on peatland availability, site selection, availability of equipment and management resources such as capital and labour.

Miscellaneous Expenses - The following expenses are estimates based on current market prices and are reflective of realistic charges that interested growers must budget for when developing new land.

Crown Lands Lease - \$100.00 + H.S.T. per application (Non-refundable)

Land Survey - Approximately \$1,000.00 + H.S.T.

Lease Registration - \$250.00 + H.S.T.

Drainage/Ditching - \$700.00 per acre for new development plus a “float charge”. The float charge is calculated at \$75 + \$1/km (up to a maximum of 300 km). A five acre development cost for drainage and ditching would be a maximum of \$3,875.00.

((5 x 700)+75+(1 x 300)).

TURFGRASS VARIETIES

Grasses generally can be categorized as either warm season or cool season grasses. Cool season grasses grow best in temperatures ranging from 15° to 24° C. Varietal selection

will be dependent on its use, appearance and market demands.

There are a number of species of turfgrasses available for sod producers in Newfoundland and Labrador. Producers use predominately Kentucky Bluegrass, (*Poa pratensis*) seed for sod production, however, some producers are experimenting with other grasses such as creeping red fescues as well as different mixtures of Kentucky Bluegrass varieties. Since all varieties have weaknesses and there is no “ideal” variety, it is recommended that a blend be used to offset individual varietal weaknesses with strengths from other varieties.

The most common grass used by turfgrass growers for lawns is Kentucky Bluegrass. This grass is known for its exceptional quality, dark green colour, texture and its tolerance to cold weather. It is highly adaptable to a wide range of soil conditions and management practices. This grass prefers moderate fertility, a well-drained bog site and full sun. As well, Kentucky Bluegrass can withstand extended drought conditions while in its dormant stage. Kentucky Bluegrass forms an excellent, strong sod via underground rhizomes making it highly suitable for peatland production.

Varieties - When using Kentucky Bluegrass (KB), the most common mixture consists of:

- 25% America KB
- 25% Touchdown KB
- 25% Alpine KB
- 25% Moon Shadow KB.

CULTURAL PRACTICES

In their natural state, peatlands are not suitable for crop production. They are acidic, infertile and are saturated with water. However, they also hold an advantage over mineral soils in that they are stone-free, have excellent water holding capability, good aeration when properly drained and a structure that encourages efficient root development. Determining the natural fertility of the organic soils can only be accomplished by conducting a soil test and having the sample tested at the Soil, Plant and Feed Lab., Department of Forest Resources and Agrifoods (see contact list at back of document). The results of this test will determine the turfgrass fertility program.

Limestone - Growers should take peat samples from the peatland to determine the current pH level. The peat analysis will indicate the amount of limestone required to bring the pH level up to the optimum level of 6.5 from 4.0; which is the average pH level for virgin peat soils. Producers should consult with area Agricultural Representatives on the Agricultural Limestone Program.

Fertilizer - The soil sample will also be analyzed to determine the amount of fertilizer required as well as the type of fertilizer for the successful growing of nursery sod. The recommendations will vary depending on the sample taken, but 10-20-20 with 2% Fitted Trace Elements (FTE) is used by most producers in the establishment year of production. This fertilizer is incorporated into the peat at a rate of 1,000 lb per acre. For a maintenance program, 15-15-15 with 2% FTE is used at a rate of 440 lb per acre 3 times per year. The high application rates along with the Fitted Trace Elements is necessary due to

the unique challenges associated with peatland production.

Seeding Rates - Seeding rates will vary among growers depending on the application process. If using a precision seeder, 110 pounds per acre is recommended. If using a shoulder seeder, 165 lb. per acre is suggested. Germination usually takes 10 - 28 days at 10° - 30° C. Seed is purchased in 55 lb.bags.



Uniform seeding is essential to proper establishment and, therefore, a precision seeder is highly recommended. Broadcast seeding decreases the chances of a successful stand and increases the labour and seeding costs.

Seeding Dates - Kentucky bluegrass can be seeded from late April until mid September. Depending on the size of the farm and available peat soil for planting, producers should try to stagger the seeding so that there is a consistent supply of sod available when markets dictate demand.

It is not uncommon for some fields to be planted in early spring and harvested in early fall. However, as with any agricultural commodity, optimum conditions must prevail in order for sods to be harvested during the first season. Usually, fields are planted in one

season and harvested the following year. The average turnover for turf is 1½ to 2½ years depending on the climate and the management practices of the grower. It takes between four months to two years to produce a marketable crop of Kentucky bluegrass.

Mowing - The development of high quality sod is directly related to the establishment of a healthy root system. Roots are encouraged due to continuous mowing of the sod on a regular basis. No more than a third of the grass height should be mowed at a time leaving the grass at a height of 2 inches.

PEST CONTROL

Sod producers should remain diligent in scouting their fields using Integrated Pest Management (IPM) techniques for weeds, insects and diseases. An IPM program uses/incorporates a variety of control measures. This lessens the risks to the pesticide applicator and the environment while still ensuring economic viability at the farm level. Monitoring, pest identification, timing, thresholds, keeping beneficial insects and record keeping are all fundamentals of an IPM system. Producers should ensure that all pesticides used are registered for turfgrass production. A Pest Management Specialist is on staff to assist growers in developing an Integrated Pest Management Program.

Weed Control - Weeds are not usually a problem with turfgrass production on virgin bogs. However, Reed Canary Grass is a problem on older fields, where this grass was used previously to seed pasture and hay. If this happens, the producer will have the added expense of time, money and labour in an attempt to control this weed. Eventually a

spray program will have to be used to control broadleaf weeds. It is important to remember that the use of chemical sprays for the control of weeds must be done by following the label instructions for proper application rates and stage of growth.

Insect Control - Some of the common insects that can negatively affect the successful establishment of Kentucky bluegrass are the



larvae (cutworms) of the European Marsh Crane fly and the European Antler Moth, chinch bug and scale. Presently, the chinch bug is of the greatest concern since it can affect the economic viability of nursery sod if not controlled. The other insects are potential pests and producers need to be able to identify them in the event that they become established. It is important to remember that the use of chemical sprays for the control of insects must be done by following the label instructions for proper application rates and stage of development.

Disease Control - Diseases that affect cool season turfgrasses can be categorized under three headings; winter, spring and fall, and summer diseases. Two common winter diseases that sod producers should be aware of are grey snow mould and pink snow mould.

Both diseases are identified as grey or reddish-brown patches visible after spring thaw. These diseases appear when succulent growth continues into late fall. To alleviate this problem, producers should avoid applying nitrogen fertilizer within the last six weeks prior to winter dormancy and mowing should continue until leaf development stops.

There are three spring and fall diseases that negatively affect most species of Kentucky bluegrass. They are leaf spots, necrotic ring spot and powdery mildew. Leaf spots appear in the spring as water-soaked spots on lower leaves. It survives as an over-wintering fungus in thatch and infected leaves. Managers should use resistant varieties of Kentucky bluegrass and avoid heavy applications of nitrogen fertilizers in spring.

Necrotic ring spot appears as bleaching on outer leaves. The fungus invades the roots and crowns causing symptoms long after the fungus has been eradicated. Recovery is possible with light fertilization, frequent watering and spiking or aeration to relieve compaction.

Powdery mildew appears as white, powdery masses on leaves. Usually the plants are weakened and in this state, they are susceptible to other necrotic diseases. Control of powdery mildew involves a reduced Nitrogen fertilizer application and using a registered fungicide.

Other diseases that affect bluegrasses include rusts, dollar spot and fairy ring. It is important to remember that the use of chemical sprays for the control of diseases must be done by following the label instructions for proper application rates and stage of growth.

MARKETING

Markets for sod usually coincide with areas of rapid urbanization and increased housing developments. Landscapers are the dominant end users and growers have to be diligent to meet the wholesale needs. Canada Mortgage and Housing Corporation (CMHC) showed a 52% increase in new home construction on a provincial basis from 1998 to 2002. 2003 housing starts are expected to maintain the same yearly increase of 10% - 15% over the previous year.

Post harvest care is crucial since sods are considered a perishable crop. A maximum time frame of 48 hours is recommended from cutting to laying. It is imperative that the



manager coordinates the harvest with the landscaper for prompt delivery to ensure a high quality product. It is also important for the grower to explain the proper care and treatment after the laying of the sod so that there is a greater chance of success.

EQUIPMENT

Agricultural development on peat soils requires intensive management skills. Equipment for sod production under these

conditions is highly specialized. For new entrants, equipment required to adequately farm peatlands for sod production may amount to \$150,000.00. This would include a 60hp 4wd tractor with dual turf tires, loader attachment, forklift, sod cutter, precision seeder, mower, lime spreader, rotary tiller, ditcher, fertilizer spreader, and boom sprayer.

Depending on the size of the operation, as with other agricultural ventures the producer may be involved in, the transportation of the sods must be considered. The producer may have access to their own trucking or may have to lease trucks in order to get the sods to the market. In any event, this cost must be considered when setting the price, both at the wholesale and the retail level.

COST OF PRODUCTION (COP)

The following cost of production is a theoretical model based on current industry averages, input from the Ontario Ministry of Agriculture and Food as well as information from the Forage COP. The following assumptions have been made in the design of this analysis:

1. 50 acre sod farm on peat soil.
2. New entrant with machinery expense of \$150,000.
3. Price per ft² is \$0.22 and does not include trucking charges.
4. Pesticides include weed, disease and insect controls.
5. The depreciation expense is based on the straight-line method.
6. Fertilizer - 10-20-20 with 2% FTE
\$13.77 per 25kg bg
15-15-15 with 2% FTE

		\$13.50 per 25 kg bg
7.	Limestone -	\$25.00 per tonne
8.	Seed -	\$282.00 per 55 lb. bag
9.	Herbicide -	\$74.50 per 10L
10.	Insecticide -	\$169.50 per 10L

It is important for the reader to understand that this model is a theoretical model and that individual expenses may vary. Expenses such as labour and pesticides are deliberately set at the high end of the range. As well, trucking costs are not included.

2002 Turfgrass COP (Theoretical)

Avg. Yield/acre.(ft ²)	36,000
Avg. Price/ft ²	0.22
Avg. Income/acre	\$7,920.00

Variable Costs/Acre

Seed	705.00
Limestone	200.00
Fertilizer (10-20-20) FTE	247.86
Fertilizer (15-15-15)	324.00
Pesticides	350.00
Machinery Operating Exp.	78.26
Labour	680.00

Fixed Costs

Depreciation - Machinery	127.50
Insurance	30.38
Repairs	45.74
Taxes - Property	0.00
Interest - Machinery	150.00

Total Costs/acre	2,938.74
Yield	36,000
Cost/ft²	0.082
Return to Management	\$4,981.26

Note: Most producers have their own trucks

to deliver sods. For those who have to use independent trucking firms, additional costs could reach as high as \$27.00 per pallet for delivery within 2 hours of the St. John's metropolitan area.

REGULATORY ISSUES

In Newfoundland and Labrador, agricultural pesticides are regulated by the Federal and Provincial governments. Federal guidelines under the Pest Control Products Act, Health Canada, regulates the registration, classification and labeling issues of pesticides. Provincial guidelines under the Environmental Protection Act, regulates the legal requirements for the sale, transportation, storage, mixing, application and disposal of commercial and restricted class pesticides. All producers of agricultural commodities within Newfoundland and Labrador must be licensed in order to purchase and apply commercial pesticides.

Movement of nursery sod from Newfoundland and Labrador is prohibited under the Federal Plant Protection Act and the Plant Protection Act Regulations.

MANAGEMENT ISSUES

Any research into new commodities with the intent of diversifying or entering into the business as a new entrant, requires a considerable amount of time, energy and money. Sod farmers must be presented with all the information available to them in order to make sound management decisions. Entry into the business is open, however, the following questions must be answered before the final decision is made. In the end, it is the

entrepreneur that has to be able to answer the biggest challenge facing him/her: Am I prepared to take the risk in order to enter into the nursery sod production business?

Licensing - Am I prepared to become a licensed pesticide applicator through education, training and examinations as conducted by the provincial Department of Forest Resources and Agrifoods and the Department of Environment?

Business Plan - Have I accurately assessed all aspects of nursery sod production in a business plan? Are my figures realistic or do they portray an overly optimistic view that doesn't reflect current market conditions?

Fiscal - Do I have the financial resources available to me to invest in this business opportunity? Can I get long-term capital funding for the purchase of equipment and can I sustain the monthly repayment schedule? Do I have adequate operating capital for start-up costs?

Marketing - Have I researched marketing opportunities adequately as part of my business plan? Are there other niche markets available that other producers have not explored? Is the market currently saturated and what opportunities will exist in the future?

Training - Do I have the required training to enter into a highly technical field such as agriculture? If not, is it realistic for me to expect to be able to start an agrifoods venture without adequate training and am I prepared to search out training opportunities?

Human Resources - Is there an adequate supply of available labour that is required in

an industry that is labour intensive? Can I pay fair market value in order to retain and properly maintain sufficient staffing levels?

CHRONOLOGICAL GUIDE

Many farming activities overlap throughout the year and are obviously dependant on weather conditions. The purpose of this section is to be used as a general guideline so that the producer has an awareness of activities which need to be addressed.

January, February, March, April:

- Year-end Record Keeping
- Equipment Repairs
- Training and Educational Seminars
- Seed Purchases
- Fertilizer and Pesticide Orders

May, June, July, August, September:

- Liming, Fertilizing, Rotovating
- Seeding, Ditch Cleaning
- Crop Scouting/Pesticide Spray Program
- Marketing/Sales
- Mowing
- Harvesting (last year's crop)
- Liming, Fertilizing and Re-seeding Harvested Fields.

October, November:

- Harvesting, Mowing
- Market Development
- New Land Development
- Soil Sampling

December:

- Equipment and Inventory Storage
- Equipment/Building Maintenance
- Fertilizer/Pesticide Inventory

SUMMARY

Producers interested in entering the turfgrass sector as a new entrant into the agrifoods industry or as an expansion to an existing



operation must do the background research to determine if the new venture is feasible. The entrepreneur must be diligent and realistic when writing the business plan that will ultimately determine whether or not to proceed with this idea or explore other opportunities. Many issues ranging from existing infrastructure, knowledge and peatland availability to long term commitment and financial stability have to be researched by the producer. This paper has addressed many of these concerns in order to provide the reader with a basic knowledge of the turfgrass industry.

CONTACTS

The following is a listing of provincial and federal contacts:

Department of Forest Resources and Agrifoods
P.O. Box 2006, Fortis Tower
Corner Brook, NL

A2H 6J8
Pest Management Specialist: (709) 637- 2087

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Crops Specialist: (709) 729-6867
Soils Lab: (709) 729-6738

Department of Forest Resources and Agrifoods
P.O. Box 340
Pasadena, NL
A0L 1K0
Crops Specialist: (709) 686-2702

Canadian Food Inspection Agency, CFIA
P.O. Box 460
John Cabot Building
St. John's, NL
A1C 5K4
(709) 772-4424

Newfoundland and Labrador Horticulture Producers Council
P.O. Box 251
Mount Pearl, NL
A1N 2C3
(709) 747-1378

Newfoundland and Labrador Federation of Agriculture
P.O. Box 1045
Mount Pearl, NL
A1N 3C9
(709) 747-4874

Farm Credit Corporation
P.O. Box 68
Mount Pearl, NL
A1N 2C1
(709) 772-4635

Business Development Bank of Canada
215 Water Street, Main Floor
P.O. Box 520, Station "C"
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A1C 5K9
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<http://www.turfgrass.co.uk/>
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