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Pesticide Reduction Plan for Golf Courses

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Foreword

This guide provides the general framework for preparing a pesticide reduction plan for golf courses. The proposed procedure covers all of the information that must be contained in a pesticide reduction plan under section 73 of the *Pesticides Management Code*.

The guide divides the reduction plan into two main parts:

- the preparatory phase, which consists in compiling information on all pesticides applied during the previous three years and determining an integrated pest management strategy for reducing pesticide use;
- elaboration of the pesticide reduction plan, including reduction objectives.

The following section explains the features of the pesticide reduction plan as well as the related requirements and reduction objectives.

1 - Introduction

Green spaces such as golf courses play an important role in the quality of urban life: golf course vegetation (turf, trees, shrubs, flowers, etc.) contributes to peoples' well-being. Golf course superintendents often feel they must satisfy the requirements of players, who want turfed areas to be maintained to professional tournament standards. Mowing heights are therefore very low, which places enormous stress on plants and thereby fosters pest development and, in particular, greater pesticide use. Regular pesticide application not only creates a reliance on these products, but also increases the risk of public exposure and environmental contamination. Pesticides are designed to be toxic to pests; however, they can also be toxic to species other than the intended targets, including humans.

The use of pesticides increases the risk of pollution as well as the health risks for applicators, golfers and the general public. According to the pesticide sales report for 2001, fungicides, which are mostly used on golf courses, account for 27 685 kg of the pesticide active ingredients (kg ai) sold in the ornamental horticulture sector, which includes golf courses, green space maintenance firms and municipalities. In the sector as a whole, herbicide sales account for 119 801 kg ai and insecticide sales, 1119 kg ai.

Pesticide use varies from one golf course to the next, as some operators have already begun reducing the application of these products. The Québec government therefore decided to make a pesticide reduction plan for all golf courses in Québec a requirement of its *Pesticides Management Code*.

2 – Goals of the Ministère du Développement durable, de l'Environnement et des Parcs

The purpose of requiring golf courses to submit a pesticide reduction plan is to:

- reduce the human health and environmental risks associated with pesticide use;
- reduce the amount of pesticides used;
- foster better cultural practices, integrated pest management or environmentally sound management;
- promote use of the least-toxic and least-persistent products;
- reduce reliance on pesticides;
- make stakeholders (golf course owners, superintendents, employees, golfers,

etc.) responsible.



3 – Requirements of Section 73 of the Pesticides Management Code

An owner or operator of a golf course who applies pesticides or has pesticides applied on the golf course must, every three years beginning on April 3, 2006, send a pesticide reduction plan to the Minister.

The plan must contain the following information:

(1) identification:

- a. the name and address of the owner or operator of the golf course;
- b. the name and address of the golf course;
- c. the name and address of the person or permit holder who is responsible for pesticide applications;
- d. the name of the person responsible for maintaining the green areas of the golf course; and
- e. the total area of the golf course including only the greens, tees, fairways, sand traps and roughs, in hectares;

(2) pesticides:

- a. the total quantity of pesticides applied annually in the three years preceding the sending of the plan to the Minister for the following classes of pesticides, with an indication of the area treated for each class:
 - o fungicides;
 - o insecticides;
 - o herbicides;
 - o rodenticides; and
 - o other pesticides; and
- b. the name of each pesticide used for each category and its registration number;

(3) pesticide reduction objectives for the next three years, expressed in percentage or in quantity, for each of the following classes of pesticides:

- a. fungicides;
- b. insecticides;
- c. herbicides;
- d. rodenticides; and
- e. other pesticides;

(4) methods used to observe, monitor and detect harmful organisms and the data collected, the preventive measures, cultural practices and control methods used to attain the pesticide reduction objectives;

(5) measures taken to prevent pesticides from migrating outside the premises; and

(6) an evaluation of the results attained with regard to the reduction plan for the previous three years, their justification and the corrective

adjustments to be made, if any.

The plan must be signed by an agronomist who is a member of the Ordre des agronomes du Québec.



4 –Pesticide Reduction Strategy or Approach

4.1 Integrated Pest Management (IPM)

Integrated pest management is an approach based on the prevention of pest infestations. It reduces human exposure to pesticides as well as their application by using them only as a last resort. IPM manages the source of the problem; it is not limited to substituting less-toxic pesticides, notably biopesticides.

IPM employs the most appropriate combination of techniques (see Appendix A for examples) to maintain pest activity within a tolerable level. Using IPM on a golf course ecosystem requires a detailed understanding of the factors influencing pest development and, above all, an understanding of the environment and the interactions occurring there. Knowing how weather conditions, the biology of species grown (bentgrass, Kentucky bluegrass, etc.) and human activity affect the populations of pests and beneficial organisms, their annual recurrence and seasonal fluctuations, is crucial. IPM employs alternative methods that change and evolve with increased understanding of the golf course ecosystem and new knowledge of the biology of pests and beneficial organisms. It is also flexible enough to adapt to new pest problems and biotic and abiotic stresses that arise from time to time.

IPM is a preventive rather than reactive approach to pest control: it attempts to address the source of the problem and prevent appearance.

5 – Desired Results

Through the pesticide reduction plan, the Ministère du Développement durable, de l'Environnement et des Parcs wants to make everyone involved with golf courses aware of the need to reduce the risks to human health and the environment, especially water, by managing pesticide use in a more environmentally responsible manner. In a context of sustainable development, golf courses should be managed using an integrated pest management approach. After all, "harmony with nature is part of the game's heritage and its enjoyment." ¹

In order to achieve the set objectives, all stakeholders, i.e. everyone who works at or uses a golf course (owners, superintendents, employees, golfers, etc.) must do their part.

Section 73 of the *Pesticides Management Code* applies to all golf courses, regardless of the amount of pesticides applied. It aims first and foremost to reduce the use of pesticides on greens, tees, fairways, roughs and sand traps; however, the pesticide reduction objectives can cover the entire course (flower beds, ponds without outlets, trees, shrubs, etc.). Golf course operators who use few or very few pesticides on the course or who have reduced their pesticide use to a minimum must obtain an attestation to that effect, signed by an agronomist who is a member of the Ordre des agronomes du Québec. The pesticide reduction plan should cover all other green areas of the golf course as well, and include testing of cutting-edge techniques (for example, by entering into written agreements with researchers) or even participation in a certification program, such as the Audubon Cooperative Sanctuary

System of Canada.

While efforts to reduce pesticide use should focus on the classes of pesticides most used on golf courses, i.e. fungicides, the reduction plan must cover all categories of pesticides (fungicides, herbicides, insecticides, rodenticides, algicides, etc.), indicating the area treated for each class.

You will attain your reduction objectives by adopting an integrated pest management program built on the following elements:

- site history (knowledge of the golf course ecosystem, cultural practices, pests, causes of infestation);
- methods used to detect (scout) and monitor pests;
- control methods;
- modification of the environment; and
- monitoring and re-evaluation of results.

It is therefore vital that the percentage reduction for each category of pesticides reflect the efforts that can actually be made to minimize pesticide use on the golf course. From the very first plan, every means must be taken to reduce the use of pesticides. The reduction objectives for each class of pesticides in subsequent plans will be based on the results obtained under the previous plan, thereby making it possible to set effective and realistic percentage reduction targets.

Québec golf courses that are subject to a municipal by-law or that have already adopted an integrated pest management strategy have set an example by reducing the amount of pesticides applied by over 30%. The baseline reduction percentage for each class of pesticides should therefore be 25%.

Note that the replacement of one pesticide with another pesticide that requires a lower application rate to treat the same surface area is allowed only if the replacement pesticide has a much lower toxicity level (acute, chronic), is considerably less persistent and has a far lower impact on the environment (bees, fish, wildlife, birds, etc.).

¹ David Stubbs, *The Committed to Green Handbook for Golf Courses*, 1996.



6 – Reduction Plan

6.1 Part I – Preparatory Phase

In order to submit a pesticide reduction plan that is duly signed by an agronomist, it is recommended that, during the three-year preparatory phase, the golf course superintendent work with an agronomist who is a member of the Ordre des agronomes du Québec.

The signed reduction plan must include the agronomist's recommendations for achieving the pesticide reduction percentages defined for each class of pesticides for the three years covered by the plan. The owner or manager of the golf course is responsible for following the agronomist's recommendations. Moreover, the

agronomist must identify the strengths and weaknesses of each of the areas treated before making his recommendations. The agronomist is responsible for the methods proposed for achieving the reduction objectives set out in the plan. In signing the plan, the agronomist becomes professionally liable and attests that his recommendations were made on the basis of the generally accepted standards of practice for green spaces and best management practices. Under their professional code of ethics, agronomists are required to keep their knowledge and skills up to date. In this regard, the agronomist who signs the plan is a partner in achieving the pesticide reduction objectives based on the latest scientific and technical knowledge.

That is why it is important to involve the agronomist in the pesticide reduction plan from day one and to compile all of the information required for the plan. Keeping a written record of the management policies, reduction targets and actions taken to reduce the use of pesticides is crucial to ensuring effective management over the medium and long terms. This information includes the methods used to observe, monitor and detect pests, preventive measures, cultural practices and control methods used to attain the pesticide reduction objectives.

There are two basic elements to the preparatory phase:

1. Site history, by hole (tee, fairway, green, roughs, sand traps, etc.).

A site history makes it easier to pinpoint problems by providing a real picture of the golf course. A history of each hole is compiled by keeping records (see appendices B.1 to B.4) of the following information:

- turf species used, soil quality, age of the hole (whether the run has been restored or not, etc.);
- current cultural practices (fertilization, mowing, top dressing, irrigation, etc.);
- pest problems encountered, their location and magnitude, and the actions taken (cultural practices, control methods, action thresholds, biological control, chemical control, etc.);
- abiotic problems and the actions taken (drainage, pressure from treading, quality of irrigation water, winter damage, mulch to ease winter damage, etc.);
- observations, results (success or failure of methods used to control pest or abiotic problems) and solutions (control methods other than pesticides and those using pesticides).

2. The keeping of records on the total quantity of pesticides applied annually in the three years preceding submission of the plan to the Minister for each class of pesticides (fungicides, insecticides, herbicides, etc.), beginning on April 3, 2003. This information is a requirement of section 73 (par. 2) of the Code. Appendix D provides a sample pesticide application record for each class of pesticides by application site (greens, tees, fairways, etc.) and area treated.

This record can be used both for the use register required under section 52 of the *Regulation respecting permits and certificates for the sale and use of pesticides* and the information on pesticide use required under section 73 of the *Pesticides Management Code*.

Appendix E provides a sample purchase register, a requirement of section 50 of the *Regulation respecting permits and certificates for the sale and use of pesticides*.

6.2 Part II – Elaboration of the Plan

6.2.1 Pesticide reduction objectives and methods used to attain them (s. 73, par. 3 and 4)

The pesticide reduction plan is structured according to the integrated pest management program adopted for your golf course. Using the data and information compiled during the preparatory phase, you can establish reduction objectives for each class of pesticides and determine the action required to attain those objectives.

The plan consists in more than just writing down reduction percentages or amounts for each class of pesticides. During the three years covered by the plan, you must keep a record of various information and data in order to uphold your commitment to reduce the use of pesticides and, if necessary, justify any fluctuations in the amounts applied.

This information and data includes:

- detection measures (scouting), their frequency, and data on action thresholds; for example, in the form of a chart such as the one proposed in Appendix C;
- the names of endemic, secondary, new or potential pests;
- an assessment of the extent of damage caused by each pest;
- the planned means of reducing pesticide use (type and description of techniques, including those using pesticides and those not using pesticides) (Appendix A);
- pest control management practices using pesticides (quantities applied, area, frequency of application, period of control, effectiveness, etc.), for each hole and each pest (Appendix D);
- an analysis of pest control management practices for each class of pesticides (fungicides, herbicides, insecticides, etc.) in order to identify pests requiring control measures and determine realistic ways to attain the pesticide reduction objectives.

6.2.2 Measures taken to prevent pesticides from migrating off site (s. 73, par. 5)

The plan must include a description of the measures taken to prevent pesticides from migrating off site, such as:

- bank or shoreline restoration by planting native shrub material;
- buffer zones between application sites and streams, ponds, lakes, etc.;
- a drainage system that carries water to a holding pond to ensure filtration before its release into a watercourse;
- a program for monitoring pesticides and nitrates in surface and groundwater;
- anti-drift equipment for pesticide application;
- establishment of naturalized areas.

6.2.3 Evaluation of results (s. 73, par. 6)

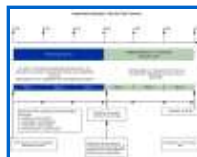
The plan must also include an evaluation of the results obtained with respect to the reduction plan for the previous three years, the reasons why the objectives were or were not attained and the corrective action to be taken, if any, in order to prepare the next three-year reduction plan.

Logically, results should be evaluated on a yearly basis so that you can adjust, change or keep the methods employed to reduce the use of pesticides on the golf course. Results must be analyzed with a view to reassessing your control strategy for the purpose of reducing pesticide use.



7 – Schematic of the Plan

Pesticide Reduction Plan for Golf Courses



Click to enlarge

8 – Information Sources

Audubon Cooperative Sanctuary System of Canada

115 First Street, Suite #116
 Collingwood (ON) L9Y 1A5
 Telephone: (705) 446-1532
 Fax: (705) 446-0822
 E-mail: info@acssc.ca
 Web Site: <http://www.auduboninternational.org/programs/acss/golf.htm>

Coalition pour un golf responsable

C.P. 642, succursale B
 Montréal (Québec) H3B 3K3
 Telephone: (514) 285-4874
 Fax: (514) 282-4292
 E-mail: info@asgg.org

The Coalition is a regrouping of many associations.

Ordre des agronomes du Québec (OAQ)

1001, rue Sherbrooke Est, bureau 810
 Montréal (Québec) H2L 1L3
 Telephone: (514) 596-3833 or 1 800 361-3833
 Fax: (514) 596-2974
 E-mail: agronome@oaq.qc.ca
 Web site: www.oaq.qc.ca

The OAQ will tell you whether a person is a member and can even give you a list of agronomists in your region who are specialized in plant protection, green space maintenance and golf courses. These services are free. Moreover, you can consult, the [reference guide for the preparation and the follow-up of a pesticide reduction plan for golf courses](#) (french), achieved for the agronomists.



9 – Useful References

DODSON, Ronald G. *Managing Wildlife Habitat on Golf Courses*, Chelsea (Michigan), Ann Arbor Press, 2000, 175 p.

QUÉBEC. MINISTÈRE DE L'ENVIRONNEMENT. *Répertoire des principaux pesticides utilisés au Québec*, Québec, Les Publications du Québec, 2002, 488 p.

QUÉBEC. MINISTÈRE DE L'ENVIRONNEMENT and MINISTÈRE DE LA SANTÉ ET DES SERVICES SOCIAUX. *Lutte intégrée dans les espaces verts*, Québec, Les Publications du Québec, 2000, 93 p.

SCHUMANN Gail L., Patricia J. VITTUM, Monica L. ELIOTT and Patricia P. COBB. *IPM Handbook for Golf Courses*, New Jersey, John Wiley & Son, 1998, 288 p.

10 - Glossary

Abiotic: The expression "abiotic factors" means the non-living variables within an ecosystem (climate, soil, topography, etc.) affecting the life of living organisms.

Action threshold: The level at which a treatment should preferably be initiated to control a pest owing to damage or economic losses.

Biopesticide (biological control agent, biological pesticide): A low-impact pest control product made from, among other things, microorganisms (bacteria, fungi, virus, algae, etc.) and pheromones (insect sex attractants).

Biotic: Refers to living organisms. The expression "biotic factors" means the influence of living organisms on the quality of the environment and composition of plant and animal communities.

Cultivar: A cultivated variety of plant developed from known natural species by selection, mutation or hybridization.

Ecosystem: A functional system including the organisms of a natural community (the biocoenosis) together with their physical environment (the biotope).

Natural pesticide: A pest control product made from plant, animal or mineral extracts (rotenone, sulphur, copper, etc.).

Soil amendment: A substance that is added to the soil to improve its physical properties and can also change the chemical and biological properties.

Synthetic pesticide: A pest control product containing synthetic organic compounds (chlorothalonil, carbaryl, etc.). Commonly called "chemical pesticide."

Appendix A

Examples of ways to reduce the use of pesticides on golf courses

- Raise mowing heights and mow less often. At the same time, organize awareness campaigns to get golfers to accept the new heights.
- Select turf and plant species appropriate for the climate.
- Use high-quality seeds, disease-resistant varieties and seeds containing endophytes.
- Keep native species and, where possible, plant a diversity of species.
- Apply organic soil amendments (compost, peat moss, etc.).
- Aerate soil to prevent compaction.
- Ensure good drainage.
- Install fences to prevent winter damage.

- In winter, install a protective cover with aeration holes on greens and tees.
- Leave grass clippings on the ground in fairways and roughs.
- Keep mower blades well-sharpened.
- Select pest-resistant varieties of landscape plants, trees and shrubs.
- Maintain soil fertility by adding organic fertilizer.
- Apply mycorrhizae.
- Use corn gluten fertilizers.
- Establish an irrigation program to water early in the morning.
- Improve air circulation near greens and tees by pruning adjacent shrubs or trees.
- Keep shade to a minimum in areas susceptible to disease.
- Weed small areas by hand.
- Clean equipment often to prevent spreading of diseases and weeds from infected areas.
- Maintain sand traps mechanically; never apply herbicides.
- Limit pesticide applications by treating affected areas only; spot treatment whenever possible.

Avoid pesticides... **a natural thing to do.**



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