WASTE MANAGEMENT ON GOLF COURSES

By Mary Purcell

Waste management is the new environmental hot topic. We all produce waste and we all have the responsibility to manage waste in a sustainable manner. The rate of waste generation is increasing and existing waste disposal sites are reaching the end of their useful lifetime.

Economic growth during the last decade has stimulated greater consumption throughout society and has created a 'throw-away' culture.

Recently, public awareness and expectation of a clean and green environment is high, be it on the streets or at the golf club. The overall management plan of the golf course should have waste management high on the list of priorities.

Waste prevention and minimisation require Course Managers and greenkeepers to make small, but significant behavioral or operational changes. Simple changes like on-site composting can benefit the environment greatly. Of course, the possible waste disposal solutions are dependent on waste composition, since the organic fraction is the main factor that determines its viability, while the fractions of paper determine the feasibility of recycling (Koufodimos and Samaras, 2002).

REDUCE, REUSE, RECYCLE – the well-known three Rs involved in optimising a waste management strategy. Reducing waste, reusing where possible and also recycling resources are all simple steps in a successful waste management plan. Recycling represents one attempt to reduce the amount of rubbish being buried in landfills. Source reduction, resource recovery and waste disposal should be considered when planning a waste management programme. EU policy, most recently published in the Sixth Environment Action Programme, stressed the importance of preventing and recycling waste. It also clearly identifies a need to decouple waste generation from economic activity and to reduce waste volumes (EPA, 2004).

Waste management techniques - Some simple steps to improve the current waste management system on a golf course can include the following:

- Leave clippings (grass and other organic materials) in place
- Dispose of chemicals in a responsible manner
- Avoid purchasing products with excess packaging
- Make a real effort to recycle
- Buy recycled products
- Avoid over-purchasing
- Allow for naturalised areas to be created on the course (eg, wildflower meadows)
- Onsite composting
- Onsite mulching
- Dispose of non-recyclables in an environmentally-sensitive manne

Grass clippings and other materials such as prunings and dead branches can be left in place where agronomically possible. Grass clippings, on areas that are not required to be as manicured, can be left where they fall. This reduces the amount of waste being generated, allows nutrients to be returned to the ground and also cuts down on work. If the clippings are going to be removed, then it is best to compost them or use them as mulching.

Disposing of any chemicals on the course in a responsible manner is of utmost importance. All chemicals should be disposed of according to the label and extreme care must be taken to ensure no chemicals enter waterbodies or leach into the soil. Also, care needs to be taken so that they chemicals are not left around the course for susceptible wildlife to come in contact with. Any batteries or used oil should be recycled or disposed of responsibably. It is also important to make an effort to recycle and buy recycled products.

Recycling office paper, scorecards, etc, is an easy behavioural step that can be taken and also ordering recycled products is important. Buying recycled products helps drive the recycle market and not just flood it with products to be recycled. Also good management in purchasing or ordering goods for the course can help reduce waste from unwanted or unused products. It is important to ensure the non-recyclable waste from the course is collected by a reputable collector and not from 'the man in the van'. All too often, the waste collected by 'the man in the van' is fly tipped in rural locations.

Allowing for or creating naturalised areas or increasing the amount of areas left for nature and increasing the size or amount of bufferzones (no-spray zones) not only increases the habitat value of golf courses but also decreases the inputs required for management, therefore minimising waste generated.

Composting - will reduce the waste being sent to landfill. Top quality compost can easily be made from general garden waste. Leaves, grass clippings and vegetation trimmings are suitable for composting. Compost has the potential to act as a soil/sand improver. It is beneficial to micro-organisms, which improve soil structure and act as a slow release fertiliser on the course. In principle, it presents an ideal solution to the challenge of turning organic waste into a valuable product. There are many benefits which composting has to offer on a golf course:

- Viable means to remove permanently the organic material fraction from the waste stream.
- Reduces the amount of waste collected, thereby minimising the environmental impacts and costs associated with managing organic waste.

- Composting of organic wastes at or near the point of production will result in reduced transportation and energy costs, along with saving landfill space.
- Nutrients are returned to the soil, aiding the cycle of nutrients.

THE COMPOSTING PROCESS - Compost is made by employing accelerated simulation of a soil process (decomposition), where decomposer organisms carry out their role in global cycling of carbon and plant nutrients. On a golf course, one of the major products to be composted will be grass. Grass has a high odour potential because of the ease at which it becomes anaerobic. So piles need to be managed properly.

Piles will need periodic turning for aeration and watering to add moisture if the compost dries out too much. The optimum moisture content is about 40% to 60%, in my opinion. Moisture content can be increased by spraying a compost heap with water, and can be decreased by adding dry straw/sawdust. The ratio of green to brown material is also important for the Carbon:Nitrogen ratio (optimal at 30/20:1). The C:N is perhaps, the most important factor that requires attention with respect to the nutritional needs of the microbes active in composting. A large percentage of the carbon is oxidised to carbon dioxide (CO_2) by the microbes in their metabolic activities. Once the composting process has stabilised, the material can be used as a soil improver.

Mulching - of branches and wood, which are not being left in place for conservation reasons (e.g. safety, excess fallen wood) is ideal for mulching on site for use on the course. Onsite mulching has many benefits including:

- Mulch conserves moisture
- Prevents weeds
- Adds organic matter to the soil

Conserving water in the soil is very beneficial to a course. It reduces the amount of irrigation required. Mulch also prevents weeds from emerging and therefore reduces the need for labour (manual removal, herbicide spot applications) and thus saves money. An onsite shredder is a good investment.

HAZARDOUS WASTES - It is important to handle, store and dispose of hazardous wastes properly according to the label/laws. Storage areas for hazardous wastes should be secure and not accessible to susceptible wildlife. Containers should be in good condition to avoid leaks and labelled and dated clearly. Hazardous wastes on a golf course include: Course care products (pesticides, herbicides); Ignitable waste (petrol, diesel, paint, parts maintenance products); Waste oil; Batteries; Solvents.

LITTER - on a course is unsightly. Bins should be provided on the course and where possible separate bins should be made available for recyclables. Golfers and visitors should be educated on their importance. Signs reminding golfers to bring home litter or even pick it up can prove very successful. It lets people know the course is managed with waste taken into account.

WATER CONSERVATION - The management of water can be llisted under waste management. Water is a valuable resource and should be managed carefully. Simple actions can help in reducing water misuse on the course:

- Rainwater collection for watering grounds
- Install low flow devices
- Maximise native species on the course
- Use water at appropriate times
- Maximise irrigation systems and management – precise efficiency

Reusing rain water for irrigation can help reduce the amount of water used on the course. Installing low-flow devices enhances the use of water. Planting native species means they will require less water than plants which are not native to the area.. Irrigation patterns should be suitable to the environmental conditions and ensuring irrigation is not used during times where evaporation is high is important in reducing the amount used. Irrigation systems should be inspected regularly (GCSAA, 2007) to ensure they are in good repair i.e. no leaks.

Make golfers aware - I realise Course Managers and greenkeepers are already over-burdened in many instances and managing all aspects of waste may seem a very thankless job. I would highly recommend, if one is serious about reducing and carefully managing waste, that golfers and the local community are made aware of all efforts that are being made to protect the environment and manage the course in a sustainable way. Greenkeepers are, at the end of the day, in charge of vast tracks of land and it is vital that the community at large realises Course Managers are playing their part in protecting it. Publicity could be as simple as placing notices around the course or in the clubhouse, which show how the club is reducing, reusing and recycling. From experience, the general public will be very receptive to all strategies that are being implemented.

Waste management should be high on the priority list for sustainable management of a golf course. Implementing a successful waste management plan involves making informed decisions for both the tactical (day-to-day) and strategic (long-term) waste management operations specific to the course. The waste management plan should be monitored periodically to optimise it. Constant thinking and improvement of existing strategies will lead to a more rational and efficient waste management system

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