Innovative Approaches, Methods and Techniques for Improving Water Quality

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Pinellas County is a peninsula on the west central coast of Florida surrounded on three sides by the Gulf of Mexico and Tampa Bay. Pinellas County is 97% built out, and is the most densely populated county in Florida. Because of all the impervious surfaces that occur in these developed lands there is a tremendous amount of stormwater runoff. This runoff carries all the nutrients, chemicals, bacteria, sediment, and trash that find their way onto the impervious surfaces directly down storm drains and into water bodies. Whereas sewer treatment facilities clean and filter their water, stormwater drains are not filtered or cleansed in any way. This has led to 85% of the waters in Pinellas County being designated as impaired due to nutrients, sediment, bacteria, or other pollutants.

The Environmental Protection Agency (EPA) had requirements for the County to meet certain water quality standards called Total Maximum Daily Loads (TMDL). TMDL are the amount of pollutants a water body can receive and still retain the water quality for the designated use of that water body. The County was facing stiff fines from the EPA for not meeting these TMDLs. The County had to prove to the EPA that it was making efforts to reduce the TMDLs and bring the impaired water bodies into compliance.

Materials and Methods

The County used a two-pronged approach to address the issues of chemicals, nutrients, sediment, and bacteria getting into the waters, and thus not meeting the mandated TMDLs for water quality. The first prong was to institute a fertilizer ordinance banning the use of nitrogen and phosphorus during the rainy season (not based on science) from 1 June 2013 through 30 Sept. 2013, including banning the application of phosphorus unless a deficiency was shown via soil test. The second prong mandated educational classes for landscape maintenance industry personnel regarding ways to reduce polluted runoff and thus reducing stormwater pollution.

The Pinellas County Stormwater Division requested the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) Extension, Pinellas County, assist them in the development of a training, testing, and evaluation curriculum for the landscape maintenance industry to reduce stormwater pollution.

One of the main challenges for the County was the postage expense of the certificates and vehicle decals awarded to attendees passing the exam. A method was needed to obtain onsite test results of attendees which would allow us to be able to award decals and certificates prior to the end of class. Extension was already familiar with and using Turning Point Technology software and had 150 response devices. This technology allowed for pre- and post-testing and provided immediate grades if the attendee list was inserted into the program. This technology fit the need for immediate test score results and was instituted into the class program. Participants had to pass a 20-question post-test with a minimum 75% correct response rate.

Another challenge was the time span of only 3 hours to cover the topics needed to provide sufficient knowledge for the attendees to learn how to reduce stormwater pollution. Topics we decided to cover included an overview of the reasons for reducing stormwater runoff; proper horticulture practices for maintaining healthy plants; the nine principles of Florida-Friendly Landscaping™; proper planting specifications; proper pruning techniques; cultural practices for healthy lawns; equipment safety, management and storage; mangrove benefits and laws regarding pruning; irrigation problems; and debris management.

To provide larger companies with a method for teaching the class to their employees, the owner or designated instructor had to take the landscape maintenance training class and pass with a minimum score of 90%. Training CDs were provided for use in teaching their employee personnel, and testing was done via a website controlled by the Pinellas County Stormwater Division.

Results and Discussion

During the time span of Oct. 2010 through June 2014 (45 months), one-hundred-four classes were offered to 3,536 people. The average knowledge gain was 37% with an overall passing rate of 98%. As a result of these outcomes, it is anticipated there will be improved progress of: proper management of green waste to keep it out of water bodies; improved horticultural practices leading to healthier plants that are better able to absorb nutrients and require fewer pesticides; and proper management of equipment and use of secondary containment for spills, thus leading to reduced pollution loads to water bodies.

Conclusions

The technology used to do this training is widely available (although TurningPoint Technology hardware is costly) and offers immediate pre- and post-test results. Some unintended advantages of the training were improved attendance in the Limited Commercial Landscape Maintenance pesticide training course, and increased exposure to the UF Extension facility and its resources. It remains uncertain if increased knowledge gains will lead to implementing proper practices for reducing stormwater pollution; behavioral practice changes of landscape personnel; and overall improvement in water quality.