

Rain Barrels: A Tool for Reducing Nonpoint Source Pollution

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Abstract

Stormwater runoff is a problem in Indian River County as evidenced by the declining ecological and biological integrity of the Indian River Lagoon (IRL). The IRL's decline in water quality is due to an increase in the stormwater drainage systems, which increase the amount of nonpoint source pollution, such as nutrients, pesticides, and sediment, flowing into the system. In addition, the amount of freshwater discharged into the IRL has increased and negatively impacts aquatic organisms. Decreasing the amount of stormwater that flows through the watershed can reduce these negative effects. Rain barrels are one tool that can be used to do this. Rain barrel workshops were created for residents as a way for them to reduce stormwater runoff in their yards. The workshop includes a presentation about stormwater runoff, nonpoint source pollution, and the benefits of rain barrels. As part of the workshop, participants construct a rain barrel and are taught how to properly set it up. Telephone surveys are conducted eight weeks after each workshop to establish how much water has been collected and how it is used. Workshops were well received with 58 residents participating over six months and constructing a total of 58 rain barrels. 47% of the barrels were set-up two months after the workshop, which prevented a minimum of 1,540 gallons of rainwater from becoming stormwater runoff if the barrels were filled once. Through the workshop, 94% of participants increased their knowledge of stormwater runoff.

Introduction

The Indian River Lagoon (IRL) is a 156-mile estuary that extends through five coastal counties including Indian River County, and the water quality and ecological and biological integrity of the lagoon have been declining due to anthropogenic activities, which include point and nonpoint source pollution, disruption of natural patterns of water circulation, and freshwater inflow alteration (Sigua et al., 2000).

The decline in water quality and subsequent designations are due in part to stormwater drainage systems for residential, commercial, and agricultural developments that have more than doubled the size of the lagoon's drainage basin. This alteration leads to an increase in the amount of freshwater that is discharged into the lagoon, which results in a decrease in the Lagoon's salinity concentrations, an increase in turbidity, and stress on species that have adapted to the clear brackish water of the estuary (Sigua et al., 2000). In addition, the increased size of the drainage systems is also resulting in an increase in nonpoint source pollution, such as nutrients, pesticides, metals, and suspended solids, entering the lagoon, which negatively affects the aquatic plants and wildlife.

The harmful impact by anthropogenic activities on the IRL will likely continue considering the projected increase in the population of Indian River County. Rain barrel workshops were developed to encourage residents to reduce the amount of stormwater flowing off their yards. In addition, the workshops educate participants about the effects of stormwater runoff and how the rain barrel aids in reducing those effects.

Objectives

- 100% of workshop participants will construct a rain barrel.
- 70% of participants would increase their knowledge of nonpoint source pollution and stormwater runoff.
- Within 2 months of the workshop, 60% of workshop participants will have set up and used their rain barrel.
- 90% of participants will be satisfied with the information they receive during the workshop.

Materials

•"Rain Barrels: A Homeowner's Guide" booklet and video (created by Hillsborough County and Southwest Florida Water Management District)

•"Rain Barrels: When It Rains It Stores" presentation (author- Bargar)

•55-gallon food-grade plastic barrels
•¾-inch spigots

•"Advantages of a Rain Barrel" fact sheet (adapted from Hillsborough County Florida Yards and Neighborhood (FYN) program)

•"Paint Your Rain Barrel" instruction sheet (author- FYN)

•"Controlling Mosquitoes" fact sheet (author- Bargar)



Methods

- Rain barrel construction instructions were obtained from the University of Florida/IFAS Florida Yards and Neighborhoods (FYN) program along with workshop materials.
- FYN extension agents were surveyed to determine how they conduct workshops and the response from their counties.
- A rain barrel presentation was created.
 - Incorporated elements of the FYN presentation while focusing on the nonpoint source pollution and stormwater runoff issues that were currently ongoing in Indian River County.
- Workshops were conducted April and June through October.
 - Rain Barrel presentation was given and a segment of the Rain Barrels video was shown to re-enforce concepts and to give a visual display of rain barrel set-up.
 - Controlling mosquitoes in containers presentation was given by a guest speaker from the University of Florida/IFAS Medical Entomology Laboratory.
 - Participants constructed a rain barrel by installing the spigot in a pre-drilled hole.
 - Participants received an information folder containing the Rain Barrels booklet and fact and instruction sheets listed in the materials section.
 - Evaluations were conducted at the end of the workshop.
- Telephone surveys were conducted eight weeks after each workshop to determine how much water had been collected, how the collected water was used, and perceptions of the rain barrel.



Results

- From April to October 2005, a total of 58 people attended the workshops and each constructed one rain barrel.
- 94% of participants increased their knowledge of nonpoint source pollution and stormwater runoff.
- A total of fifteen workshop participants have been surveyed from the April, June, and July workshops. Responses are provided in Tables 1-4.
- 93% of the participants had favorable perceptions about the workshop and the rain barrel.

Table 1. Percentage of surveyed participants that have and have not set-up the rain barrel (n=15).

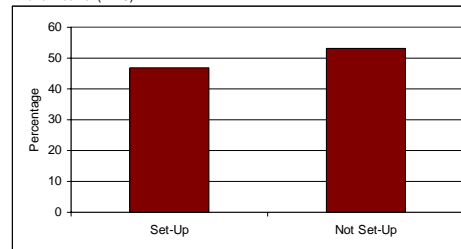


Table 2. Reasons given why some of the surveyed participants had not set-up the rain barrel (n=15).

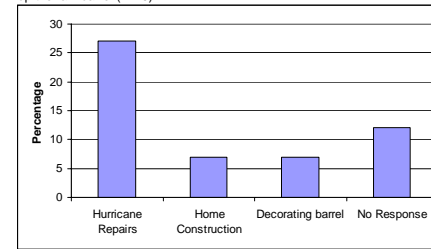


Table 3. How often the water from the rain barrel was being used by workshop participants (n=15).

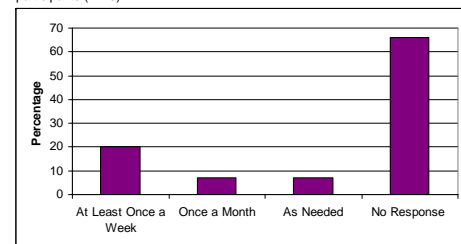


Table 4. Where the water from the rain barrel was being used by workshop participants (n=15).



Discussion

- The objective that each workshop participant would construct a rain barrel was met, but only 47% of the participants had set-up the rain barrels two months after the workshop. The 60% objective may not have been met due to the survey being conducted too soon after the workshop or extenuating circumstances such as hurricane repairs.
- The barrels that were set-up collected a minimum of 1,540 gallons of rainwater, which was prevented from becoming stormwater runoff that transports nonpoint source pollution. Since Florida receives an average of 52 inches of rainfall, the amount of rain collected will be greater in the future.
- The collected rainwater was being used by 40% of participants to water plants. This action benefited both the plant and the environment. Rainwater is healthier for plants than potable water that contains chemicals. The rainwater stayed on site and may have percolated through the soil to help replenish the groundwater and was not allowed to transport nonpoint source pollution off site.
- The workshop increased participants' knowledge of stormwater runoff issues in Indian River County based on evaluations conducted during the workshop. This increase was important because people learned about the environmental issues facing the area that impacts the way they live.
- Overall, the participants liked the rain barrel and the workshop. Some comments given during the survey included the following:
 - Feels good to help reduce stormwater runoff.
 - Would like to get more barrels to hook up together.
 - "It is a wonderful thing to help out the environment."
 - Good how-to instructions during workshop, and
 - Feels strongly about using rainwater and avoiding stormwater runoff.

Conclusion

A behavior change and knowledge increase was achieved through the rain barrel workshops demonstrated by residents storing rainwater on site and learning more about stormwater runoff. From the participant survey responses, it was concluded that rain barrel workshops were an effective method to educate residents about stormwater runoff and provide them with a tool to be proactive in preventing stormwater runoff and its accompanying nonpoint source pollution.

References

Sigua, G.C., J.S. Steward, and W.A. Tweedale. 2000. Water-quality monitoring and biological integrity assessment in the Indian River Lagoon, Florida: Status, trends, and loadings (1988-1994). *Environmental Management*, 25 (2): 199-209.

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