

# APNEP 2015 Estuary Engagement and Education Project

*Extending Distribution of the NC Aquarium's Rainwater Harvesting System to Support Sustainable Landscaping Demonstrations*



**NC AQUARIUM ON ROANOKE ISLAND**

**MANTEO, NC**

Project Report

December 31, 2015

## The North Carolina Wildflower Meadow at the NC Aquarium on Roanoke Island

is a 2,100 sq. ft. demonstration garden, created to encourage the use of native plants and sustainable landscaping methods, which supports healthy coastal ecosystems and wildlife populations. The meadow's location near the boundary of the Aquarium grounds has limited its access to sources of irrigation water, until a solution was offered by the APNEP Estuary Engagement and Education Program in 2015.

Completion of our proposed project, *Extending Distribution of the NC Aquarium's Rainwater Harvesting System to Support Sustainable Landscaping Demonstrations*, has allowed us to direct harvested rainwater stored in the Aquarium's \*four existing 2500 gallon cisterns to the wildflower meadow for high-quality, sustainable irrigation.

### Benefits resulting from this project include:

- Improved growing conditions for over 75 spp of native wildflowers, shrubs & trees providing habitat for pollinators and other wildlife.
- Installation of a new 350 sf extension of wildflower meadow has been made possible by reliable on-site water source.
- New educational programs in 2015 have highlighted the meadow's value for wildlife, especially native pollinators.
- More frequent utilization of the collected rainwater reduces the volume of overflow from the cisterns and increases re-infiltration of runoff to groundwater.
- Increased utilization improves the quality of stored rainwater, allowing it to be used more often in exhibits that showcase the Albemarle and Croatan Sounds, as well as other coastal freshwater systems.

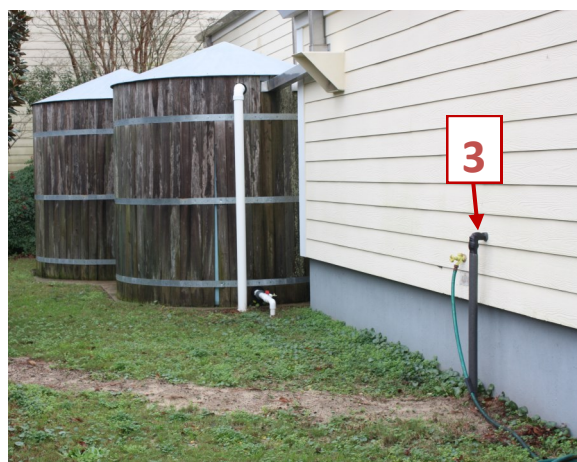
### The following tasks were undertaken to complete this project:

- 560 ft of 2" pipe was placed in a 6" deep trench running from the existing rainwater pumping station to the wildflower meadow site.
- A pump house (**photo 1**) was constructed to house two new 1-HP jet pumps. (**photo 2**) The primary pump has been connected to the new rainwater line, and the second pump will provide groundwater for backup irrigation during periods of drought.





- An opening was drilled through the exterior wall of the Aquarium building (3) to permit connection of the new distribution line to the existing pumping station.
- Shutoff valves and check valves were installed as required at the main pumping station (4) and in the new pump house.
- Three shutoff valves were installed on the waterline between the pump house and the wildflower meadow to facilitate potential additional usage of the collected rainwater for outdoor exhibits, programs and activities.
- A 3/4" yard hydrant water spigot (5) was installed at the end of the new water line at the wildflower meadow site, allowing for irrigation by hand or by portable sprinklers.





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The NC Wildflower Meadow at the NC Aquarium on Roanoke Island is an ideal venue for educational programs that focus on coastal ecosystems and wildlife.

Conservation-oriented activities held at the meadow in 2015 will continue in 2016 and beyond, as this outdoor demonstration garden grows in size and diversity with the support of harvested rainwater irrigation.

Visitor awareness of the wildflower meadow increased by means of new program information displays and directional signage. New interpretative signs created for the meadow highlight its environmental benefits and invite visitors to participate in a citizen science project for pollinator conservation.



# Moth Party!

July 22, 2015

## Learn about our nighttime fliers during National Moth Week

Thirty-two participants of all ages collected moths at three black-light and bait stations adjoining the wildflower meadow. Illustrated field guides showed a selection of moths commonly found in Dare County. Several species of moths and other invertebrates were tentatively identified. Based on positive feedback from participants, plans are underway to make the Moth Party an annual summer event that will contribute to our understanding of the wildflower meadow's value to native pollinators.

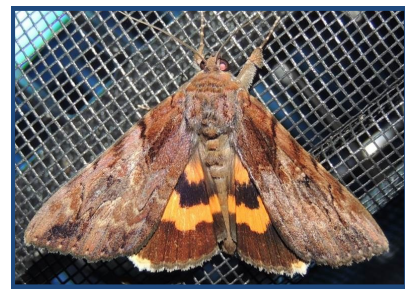


### A few of the guests attending the Moth Party: (ID confirmation pending)

- ◆ Delicate cynthia ( photo #1)
- ◆ Little wife underwing (#2)
- ◆ Button slug moth (#3)
- ◆ Grapeleaf folder moth (#4)
- ◆ Owlfly (5#)
- ◆ Snowy urola (#6)
- ◆ Yellow-lined owlet



1



2



3



4



5



6





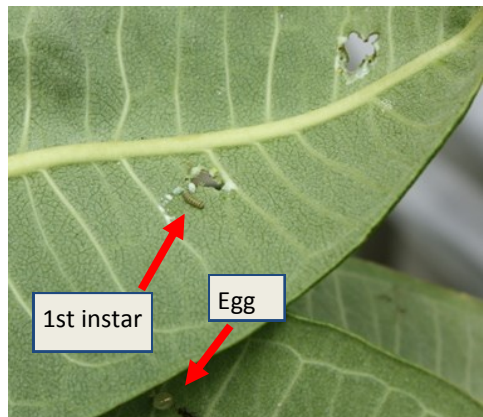
## Monarch Larva Monitoring Program

<http://www.mlmp.org>

NC Aquarium summer campers participated in this citizen science project during July and August, 2015, by searching for monarch eggs and larvae on four species of milkweed in the wildflower meadow. Campers age 6 through 12 years observed many invertebrates that use milkweed for their habitat, including ants, milkweed bugs, ladybugs and their larvae, and aphids.

Monarch eggs and caterpillars were recorded on August 20<sup>th</sup> on nine individual plants representing three milkweed species. One adult monarch butterfly emerged from a chrysalis in the meadow on September 7<sup>th</sup>

The Monarch Larva Monitoring Program (MLMP) was developed by researchers at the University of Minnesota to collect long-term data on larval monarch populations and milkweed habitat. Observations submitted by MLMP volunteers aid in monarch research and conservation, and help advance the understanding of butterfly ecology.



Citizen science activities to aid monarch butterfly conservation continues at the Aquarium with fall monitoring of adults and larvae and will resume in the spring of 2016. Staff, campers and other program participants will record and submit observations to the Monarch Larva Monitoring Program, and to Journey North, an online global study of wildlife migration and seasonal change.



<https://www.learner.org/jnorth/>



# Pollinator Conservation Citizen Science

According to the White House Pollinator Health Task Force, “there is much more to learn about the relationships between plants and their pollinators.” The abundance and diversity of insects visiting the wildflower meadow’s native plants made it clear that this site could contribute valuable data to pollinator research and conservation efforts.

Images of the meadow’s insect life contributed by Aquarium staff, volunteers and visitors are being used to compile a new database that will track pollinator activity and native plant habitat preferences. Insect species are identified with field guides and online resources such as [bugguide.net](http://bugguide.net) and [discoverlife.org](http://discoverlife.org). Aquarium horticulture staff provide identification of the plants seen hosting pollinators.

Visitors to the meadow are now greeted by an educational sign (pg. 6) that encourages their participation in this citizen science initiative. Their photographs of insects, other invertebrates and birds interacting with meadow plants can be sent to us via Instagram or Facebook.

“The actions of a single person can make a difference – every citizen can contribute to pollinator conservation and should have the opportunity to become engaged in ways that are meaningful”.

-- from the National Pollinator Health Strategy, May 2015



Fiery skipper



Mason wasp



Red-banded hairstreak butterfly



Gulf fritillary butterfly



Scoliid wasp (top)  
Ailanthus webworm moth (bottom)



Metallic green sweat bee

## ***Where's the Wildflower Meadow?***



Visitors read information about the Aquarium's programs, special activities and outdoor attractions on the overhead monitors throughout the building. Colorful slides of the wildflower meadow encourage them to go outside, explore, and learn more about native plants and wildlife habitat.

Visitors exploring outside the Aquarium building in the past have not always been aware of the meadow due to its remote location at the north end of the grounds. A new directional sign was placed on the Aquarium's waterfront in late summer of 2015 to point visitors towards the wildflower meadow.





# Walk on the *Wild* side . . .

## in our North Carolina Wildflower Meadow!

*A Snapshot in Time*

A meadow is an open field where native grasses, wildflowers, and other non-woody plants have naturalized and spread. It is an early stage of succession from disturbed area to forest. Many meadows would not exist without human intervention, such as mowing or fire. Native meadow plants support healthy ecosystems and require less water and fertilizer than traditional landscaping. More than 70 native species attract pollinators and provide year-round habitat in the Aquarium's meadow.



*Here's the Buzz*

More than 80% of flowering plants in the world depend on pollinators—bees, butterflies, birds, and other animals that help them reproduce by spreading pollen. Pollinators are essential to natural ecosystems and to more than 100 important food crops. Scientists are still working to understand pollinators and learn how to protect them.

*Bee a Pollinator Partner*

Your observations may help to advance important pollinator conservation efforts. Did you take any pictures of bees, butterflies, moths, flies, beetles, ants, or birds in the meadow?

Share them with us:   #RImeadow




Two interpretative signs for the wildflower meadow were developed this summer through the collaborative efforts of Exhibits, Education and Horticulture staff. The larger sign describes the ecology of meadows, their value as wildlife habitat, and the environmental benefits of sustainable landscaping practices.

Pollinator citizen science is also featured on this sign, with an invitation to Aquarium visitors to take photos of wildlife visiting flowers in the meadow and to share them with us via social media.

The rainwater harvesting sign is located next to the new spigot connected to the rainwater cisterns. Visitors learn here that we're using our collected rainwater for meadow irrigation, as well as for exhibit plantings and tanks. This sign also highlights the importance of reducing stormwater runoff in protecting coastal water quality.



# HARVEST *the Rain!*

The Aquarium's cisterns can hold 10,000 gallons of rainwater collected from our roof. This free resource helps us to fill exhibit tanks, water plants in the Wetlands conservatory, and keep the wildflower meadow thriving through dry spells.

*Saving our estuaries*

Using rainwater reduces the demand for groundwater and municipal water. Stormwater runoff is captured and filtered before it reaches rivers and estuaries so that our coastal waters stay clean and healthy!



To learn more about rainwater harvesting at home, call or visit your county Cooperative Extension office.