AmeriCorps Master Naturalists Improve Youth Environmental Education

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Most Florida residents live near the beach. Coastal ecosystems contain fragile habitats. Development has created habitat loss and degradation. From 2004–06, tropical storms damaged dune systems, requiring dune restoration. Local school districts emphasized the need for programs with activities that provide investigative and problem solving experiences related to science and mathematics. School-age youth were identified as the audience with their classrooms serving as plant nurseries. From 2004–14, Okaloosa and Walton County Extension implemented “Dunes in Schools”. Nearly 7000 students were educated on ecology and horticulture. Each student was able to grow and install at least one sea oat (Uniola paniculata) plant, restoring a linear acre of foredune. As the curriculum became established in schools, it became necessary to transfer coordination to a partner organization. A local non-profit organization offered AmeriCorps participants and other personnel to continue the program. However, many individuals lacked knowledge to instruct. Extension offered a solution, the Florida Master Naturalist Program (FMNP). Thirty-four people completed the Coastal and Environmental Interpretation Modules. Graduates are required to create and deliver an education tool. AmeriCorps developed a seven-lesson curriculum that aligned with the Florida science standards. Efforts to improve the interpretive skills of the AmeriCorps volunteers through the FMNP built the self-confidence of the adults while enhancing the learning of the youth. Today, “Dunes in Schools” continues as a staple in nine schools, with nearly 900 students participating annually. Pre- and posttest surveys have yielded an average 15% knowledge gain. The children have been able to follow the development of the ecosystem, which has enforced the concepts of environmental stewardship.

Coastal ecosystems contain naturally fragile dynamic habitats. These ecosystems are also the areas that are heavily visited, utilized and developed; which impacts them with various degrees of degradation. In addition to anthropogenic impacts there are also the naturally occurring storm events and other hazards that can negatively affect these areas. Restoration efforts were needed in order to initiate recovery of these coastal areas, especially after the 2004–06 active hurricane seasons. These coastal habitats contain important plant communities that are necessary for dune stabilization, wave attenuation and water quality protection. As an offshoot of the Grasses in Classes program in Northwest Florida, which focuses on the estuarine environment, the Dunes in Schools program was created to focus on these coastal dune systems. Living shorelines, the umbrella in which this program started, is the concept of creating natural protection areas using native vegetation instead of hardening techniques. However, the availability of plant material for such projects is often limited. The need for plant material for this type of restoration was expressed. Additionally, the local school districts had made requests for programs that could provide students with meaningful hands-on activities which would provide investigative and problem solving experiences related to science and mathematics. Therefore, school age youth were identified as the principle audience with their classrooms serving as the grass-growing facilities. Research shows that youth who are involved in environmental programs are more likely to foster an interest in environmental stewardship and participate in outdoor activities throughout their lifetime.

The “Dunes in Schools” program is an enrichment program designed to promote community stewardship and awareness of coastal ecosystems. Dunes in Schools in Okaloosa and Walton counties was created over a decade ago, originally in 2002 and re-established in 2009. Beginning with a grant from United States Fish and Wildlife Service to purchase plant seeds, the program expanded to bareroot plant cultivation, and ultimately horticultural science that supported local dune restoration efforts. As a University of Florida/IFAS Extension and Florida Sea Grant program, it grew to be a staple of K–12 education for those two counties. Throughout the years, multiple community partnerships were formed to assist in all aspects, from funding to delivery. Sustaining the demand of the program was challenging, but attainable due to these partnerships.

Program Growth & Partnerships

The premise of the program was for students to grow dune building plants such as sea oats (Uniola paniculata) in the classroom, participating in curriculum activities throughout the semester, and assisting in a restoration project. Skills for both instructors and students were honed through the guidance of the marine science, horticulture and 4-H agents. Beginning with a few classrooms a year, it was easily coordinated with small amounts of time and donations. During the re-established program timeframe, slight changes in design and implementation helped the program to gain popularity and grow year after year.

The following is a timeline that demonstrates the changes in the program and the partnerships that were cultivated to make it successful:

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2002–06:
The first version of Dunes in Schools was launched run by University of Florida IFAS Extension and Florida Sea Grant Okaloosa/Walton County agent in partnership with the 4-H agent in Okaloosa County, FL.

- Originally designed as students growing plants from seed, it quickly changed into growing seedlings to lower the time requirement and mortality rate. Agents would do a presentation introducing the program and coastal systems and then at the end of the semester the plants were planted on designated public area dunes systems by the students that grew them.

- Funding was possible through in-kind donations. Then funded in part by the United States Fish and Wildlife grant under the Grasses in Classes umbrella. During this period 2–3 classes participated from two schools yearly with a total of 145 students growing and planting approximately 250 sea oats.

2008–10:
The second version of Dunes in Schools is launched run by the new University of Florida IFAS Extension and Florida Sea Grant Okaloosa/Walton County agent in partnership with the Commercial Horticulture Okaloosa County agent, Okaloosa County 4-H agent, Walton County 4-H agent, and Okaloosa County Master Gardeners.

- This design utilized the master gardeners to grow the plants until they were ready to go to the classrooms in the beginning of spring semester. The Sea Grant and Commercial Horticulture agents would go into all the participating classrooms and teach the students about coastal dune systems, why the program is important and the basics of plant care. The agents would work with the teachers throughout the semester to trouble shoot any issues and monitor their progress. Each teacher combined various skills with the plant care to make the program fit within their lessons.

- At the end of the semester the plants would be planted by the students during a field trip. Each year the numbers of students would increase and by the second year these field trips had to be redesigned to accommodate the growing number of students.

- The new field trip design, implemented in 2009, utilized stations with the students split into groups and rotating through them. This design allowed for no more than 5–10 students planting on the fragile dune system at a time. This also allowed for stations to be designed to reiterate the scientific principles that were introduced at the beginning of the semester. For each field trip there were 4–8 stations (two being plant prep and planting) depending on the size of the field trip group.

- Funding was possible through in-kind donations and continued support under the U.S. Fish and Wildlife grant under the Grasses in Classes umbrella. During this period we went from 60 students to 134 per year from four schools.

- 2010 was the key year when the program went from a fun addition for classroom teachers to a needed curriculum and the support and requests grew.

2010–12:
The 2010–11 school year started with 332 students which increased to 559 students from 19 classrooms. Because of this increase in student numbers, partnerships were sought to handle the number of students, presentations and program aspects. The Okaloosa County School Board wrote for a grant that funded a science coordinator for two years. One of the original teachers, Dawn Pack, who had participated in Dunes in Schools each year was hired and one of her primary responsibilities was to bring this program into more classrooms. Program partners included Okaloosa County School Board, Okaloosa County Master Gardeners, Choctawhatchee Basin Alliance, Florida State Park Service, Walton County Master Gardener volunteers, Master Naturalist volunteers, Eglin Air Force Base Biologists and volunteers, and AmeriCorps volunteers.

- The agents worked with Mrs. Pack to teach the required program principles, approved learning materials that she created and provided resources when needed. She would handle the initial class introduction to the science, coastal importance, and plant care. The agents would bring in the plants, set up the grow lights and organize the field trips.

- Partnerships were cultivated during this time with the Florida State Park Service for planting locations and field trip volunteer help. Other neighboring county agents, master gardeners, and master naturalists would come out to help with field trip stations.

- As the numbers grew, we also incorporated AmeriCorps volunteers into the field trips. The AmeriCorps group was trained through the Extension Master Naturalist program and helped with field trip stations and program logistics.

- Funding through United States Fish and Wildlife Service provided the opportunity for Extension to partner with Choctawhatchee Basin Alliance to offer sea oats growing as part of the local school science program. This became one of the key, long standing partnerships that helped to grow this program into what it is today.

- During this time 891 students participated in the program from 19 different classes within four schools and restored approximately 12,000 square feet of public coastal dune habitat.

2012–14:
By 2012 the program has gained momentum and was in great demand by multiple schools in the counties. Unfortunately, the two years of grant funding that the Okaloosa School Board had secured for the science coordinator came to an end. To fill this void new partnerships were fostered to spread the work around to keep this program running and growing. Program partners included Okaloosa County Master Gardeners, Choctawhatchee Basin Alliance, Florida State Park Service, Walton County Master Gardener volunteers, Master Naturalist volunteers, Eglin Air Force Base Biologists and volunteers, NOAA Fisheries Lab, and AmeriCorps volunteers.

- AmeriCorps Volunteers, Choctawhatchee Basin Alliance and agents worked together to provide class introductions to the science, coastal importance, and plant care. The agents delivered the plants, set up the grow lights and organized the field trips together with partners.

- Field trip design continued to utilize the rotating station model, with 60–280 students attending through six field trips for each school year. Stations were run by volunteers and/or partners, trained by the agents. Each station’s learning activity was chosen by the agent in an effort to solidify the connection from the beginning of the semester.
Continued funding provided by the United States Fish and Wildlife Service grant run by Choctawhatchee Basin Alliance and in-kind contributions from our partners.

During this period of time 1453 students were educated, contributing approximately 1500 plants to the restoration of approximately 14,000 square feet of public coastal dune habitat.

**2014–Present:**

By 2014, the program outgrew the ability of the local county agents to manage and the lead agent was transitioning into another position out of the state. This year became the third transition of the program. Choctawhatchee Basin Alliance agreed to take over as managing partner if we transitioned it to a middle school only program to meet their curriculum objectives. Through a multiyear transition, the program was turned over to the Choctawhatchee Basin Alliance, our local non-profit partner. Two years later, it has become a staple of middle school education in the area.

- Agents spent four months training Choctawhatchee Basin Alliance’s education coordinator on all of the scientific principles, learning objectives and goals of the program. As well as developing an on-line eight-lesson curriculum that aligned with Florida science standards and was specific to each county depending on the participating school.
- Field trips are run with the same design and partners are utilized in addition to in-house employees.
- Funding continues through many various sources as Choctawhatchee Basin Alliance has been successful in getting donors for the program and Extension now continues in a support role.
- During 2014 and 2015 school years, 898 middle school students participated in the program within Okaloosa and Walton Counties through 43 classrooms in 10 schools restoring approximately 5000 square feet of dune habitat. In 2016, the Dunes in Schools program is scheduled to reach approximately 900 students from 5 schools and restore 5000 square feet of dune system in 4 state parks with over 1000 Sea Oats.

**Outcomes and Impacts**

Since the beginning of Dunes in Schools in 2002, nearly 5,000 youth have gained knowledge of the economic and ecological importance of coastal dune systems. According to Land Management Impacts on Coastal Watershed Hydrology (Fares and El-Kadi, 1995), the value of coastal ecosystems services that is created by restoring native vegetation to dunes is $5,763 per acre annually. With an average restoration of 2610 ft²/year (worth $345.30) for thirteen years, the value of the service provided by the youth is $4,489. Since much of the restoration would have normally been performed by state park employees, the savings to the state is substantial. The coastline of Okaloosa and Walton Counties stretches nearly 70 miles. While nearly half of it is preserved conservation land, the remainder has experienced intense development over the past 20 years. Due to the ever growing military installations, Okaloosa and Walton Counties have a large population of families that have never experienced the unique habitat. With no major tropical storms over the past ten years, the children have been able to follow the development of the ecosystem over time, which has enforced the concepts of environmental stewardship.

Through the efforts of loyal teachers, evaluations of the knowledge gained by the students has been collected with pre-and post tests during the classroom instruction, resulting in an average of 15%. Additional follow-up surveys were distributed to both the students and their parents that attended the field trip plant installation events. During these activities, the students rotate between educational stations before getting the opportunity to place their individually grown Sea Oats plants. The survey results revealed that the knowledge gained by the parents attending the event was even more significant. The vast majority had no working knowledge of the dune building process, the environmental importance of a stable dune system, nor the role of barrier islands for storm protection.

Through a multi-year transition, the program was turned over to Choctawhatchee Basin Alliance, a local non-profit partner. They were able to secure annual funding for plant material, as well as, transportation to installation events. Additionally, the combined efforts to improve the interpretive skills of the AmeriCorps volunteers through the Florida Master Naturalist program built the self-confidence of the adults while enhancing the learning the youth. Two years later, it was regularly incorporated into the middle school science education for area schools. Extension continues in a supportive role, rather than the coordinator, and the program has continued to flourish, grow, and solidify.

**Literature Cited**