



Ashley Mullens



Extension Associate

Louisiana State University
Baton Rouge, LA
awmullens@agcenter.lsu.edu

Youth Wetlands Education and Outreach Program

Abstract

Louisiana contains approximately 40% of the nation's coastal wetlands in the contiguous United States, but accounts for over 80% of the total national wetland loss. Continued wetland loss in Louisiana will result in severe ecological and economic ramifications for the entire nation. The need for individuals willing to make significant contributions to help control wetland loss and create sustainability of Louisiana wetlands is immense. The Youth Wetlands Education and Outreach Program is a statewide program consisting of environmental education lessons and hands-on activities, designed to heighten the awareness of Louisiana's youth to the unprecedented problem of wetland loss. Program materials, including structured lesson plans, supplies, and step-by-step procedures to activities, are provided for educators to implement throughout the academic year. During the summer months, students are encouraged to attend four summer camps associated with the program and participate in wetland restoration efforts. The program promotes awareness, ownership, and empowerment in youth by immersing students in a concentrated curriculum of wetland related environmental studies. The Youth Wetlands Education and Outreach Program provides youth with direct experience and increased knowledge of environmental action skills, to instill in students that they can make a meaningful contribution to preserving, conserving, and restoring Louisiana's wetlands.

Program Needs

The need for individuals willing to make significant contributions to help control wetland loss and create sustainability of Louisiana wetlands is immense. There are currently increased restoration efforts being made in Louisiana because of the recognized importance of wetlands; however, attempts at restoration and rehabilitation often prove difficult due to lack of knowledge about the ecosystem. The Youth Wetlands Education and Outreach Program provides science-based, hands-on activities for students to gain an understanding of the functions and values of wetlands and explore strategies for sustaining these unique ecosystems. Louisiana's wetlands serve as an excellent place for students of all ages to learn about wetland ecosystems.

The Youth Wetlands Education and Outreach Program is based on a pilot study by Karsh (2002) that indicated students who participated in horticulture lessons containing classroom curriculum and hands-on activities significantly improved their overall science scores, as compared to the students who did not participate. Like the lessons utilized in the study by Karsh (2002), the *Youth Wetlands Education and Outreach Program* curriculum is designed to follow Louisiana's Grade Level Expectations (GLE's). Because of this association to GLE's, pre- and post test scores reflect increased knowledge of main science concepts.

Increased post test scores associated with GLE's are significant because the United States is falling critically behind other nations in developing its future workforce of scientists, engineers, and technologists (4-H SET: A Strategic Framework for Progress, 2007). Scores from the National Assessment of Education Progress (NAEP) showed that Louisiana's average science scores in 4th and 8th grade were lower than those of the nation's public schools (NAEP, 2005). This is evidence that teaching and learning techniques for math and science in grades K-12 need to



be enhanced and improved by integrating interesting instruction. Better prepared teachers and more hands-on experiences, like those associated with the Youth Wetlands Education and Outreach Program, must be available to capture and hold the interest of the students (Thompson 1999).

Targeted Audience

The target audience of the program includes youth in grades 4-12 in urban, rural, and suburban communities. Parents, teachers, and community volunteers are also encouraged to participate in service activities and restoration projects.

Program Goals and Objectives

Program Goals

1. Instill into students the complexities and consequences of continued unprecedented loss of wetlands on the citizenry of Louisiana;
2. Encourage students to act as ambassadors for wetland conservation and restoration and to share their views and knowledge with others in their community;
3. Motivate youth to become responsible environmental stewards by their participation in wetland related summer camp activities; and
4. Encourage teachers to promote student participation by utilizing science-based, hands-on lessons which bridge theory with practice.

Program Objectives

1. Develop environmental based lesson plans for grades 4-12 and provide schools with a teacher/student manual (including lessons and teaching materials) that can be readily used in a classroom setting;
2. Provide opportunities for service-learning activities that teachers can conduct during an intensive week dedicated to wetland learning, known as Youth Wetlands Week;
3. Provide field-based, hands-on experiences to youth during organized restoration projects held across the state and during participation in overnight camps, 4-H Camp Grant Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings; and
4. Conduct trainings and workshops that provide teachers with the skills to impact knowledge gained by students, while enhancing science proficiency.

Program Design/Curricula and Materials

Type of Program

The Youth Wetlands Education and Outreach Program is a state-wide program designed to heighten students' awareness of Louisiana's wetland loss through an organized educational program of outreach, empowerment, and advocacy. Although program materials are available year round, Youth Wetlands Week is an intensive week dedicated to in-classroom wetland learning held in the spring semester of the academic year. Throughout this week, educators teach the provided lesson plans in the curriculum manual and conduct service-learning activities in their community. During the summer months, students are encouraged to attend four summer camps associated with the program, 4-H Camp Grant

Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings. Also, opportunities to participate in wetland restoration projects are available to students throughout the year in various locations across the state.

Curricula and Educational Materials

A major objective of the Youth Wetlands Education and Outreach program is to develop environmental based lesson plans for grades 4-12 and provide schools with a teacher/student manual (including lessons and teaching materials) that can be readily used in classroom setting. In addition to the lesson plan manual, packets sent to participating schools include resource materials, such as live plants, seeding trays, aerial photographs, laboratory supplies, markers, and field materials specific to conducting the grade appropriate hands-on wetland exercises.

Supplemental materials for the Youth Wetlands Education and Outreach Program:

- The Barataria-Terrebonne National Estuary Program (BTNEP) provides videos to be included in each grade-level packet. Examples of video titles are, Haunted Waters, Fragile Lands-Oh, What Tales to Tell!, Vanishing Wetlands, Vanishing Future, and Rescuing the Treasure.
- A video production entitled *Wet Work*, modeled after the successful Discovery Channels' *Dirty Jobs*, has been created specifically for the YW Program. Each video is approximately 15 minutes in length, is included in every grade level packet, and is posted on YouTube for public viewing.

Knowledge and Research Base

Louisiana contains approximately 40% of the nation's coastal wetlands in the contiguous United States, but the state accounts for over 80% of the total national wetland loss (Boesch, et al., 1994). Wetland deterioration is a significant environmental problem in coastal Louisiana, with current rates of loss averaging 24 square miles per year. The projected loss over the next 50 years, with current restoration efforts taken into account, is estimated to be approximately 500 square miles (Barras, et al., 2003). Along with the ecological significance of continued loss of coastal wetlands, there are numerous economic implications. It is estimated that over two million residents live and work in Louisiana's coastal parishes and the national economy is dependent on the productivity of the area. Consequently, continued coastal erosion and wetland deterioration will deprive the nation of vitally important fish, wildlife, and other wetland-related economic and environmental benefits.

Organizations in Louisiana, such as the Louisiana Wetland Educational Coalition (LaWEC) and the Jason Project have developed environmental science curriculums using Louisiana's unique wetland environment as the main educational focus. Coastal Roots, a nursery-based educational program for upper elementary to high school students, was initiated by Louisiana Sea Grant College Program and the LSU AgCenter in 1999. Coastal Roots provides youth with stewardship opportunities using a hands-on, field-based technique, but lacks the in-class teaching component of environmental science subject areas.

Classroom introduction of subjects such as horticulture is rare because educators generally do not have sufficient background in the subject area and are less likely to use it as a teaching tool. Even though many teachers are interested in science, they admit that they do not feel able to teach the subject (Harlen, 1997; DeJong, et al., 2002). The Youth Wetlands Education and Outreach Program is a statewide program that consists of environmental education lessons and activities, designed to heighten the awareness of Louisiana's youth to the unprecedented problem of wetland loss. The program supplies extensive material, including structured lesson plans, materials,





and step-by-step procedures to hands-on activities, to educators to increase teacher confidence when implementing a new environmental education curriculum.

The Youth Wetlands Education and Outreach Program promotes environmental awareness, ownership, and empowerment in Louisiana youth. This approach is based on an environmental education model developed by Hungerford and Volk (1990). The program inspires youth to act as environmental ambassadors by talking to their peers, parents, and other community members about protecting and restoring wetlands. The program helps students develop critical thinking and real-world problem solving skills, while teaching them to become environmentally responsible citizens (Chawla and Cushing, 2007). Providing youth with direct experience and increased knowledge of environmental action skills instills in students that they can make a meaningful contribution to preserving, conserving, and restoring Louisiana's wetlands (Hungerford and Volk, 1990).

Partners

AWCC AmeriCorps members assist in youth wetlands education programming efforts, specifically, the dissemination of information for the Youth Wetlands Education and Outreach Program. These members also provide assistance in the four camps associated with the program, 4-H Camp Grant Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings.

In-kind contributions have been made to the Youth Wetlands Education and Outreach Program by the National Institute of Food and Agriculture (NIFA). These contributions include participation by teen leaders and 4-H Faculty at summer camps, after school events, and school enrichment activities. NIFA also contributes staff time, company resources, and marketing materials.

In conjunction with the educational and service-learning activities during the 2009-2010 school year, extension agents and program managers organized and delivered approximately 20,000 plants used in parish restoration projects. All of the plant materials used for these projects were grown either through greenhouse culture or from open field plots and were produced specifically for the Youth Wetlands Education and Outreach Program.

School and 4-H faculty in 58 parishes have participated in the Youth Wetlands Education and Outreach Program. Their participation, in collaboration with parent and community volunteers, has provided the program with the support necessary to become one of the leading wetland educational programs in the nation. In 2009, one hour of volunteer service was equivalent to \$20.85; therefore, it is estimated that the 3493 volunteers completing 2500 hours of service resulted in a savings of \$72,829 for the program (Independent Sector, 2008).

Corporate sponsors:

- Pepsi Company
- Entergy

Individuals from the following state agencies aided in the development of the Youth Wetlands Education and Outreach Program Curriculum:

- Barataria-Terrebonne National Estuary Program (BTNEP),
- Louisiana State University (LSU) College of Education,

- LSU School of Plant, Soil, and Environmental Science (SPESS),
- Louisiana Sea Grant College Program,
- Ponchartrain Institute for Environmental Sciences,
- Louisiana Cooperative Extension Service (CSREES), and
- America's WETLAND Foundation.

Program Delivery

- The Youth Wetlands Education and Outreach Program is dependent upon involvement from 4-H faculty, school faculty, America's Wetland Conservation Corps (AWCC) AmeriCorps members, and the Program Director.
 - AWCC AmeriCorps members have five required training sessions annually. Through these trainings, AWCC members learn about 4-H Youth Development, become prepared to work with youth, and increase knowledge of program materials.
 - 4-H and school faculty attend professional development training/workshops. During these workshops, participants are not only educated about available program materials, but are encouraged to develop skills to plan and lead groups.
 - The Director conducts a statewide promotional campaign to promote awareness and educate regional directors, 4-H faculty, school faculty, wetland conservation volunteer groups, and other professional organizations on the Youth Wetlands Education and Outreach Program.
- Youth Wetlands Week, held during the spring semester of the academic year, is a week of school-enrichment dedicated to increasing wetland knowledge. Educators teach the provided in-classroom lesson plans in the curriculum manual and conduct service-learning activities in their community. The majority of the lessons are designed to last one hour. Student activity sheets that expand on lesson materials are included with each lesson and can be completed in class or as a take home assignment. Additional experiential learning activities are available year-round to the students. Restoration projects, festivals, conferences, and workshops are a few examples of events offering volunteer opportunities to students.
- The Youth Wetlands Education and Outreach Program has four summer camps where youth participate in planned educational activities, while experiencing group living in an outdoor setting. In each camp, participants learn important life skills, such as problem solving, decision-making, communication, and team collaboration through a variety of activities. AWCC members, 4-H faculty, and community volunteers help lead the camps; therefore, they increase their knowledge on the subject being taught and improve leadership abilities and instructional skills.
 - 4-H Camp Grant Walker is a five-day camp for 4th – 6th grade students held for nine separate sessions during the summer. Campers are exposed to field-based learning activities, video presentations, and lectures for four hours each morning of their stay.
 - LOST Camp, based on 4-H Set: Science, Engineering, and Technology Program, is a five-day camp for 7th and 8th grade students. Campers select three activity tracks in which to participate, with each track lasting up to seven hours a day. Camp activities include boat safety, video presentations, lec-





tures, laboratory exercises, and field-based projects.

- Wild Woods Wanderings is a five-day camp providing high school participants with first-hand experiences in a forested wetland ecosystem. Camp activities consist of outdoor survival skill training and classes on map and compass skills, water quality, public policy, pollution, and aquatic education. Night classes are also offered at this camp, meaning campers are immersed in forested wetland education for up to 12 hours each day.
- Marsh Maneuvers is a five-day camp held the Rockefeller Wildlife Refuge in Grand Chenier, Louisiana. High school students are immersed in wetland ecology lessons, including fishing, crabbing, cast netting, water chemistry testing, wildlife observation, seafood processing, boating, policy debates, and more, for eight hours every day.

Program Evaluation and Outcomes/Impact

Methods

Evaluation of the Youth Wetlands Education and Outreach Program included:

1. Assessment of program content by educators who participated in the Youth Wetlands Education and Outreach Program,
2. Pre- and post tests to assess the knowledge gained from involvement in the Youth Wetlands Education and Outreach Program completed by students who participated,
3. Pre- and post tests to assess the knowledge gained completed by campers at Marsh Maneuvers,
4. Pre- and post tests to assess the knowledge gained completed by campers at Wild Woods Wanderings, and
5. A review of program content performed by the Program Director and a selected committee.

Process

Following implementation of Youth Wetlands Week (April 2010), a Teacher Assessment Survey, prepared by the Program Director in collaboration with an extension specialist and selected parish educators, was distributed to assess the functionality, applicability, acceptance, and overall success of the Youth Wetlands Education and Outreach Program.

In 2009-2010, five educators per parish (320 teachers total) were randomly selected for the Teacher Assessment Survey; 86 were completed and returned (28.6% return rate). Results showed that the overall response to the program was an average 94% approval rating (out of a possible 100%). When asked if they would participate in the program again, 78% of teachers responded positively. Based on recommendations from teacher evaluations, materials for the program were expanded to include more grade levels, new lesson plans and materials list have been developed, and online registration forms have been made available to educators.

Outcomes and Impacts

A pre- and post test, specific to each grade level, was given to the students participating in the 2009-2010 Youth Wetlands Education and Outreach Program. Out of the 55,000 student participants, 6,562 pre and post tests were completed and returned (12% return rate). The mean pre-test score was 46.8% and increased to a mean



post-test score of 58.4%. Because the lessons are associated with Louisiana GLE's, these results indicated that general science knowledge increased on average of 28% across grades 4-12 ($p < 0.001$).

A pre- and post test was given to participating students during four sessions of Marsh Maneuvers. Forty-two campers representing 16 Louisiana parishes participated in four sessions of Marsh Maneuvers during the summer of 2010. Combined pre- and post test results showed an overall improvement in test scores at the conclusion of camp, with the average score increasing 17% across grades 7-12. Specifically, results of session averages indicated that Session 1 scores increased 14.9%, Session 2 increased 18.0%, Session 3 increased 18.0%, and Session 4 increased 18.0%.

During Wild Woods Wanderings, a pre- and post test was completed by the youth participants at each session. Thirty-eight youth participants, representing 14 parishes in Louisiana attended the camp during the two summer sessions held in 2010. The pre-test average was 40% and the post test average was 57%, indicating a 17% increase in scores.

Program plans are to develop a longitudinal study to track environmental stewardship of youth participants that have been involved in multiple years of wetland-related educational activities through the Youth Wetlands Education and Outreach Program.

Evidence of Sustainability

In the first year (2007), participation in the Youth Wetlands Education and Outreach Program reached 22,000 students in 46 parishes. Program participation has increased steadily with 50,000 students in year two, 55,000 students in year three, and approximately 80,000 registered for 2011, resulting in a 45% annual growth rate from 2010 to 2011.

The Youth Wetlands Education and Outreach Program curriculum is geared towards grade specific benchmarks mandated by the Louisiana Department of Education, otherwise known as GLE's. The program lessons prove to be an excellent curriculum source for educators aiming to incorporate science into their learning objectives. Schools participating in the Youth Wetlands Education and Outreach Program are able to keep all materials even after the lessons are complete and past materials are available for download on the program website. New lessons are implemented for every grade level each year so students will continue to receive fun and interesting information on the current issues facing Louisiana's wetlands. To encourage participation, a stipend is provided to parishes that successfully complete the program and return pre and post tests, along with teacher evaluations.

Participation by local and state 4-H faculty and in-kind contributions from various state agencies aid program implementation. Although the program is managed by a Director, the success of the Youth Wetlands Education and Outreach Program is dependent upon volunteers, including teachers and other school faculty, parents, and supporting community members. These volunteers are especially critical to the design and implementation of large-scale restoration projects. Allowing volunteers to be involved the development of program curriculum and restoration projects will promote long-term service and the recruitment of new volunteers.

Corporate sponsorships and donated materials defray the cost of program. Funding was originally secured for three years from the Louisiana Department of Natural Resources (LDNR). In 2010, the YW Program was refunded for an additional three years by the Louisiana Office of Coastal Protection and Restoration (OCPR).

Considerations for Replication

The preservation of valuable estuaries is not just a Louisiana concern because wetlands occur in every state. The



Youth Wetlands Education and Outreach Program could easily be replicated in other states with cooperation from 4-H faculty, school educators, parents, and community volunteers. Many state agencies, such as LDNR and OCP, have an educational component and agreements between these agencies and the 4-H Youth Development Office, can aid in program implementation. Current estimates show that program implementation costs approximately \$9.00 per student, which is an all-inclusive amount.

The existing curriculum teaches general facts about wetlands; therefore, the lessons could be distributed as is, or tailored to specific habitat found in the particular state. The positive response from participating youth at summer camp indicates that the outdoor experiential learning is beneficial to their understanding of wetland knowledge. Because the success of the program relies heavily on volunteer recruitment, efforts should be made to involve environmentally-based organizations that have a mission statement that pertains to service.

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