# An Evaluation of Aquatic Resource Education Programs in the Southeastern United States, Puerto Rico and Virgin Islands

Charles Teddlie, Peabody 113-C, College of Education, Louisiana State University, Baton Rouge, LA 70808–6806

Victoria Davis, U.S. Fish and Wildlife Service, Division of Federal Aid, 1875 Century Blvd., Atlanta, GA 30345

**Lyle Soniat,** Louisiana Department of Wildlife and Fisheries, P.O. Box 98000, Baton Rouge, LA 70808–9000

Abstract: This report summarizes results from Phase One of an on-going evaluation of the Aquatic Resource Education Programs (AREPs) in the Southeastern United States, Puerto Rico, and Virgin Islands (for the purposes of the comparative analyses of this study, Puerto Rico and the Virgin Islands will be referred to as a "state"). This phase, which concluded in July 1998, involved performing an evaluability assessment of the program, including the generation of sub-components for each of 3 AREP goals (awareness, appreciation, participation). There were 4 activities in this phase: collecting and reading each of the state proposals, generating a matrix that identifies program subcomponents for each state and relates them to the 3 AREP goals, identifying commonalities across the state program sub-components, and defining generic sub-components for the AREP goals. Individual state analyses yielded interesting results: some programs are innovative and may serve as models, some have a unique approach, several use Project Aquatic WILD as a major part of their AREPs, almost all states use fishing clinics, many are integrating technology in their AREP awareness component, and some have unique site-based, indigenous programs. The analysis of the generic subcomponents of the AREP goals led to several conclusions: 18 generic sub-components for the 3 goals were identified—8 awareness sub-components, 5 appreciation subcomponents, and 5 participation sub-components. No state AREP addressed all 18 subcomponents, and several addressed only a few of the 18 sub-components.

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 52:442-452

The U.S. Fish and Wildlife Service (the Service) has provided Wallop-Breaux funds since 1984 to 8 Southeastern states, Puerto Rico, and the Virgin Islands to educate citizens regarding the proper use and management of aquatic resources. The

goals of these AREPs were established by the Service to be very broad: to increase awareness or knowledge of aquatic resources, to increase appreciation of aquatic resources, and to increase participation in activities associated with aquatic resources.

Each state, Puerto Rico, and the Virgin Islands was given the freedom to establish its own AREPs in the most appropriate way. These programs are diverse due to the Service providing few guidelines to follow in developing programs and to the wide variety of aquatic resources and the varying educational needs that such resources encompass.

Within the Southeastern United States, Puerto Rico, and the Virgin Islands, the types of aquatic areas include gulf coastal waterways (beaches and bays), brackish and fresh water coastal estuaries, large and small fresh water rivers and streams, lakes and ponds, and a variety of man-made areas. Some areas contain a variety of these different types of aquatic areas, while others have more homogeneous habitats.

While the Service has been funding AREPs in the Southeastern United States, Puerto Rico, and the Virgin Islands for several years, there has been no uniform evaluation of these programs. The Service decided that a uniform evaluation would prove valuable in 3 different areas: the further delineation of common goals and their subcomponents for the statewide programs; the identification of "best practices" related to awareness, appreciation, and participation; and the development of a common set of evaluation instruments that could be used throughout the Southeastern region. K.T. Associates (KTA) performed the evaluation.

There are 3 major phases associated with the overall evaluation plan (Teddlie 1997): (1) to provide an evaluability assessment of the program as a whole, including the generation of sub-components of each of the major goals (2) to complete formative evaluations of the programs in the 8 states, Puerto Rico, and the Virgin Islands, and (3) to produce a set of evaluation instruments that could be used for internal assessment and cross-state/ Puerto Rico/Virgin Islands comparisons.

This report summarizes Phase One activities. The evaluability assessment (Rutman 1977) of the program as a whole was designed to determine the sub-components of the major program goals. Conversations with some program coordinators indicated that they wanted more complete information from the Service concerning what their program should be accomplishing. The delineation of these sub-components of the major goals should yield that information.

#### Methods

Overall Activities Associated with Phase One of the Evaluation

There were 4 activities associated with the accomplishment of Phase One of the overall evaluation (Teddlie 1997): collecting and analyzing each of the current AREP plans, generating a matrix that identifies the program sub-components for each state as they relate to the 3 broad AREP goals, identifying commonalities across program sub-components associated with each of the 3 broad AREP goals, and defining more specific sub-components (underneath awareness, appreciation, and participation),

#### 444 Teddlie et al.

and definitions thereof for the overall AREP based on the commonalities among the program components.

#### Methods Used in the Evaluation

The procedure used to analyze the AREPs was a qualitative data analysis technique, known as the constant-comparative method (e.g., Lincoln and Guba 1985, Patton 1990). This method involves analyzing each piece of information (in this case, sub-components of AREPs) to determine to which category (in this case, which AREP goal) it belongs. The result of this constant-comparative method is a matrix with a set of goals and their sub-components which was derived from analyses of currently existing AREPs. Thus, the current AREPs determine the structure of the sub-components of each of the major goals for the overall program.

This constant-comparative method is an iterative one; in this case, there are 3 stages:

(1) individual state/Puerto Rico/Virgin Islands analyses of the sub-components associated with each of the major goals, (2) analysis of the major goals and their sub-components across states, and (3) determination of the generic sub-components associated with each of the major AREP goals.

Stage One Method: Individual State Analyses of Program Sub-Components

The most recent AREPs for each of the states, Puerto Rico, and the Virgin Islands were analyzed to determine the number and type of sub-components that each had. The state of Florida has 2 AREPs: 1 for saltwater resources and 1 for freshwater resources. These sub-components were then categorized as being associated with either the awareness, the appreciation, or the participation goal. A 4-step process was used to generate state matrices which are presented in detail in Teddlie and Pol (1998):

- (1) Reviewing the proposals from the 8 states, Puerto Rico, and the Virgin Islands and performing a constant-comparative analysis of each. This analysis involved delineating the program sub-components and classifying them under 3 categories: those associated with the awareness goal, those associated with the appreciation goal, and those associated with the participation goal of the state AREP.
- (2) Mailing the initial analysis to state contact persons for verification purposes. The contact person was to confirm that we had included all sub-components, that we had not included sub-components that were inactive, and that we had accurately placed each sub-component under the appropriate goal.
- (3) Discussing with each contact person any further changes that needed to be made.
- (4) Generating a final set of state tables that included revised analyses of sub-components.

Stage Two Method: Analysis of Goals and Sub-components across States

This step involved generating a final set of 3 tables (1 each for the major AREP goals) with the appropriate sub-components from all the states included. An example from 1 of these tables is included in Table 1, which includes all the sub-components associated with the awareness goal from 2 states (Ky., La.). This process resulted in

 Table 1.
 Sub-components associated with AREP awareness goal in two southeastern states.

#### Kentucky

- (1) Integrate appreciation/responsible use of aquatic resources in the Ky. Education system
- (2) Teacher training-Project WILD, Aquatic
- (3) Place computer aquatic education on homepage
- (4) Develop posters depicting aquatic habitat
- (5) Develop annual programs for Department Conservation Education Program Leaders
- (6) Develop and maintain portable displays, videos, or slide programs
- (7) Participate in hands-on aquatic education lessons in youth/conservation camps
- (8) Training in community-based fishing
- (9) Attain and maintain 100 angling programs
- (10) Project WILD computer "book on disc" on internet
- (11) Distribute computer program "Student's Guide to Aquatic Education in Kentucky"

#### Louisiana

- (1) Develop AREP for state's public and private schools.
  - (a) Distribute fishing activity guides to participating elementary and middle schools.
  - (b) Conduct workshops at participating elementary, middle, and high schools.
- (2) Conduct fishing clinics for general public.
- (3) Handicapped fishing clinics—classroom instruction not required.
- (4) Aquatic Project WILD.
- (5) Youth Wetland Camp.
- (6) Special Programs (Hoot, Bow, Fun)
- (7) Hatchery Education—develop educational components (tours and teacher workshops) relative to the mission of the Booker Fowler Hatchery.
- (8) Instructor Advance Workshops—provide training on advance workshops for educators.

an analysis of commonalities across the statewide program sub-components associated with each of the 3 major AREP goals.

Stage Three Method: Determination of Generic Sub-components Associated with each Major AREP Goal

Each of the 3 groups of goals were assessed for commonalities among their state sub-components. For instance, almost all the states had some form of fishing clinic designed to increase participation rates. The specific characteristics of these fishing clinics, as described in their most recent program proposals, were examined for similarities and differences. If enough of the states had such a sub-component, and if it had common characteristics across the state AREPs, then it would be listed as a "generic sub-component" of the participation goal.

Several generic sub-components were established for each of the three overall goals of the program using this process. Some of these sub-components currently exist in only a few states, while others exist in all or most of the states. These generic sub-components will be used later in the evaluation cycle to more precisely define what each of the 3 major goals actually entail.

#### Results

Part I: Individual State Analyses of the Sub-components Associated with each Goal

The Service provided KTA with available documentation regarding the AREPs from the 10 Southeastern states. This documentation included proposals, program narratives, project statements or agreements, work or operational plans for various years, activity statements, and final reports. Additionally, KTA used information form a survey of the AREPs conducted in 1996 (Intl. Assoc. Fish and Wildl. Agencies 1995).

#### 446 **Teddlie et al.**

There was wide variance among the states in terms of the length and detail of the documentation of their AREPs. This variance reflects the fact that the guidelines for completing the proposals and other documents are not specific. The following points indicate the degree of variance that existed among the documents that KTA used to produce the current report.

- —There was no documentation from Arkansas, even though KTA called the contact person directly.
- —The least documentation came from Alabama (3-page work plan), North Carolina (4-page work plan), and Mississippi (5-page work proposal).
- —The most documentation came from Florida, which had 2 AREPs (1 freshwater, 13 pages; 1 saltwater, 22 pages). These 2 AREPs are analyzed separately in this report. Also, there was a 55-page FY 1996–97 annual performance review from Florida included in the documentation.
- —There was good documentation from 2 other states, Louisiana and Kentucky, and Puerto Rico. The Louisiana AREP had 20 pages of documentation from its project agreement and program narrative; the Kentucky documentation consisted of a well-detailed 9-page proposal; and Puerto Rico provided 24 pages from its project agreement and program narrative.

The individual state analyses of the sub-components associated with each of the 3 goals are described in detail in Teddlie and Pol (1998). For the purposes of Phase One of the evaluation, the individual state analyses have primary value in providing information that was then used as the "data" for the last 2 analyses summarized in this report: (1) the analysis of goals and sub-components across states, and (2) the determination of generic sub-components associated with each major AREP goal. The specific, individual state analyses will also have utility during Phase Two, which involves site visits to all 8 states, Puerto Rico, and the Virgin Islands.

There are some interesting trends in the individual state analyses that will be briefly referred to in this section of the report. These include the following.

- —There are several programs that appear to be innovative and that may serve as models for other state programs. These include: the Florida saltwater program's extensive use of a videodisc program (including a computer program, teacher guide, and student workbooks) disseminated throughout the state; the integration of aquatic resource education into the school curriculum in Florida, Kentucky, Louisiana, etc.; the development of homepages for aquatic education in Kentucky and Puerto Rico; and the administration of special programs for special populations (e.g., women, children, the handicapped) in Florida, Louisiana, and other states.
- —There are some states that have a unique approach. The best example of this is Mississippi, which coordinates virtually all of its AREP programs through the Mississippi Museum of Natural Sciences.
- —Several of the state programs use Project Aquatic WILD as a major part of their AREPs. These states include Alabama, Georgia, Kentucky, Louisiana, and North Carolina.

- —Almost all states use fishing clinics, classes, rodeos, etc., as part of their programs.
- —Many of the states are involved in integrating various types of technology in the awareness component of their AREPs. These technologies include printed media (newsletters, magazines, brochures, books, etc.), videodiscs and other visual media, homepages and other internet usage, various types of news releases (PSAs, newspaper articles), etc.
- —There are site-based programs indigenous to certain states, such as: the Booker Fowler Hatchery (La.), the Mississippi Museum of Natural Science (Miss.), the Pisgah Center for Wildlife Education (N.C.), and the Joe Budd Environmental Education Center and the Tenoroc Fish management Area (Fla.).

## Part II: Analysis of Goals and their Sub-components across States

In the second part of the analysis, all the states' AREP sub-components were grouped under the 3 goals described above: (1) awareness sub-components (2) appreciation sub-components, and (3) participation sub-components. This analysis is an interim step between the individual states' analyses and the final analysis in which generic sub-components are determined for each goal.

This interim analysis contains some interesting results:

- —Some sub-components are associated with 2 or 3 of the 3 major goals. This indicates that the 3 major goals are correlated with one another, and that certain sub-components, especially those involving hands-on educational activities, can address all 3. This overlap caused some analytical problems, and it was necessary to have contact persons validate the placement of certain sub-components under certain goals.
- —The awareness goal had the largest number of state sub-components, followed by the participation goal, and then the appreciation goal.

Table 1 contains examples of sub-components from the awareness goal for 2 states (Ky., La.).

### Part III: Generic Sub-components Associated with Three Major AREP Goals

The major purpose of Phase One of the evaluation was to perform an evaluability assessment of the program as a whole, and this assessment was designed to determine the sub-components of the major goals of the overall program. As noted above, informal conversations with program coordinators in some of the states indicated they wanted more complete information from the Service concerning what their programs should be accomplishing. The delineation of these sub-components of the major goals should yield that information.

# The Sub-components of the Awareness Goal

Information from all the state programs regarding the awareness component was considered first, and 8 sub-components emerged. The remainder of this section lists examples of specific state program activities associated with each of these 8 general sub-components of the awareness goal. This list is not exhaustive.

1. Educate the general population with regard to aquatic resource issues

Regarding aquatic resource functioning (Ala., Fla. Salt Water Prog.)

Regarding skills related to recreational sports fishing (Ala.)

Regarding basic understanding of fisheries management (Fla. Saltwater Prog.)

Regarding Community Based Fishing (Ky.)

Regarding the value and problems of ecosystems in a state (Virgin Islands)

By conducting special programs (Hoot, Bow, Fun) (La.)

By providing aquatic educational programs through a state museum (Miss.)

By providing aquatic education information through a state farm exhibit (N.C.)

Educate youth in schools (elementary, secondary) concerning aquatic resource issues

Regarding aquatic resources, sport fishing (Ga.)

Regarding natural resource issues (Virgin Islands)

By integrating appreciation, understanding, and responsible use of aquatic resources into the statewide educational system (Ky.)

By distributing fishing activity guides to participating schools (La.)

By conducting a Youth Wetland Camp (La.)

By conducting aquatic educational programs (Wet, Fish, Inland Waves) in classrooms throughout the state in conjunction with a state museum (Miss.)

3. Educate teachers (elementary, secondary) with regard to aquatic resource issues Regarding aquatic resource materials (Ga.)

Regarding Project WILD (Ky., La.)

By developing and distributing posters and Teacher's Guides (Ky.)

By conducting advanced workshops for instructors (La.)

By training teachers on integrating aquatic education into their courses (Puerto Rico)

4. Educate other special populations with regard to aquatic resource issues

By developing annual programs for Department Conservation Education Leaders (Ky.)

By conducting fishing clinics for handicapped students (La.)

5. Develop and disseminate print material regarding aquatic resources (newsletters, magazines, other publications)

Rivers of Alabama and Conservation Education Newsletter (Ala.)

Semi-annual newsletter (Ga.)

Press releases (Fla. Saltwater Prog.)

WILD Notebook monthly features (N.C.)

Newspaper articles, "press kit" folder (Puerto Rico)

6. Develop/disseminate visual (and other) media regarding aquatic resources Develop/disseminate an Aquatic Resource Education Videodisc Program (Fla. Saltwater Prog.)

Videodiscs, PSAs, slides (Fla. Saltwater Prog., Ga., Ky., Puerto Rico, Virgin Islands)

Homepage includes aquatic education material (Ky., Puerto Rico)

Radio programs regarding participation (Virgin Islands)

Distribute computer program "Student's Guide to Aquatic Education in Kentucky" (Ky.)

7. Develop and disseminate mobile displays regarding aquatic resources

Mobile educational habitat display (Fla. Saltwater Prog.)

Portable displays (Ky.)

Interior and exterior educational exhibits (N.C.)

Kiosks (Virgin Islands)

8. Prepare other educational programs appropriate for particular state contexts Providing education relative to the mission of the Booker Fowler Hatchery (La.)

Providing various aquatic resource educational programs through the Mississippi Museum of Natural Science (Miss.)

Providing various aquatic resource educational programs through the Pisgah Center for Wildlife Education (N.C.)

Providing freshwater aquatic resource programs through the Joe Budd Environmental Center and the Tenoroc Fish Management Area (Fla. Freshwater Prog.)

The Sub-component of the Appreciation Goal

Information from all the state programs regarding the appreciation component was considered first, and 5 sub-components emerged. The remainder of this section lists examples of specific state program activities associated with each of these 8 general sub-components of the appreciation goal. This list is not exhaustive.

1. Develop a basic appreciation of aquatic resources

Educate citizens regarding state's aquatic resources (Ala.)

Provide instruction in issues of water quantity and quality, principles of fishery, and aquatic resource management as related to sport fish (Ga.)

Promote and enhance public appreciation, understanding, and conservation of the state's aquatic resources (Ky.)

Develop aquatic resource education program for state's schools (La.)

Encourage and develop appreciation of the state's water resources (Miss.)

2. Develop an understanding of the environmental and conservation issues related to aquatic resources

Educate anglers to instill stewardship (Fla. Saltwater Prog.)

Involve public in conservation and restoration efforts (Fla. Saltwater Prog.) Provide instruction on the role of aquatic resources in the environment (Ga.) Educate children and adults in basic aquatic conservation concepts and ethical behavior (fishing clinics, etc.) (Puerto Rico)

Promote instruction in conservation education at grades 5, 6, and 7 (Ky.)

3. Develop an understanding of the ethical issues involved in the use of aquatic resources

Educate citizens regarding the ethical use of aquatic resources (Ala.)

Encourage public to abide by the rules and ethics (Fla. Freshwater Prog.)

Provide instruction on responsible use of aquatic resources (Ga.)

Influence public attitudes regarding responsible behavior while sport fishing (Miss.)

4. Develop an interest in and appreciation of fishing

Educate citizens regarding recreational sports fishing (Ala.)

Sponsor fishing clinics (Fla. Saltwater Prog.)

Increase participation of youth and women in recreational fishing (Fla. Saltwater Prog.)

Recruit and better inform anglers about aquatic resource issues (Fla. Freshwater Prog.)

Increase interest and participation in fishing (Ga.)

Promote understanding, appreciation, and responsible use of the aquatic environment through first hand angling opportunities (Ky.)

Modify generic community based fishing programs to the needs of targeted communities (Ky.)

Promote safe and responsible use of fishing equipment and resources (Miss.)

5. Develop an interest in and appreciation of other activities associated with aquatic resources (not fishing)

Enhance appreciation and understanding of outdoor recreation (Ky.)

Conduct Youth Wetland Camp and special programs (La.)

Conduct aquatic programs at Pisgah Center for Wildlife Education (N.C.)

Promote native plant habitat demonstrations by local nurseries which propagate native ornamental and seashore plants (Virgin Islands)

Conduct biological field sampling experiences (Fla. Freshwater Prog.)

## The Sub-components of the Participation Goal

Information from all the programs regarding the participation component was considered first, and 5 sub-components emerged. The remainder of this section lists examples of specific state program activities associated with each of these 8 general sub-components of the participation goal. This list is not exhaustive.

1. Conducting educational workshops with activities involving various aquatic resource topics (e.g., conservation, appreciation, awareness, ecology)

Conduct conservation education workshops with hands-on activities (Ala.) Show the videodisc program to environmental education organizations (Fla. Saltwater Prog.)

Create and use hands-on touch tanks and display aquaria (Fla. Saltwater Prog.)

Conduct activities associated with Aquatic Project WILD (Ga., Ky., La.)

Conduct Basic and Advanced Aquatic Project WILD Workshops, Advanced WILD Education Sites Workshops, and CATCH workshops (N.C.)

2. Conducting hands-on activities concerning aquatic resources in classrooms, or training teachers to conduct these activities

Conduct biological field sampling experiences (Fla. Freshwater Prog.)

Show the videodisc program to environmental education organizations (Fla. Saltwater Prog.)

Promote hands-on classroom activities for students and adults (Ga.)

Conduct annual training of educators in use of Aquatic Project WILD and Aquatic Education Program materials (Ga., Ky.)

Promote hands-on instruction in conservation education at grades 5, 6, and 7 (Ky.)

Promote "Hooked on Fishing—Not on Drugs" workshops to attract new schools (Ky.)

Promote aquatic educational programs (WET, FISH, Inland Waves) in class-rooms throughout the state in conjunction with a state museum (Miss.)

Provide training to public and private school teachers (Puerto Rico)

Provide students with opportunities for field identification of wildlife (Virgin Islands)

3. Conducting fishing clinics, workshops, rodeos, etc.

Conduct community fishing workshops (Introduction to Fishing, Bass Fishing, Extended Bass Fishing, Introduction to Fly Fishing) (Ala.)

Sponsor educational events with skill demonstrations (fishing) for groups including women, children, and special needs citizens (Fla. Saltwater Prog.)

Provide training programs for anglers (Fla. Freshwater Prog.)

Promote kids' fishing events on public and private properties (Ga.)

Implement national 4H fishing program (Ky.)

Conduct fishing clinics for handicapped students (La.)

4. Conducting ongoing programs and hands-on activities regarding aquatic resources at specific state sites

Promote programs with hands-on activities at Joe Budd Environmental Education Center and the Tenoroc Fish Management Area (Fla. Freshwater Prog.)

Increase video and film library regarding aquatic resources at the Mississippi Museum of Natural Science (Miss.)

Present labeled aquatic resource displays for visitors at the Mississippi Museum of Natural Science (Miss.)

Operate Pisgah Center for Wildlife Education (N.C.)

5. Conducting special events involving aquatic resource education, such as camps, field trips, state fairs, and special programs

Conduct special conservation education programs (Delta Discovery, and Becoming an Outdoors Woman) (Ala.)

Promote education programs with hands-on activities (Urban Pond Program, BOW workshops) (Fla. Freshwater Prog.)

Provide materials and training for other youth camps "Striper Adventure" (Ky.)

Conduct special programs (Youth Wetland Camp, Hoot, Bow, Fun) (La.)

Conduct statewide programs with hands-on activities for students and visitors (Miss.)

Conduct class field trips (Virgin Islands)

#### Conclusions

The determination of the generic sub-components of the 3 major AREP subgoals leads to several conclusions:

While many of the state sub-components are associated with 2 or 3 of the major AREP goals, this final analysis has resulted in a set of generic subcomponents for the 3 goals that are distinct from one another.

There are 8 distinct sub-components associated with the awareness goal.

There are 5 distinct sub-components associated with the appreciation goal.

There are 5 distinct sub-components associated with the participation goal.

No state AREP has addressed all 18 sub-components of the 3 major goals.

Several states have addressed only a few of the 18 sub-components.

The next request for proposals (RFP) for AREPs in the Southeastern United States and Puerto Rico should include information on the 18 subcomponents of the major goals.

The inclusion of these sub-components in the next RFP should: (1) increase the consistency among the AREPs since states would be explicitly addressing more refined goals in their proposals (2) lead to an expansion of some state AREPs, since these states are addressing only a few of the sub-components explicitly at this time (3) lead to the mode of some "best practices," since the RFP would include examples of the most successful programs under each sub-component, and (4) result in greater comparability across the states with regard to evaluations, since the states would be using a common set of more well defined goals (and sub-components).

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