



**BRIDGING STUDENTS' ACHIEVEMENT  
THROUGH ENVIRONMENTAL SERVICE:  
THE AUSTIN YOUTH RIVER WATCH  
2008-09 EVALUATION REPORT**

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## EXECUTIVE SUMMARY

<b><i>Program Description</i></b>	<b><i>Major Findings</i></b>	<b><i>Recommendations</i></b>
<p>Funding (approximately \$241,000) for the 2008-09 school-year was provided by the Austin Water Utility, City of Austin's water and wastewater utility revenues and drainage fees administered by the Watershed Protection and Development Review Department, and private donations.</p> <p>The Austin Youth River Watch program, which grew out of a combined concern for water quality protection and a desire to assist under-served minority students, has three major goals:</p> <ol style="list-style-type: none"> <li>1. To improve the water quality of the Colorado River and its tributaries through ecological understanding and systematic analysis,</li> <li>2. To reduce the dropout rate of students in the Austin area secondary schools through positive role-model interactions and tutoring, and</li> <li>3. To increase the participation of minority students in critical environmental issues and in technical careers that require understanding of science and mathematics.</li> </ol> <p>The fundamental principle behind the Austin Youth River Watch program is to engage under-served students in learning about mathematics, science, and English by involving them in real-world applications that use these subjects.</p>	<ol style="list-style-type: none"> <li>1. During the 2008-09 school-year, 71 high school students were actively involved in the AYRW program. Expansion of the AYRW program began during the summer of 2008, adding north Austin schools to the program for the first time, in addition to south and east Austin schools.</li> <li>2. Program students represented 13 Austin high schools; 70% of the students were female. The ethnic composition of students was: 73% Latino, 14% African-American, 1% Asian, 8% Anglo, and 3% Other.</li> <li>3. 19 of 20 2008-09 AYRW seniors graduated high school; the 20<sup>th</sup> student is finishing this year.</li> <li>4. Most students believed they knew more about water pollution issues, environmental issues, and science because of participation in the program.</li> <li>5. Most students believed their participation in the AYRW program had been very important to them, they would encourage others to participate, and they planned to continue their participation.</li> <li>6. Socially, most of the students felt they belonged in this group, were making new friends inside and outside of their schools, and were being supported by their new friends and supervisor.</li> <li>7. Academically, average AYRW students' GPAs were higher than the average of AISD high school students. Additionally, the number of absences for program students was, on average, slightly lower than the average of AISD high school students.</li> </ol>	<p>Based on the present evaluation findings, the following recommendations are offered:</p> <ul style="list-style-type: none"> <li>• The Austin Youth River Watch program should continue to recruit and train minority under-served students for river water monitoring and interacting with experienced student role models.</li> <li>• The Austin Youth River Watch program should continue to tutor under-served student trainees and to expose these students to activities that include water quality and/or environmental themes.</li> <li>• The Austin Youth River Watch program should continue to provide students supplemental educational activities that provide them with a variety of experiences that broaden their understanding of the world as well as prepare them for future academic and professional endeavors.</li> <li>• The Austin Youth River Watch program should continue to provide students with a safe, positive, and emotionally supportive environment.</li> <li>• The Austin Youth River Watch program should continue its river water monitoring service for the City of Austin.</li> <li>• The Austin Youth River Watch program should continue to add to the water quality data base of the Lower Colorado River Authority.</li> </ul>

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## **SOURCES OF EVALUATION DATA**

Information to assess the degree to which the Austin Youth River Watch program is conducting activities as planned, and the effects that the program has on participants, is collected from several sources. For the evaluation of the 2008-09 Austin Youth River Watch program, data were obtained from the following:

- **STUDENT DATA FILES**, provided by the program director, supplied information concerning student characteristics (i.e., gender, ethnicity, grade-levels, and the schools they attend).
- **STUDENT QUESTIONNAIRES**, provided students' perceptions of program benefits and effects upon the students as a result of their participation in the program. Students are requested to complete questionnaires at the completion of their spring semester.
- **INTERVIEWS AND CORRESPONDENCE**, with the program director provided information on program activities, program implementation, and the aspirations and academic endeavors of the 2008-09 Austin Youth River Watch high school graduates.
- **STUDENTS' GRADES AND ATTENDANCE**, for Austin Youth River Watch participants and high school students, were obtained from the Austin Independent School District.
- **STUDENT NEWSLETTER**, was obtained and analyzed for content.

## **INTRODUCTION**

The Austin Youth River Watch began in 1992, after the Colorado River Watch Foundation (CRWF) approached the City of Austin, Texas, with a proposal for involving minority students in river-monitoring activities. The CRWF is a nonprofit 501 (c) (3) organization that is dedicated to the scientific study, preservation, and conservation of the Colorado River—which flows through downtown Austin. As part of the CRWF's efforts, the Colorado River Watch Network (CRWN) has helped establish volunteer river-monitoring groups who regularly conduct water quality tests along the Colorado River. The CRWF proposal to the City of Austin was based on the idea that, perhaps by involving minority students in river-monitoring activities, along with providing them with tutoring and interactions with positive role-models, these students might be encouraged to complete school, and might even pursue scientific/environmental careers. With this idea in mind, the overall purpose of the CRWF proposal to the City of Austin was to reduce the dropout potential of minority students. Seeing the potential merit and worth of the proposal, the City of Austin funded the proposal. For a detailed account of the program's creation and initial implementation, see the Austin Youth River Watch program 1992-93 Final Report (ORE Publication No. 92.33).

## **FUNDING**

Although the concept of the Austin Youth River Watch was originally developed by associates of the Colorado River Watch Network, AYRW now serves as the primary program of its own separate 501 (c) 3 non-profit organization. The Austin Youth River Watch receives the bulk of its funding (approximately \$241,000) from the City of Austin's Austin Water Utility and its Watershed Protection and Development Review Department.

## **PROGRAM GOALS**

The Austin Youth River Watch (AYRW) program grew out of a combined concern for water quality protection in the City of Austin and a desire to assist under-served minority students. Since its inception, the program has focused on three overarching goals:

1. To improve the water quality of the Colorado River and its tributaries through ecological understanding and systematic analysis,
2. To reduce the dropout potential of students enrolled in Austin-area secondary schools through positive role-model interaction and tutoring, and
3. To increase the participation of minority students in critical environmental issues and encourage them to pursue technical careers that require understanding of science and mathematics.

The fundamental principle behind the Austin Youth River Watch program is to engage under-served students in learning about mathematics, science, and English by involving them in real-world applications that use these subjects. The embedding of learning within authentic activities is a process described as “situated cognition” (Brown, Collins, & Duguid, 1989). In learning activities that provide situated cognition, students benefit from using specific knowledge within real-world situations. Consequently, students can more easily make direct connections that facilitate greater understanding of academic information and its applications. As a situated cognition learning-environment, Austin Youth River Watch students must use mathematic calculations and measurements to conduct water quality tests. Because they use chemicals in these tests, they must also learn about chemical properties so that they can understand the results of their tests. Additionally, students write in personal journals, contribute articles and poems to the Austin Youth River Watch program’s newsletter, and prepare written reports that are sent to the Lower Colorado River Authority (LCRA). Thus, the Austin Youth River Watch program is providing situated-cognition learning experiences in which under-served students are learning and practicing mathematics, science, and English while participating in environmental studies and providing a service to the City of Austin, Texas.

# **PROGRAM DESCRIPTION**

## **GENERAL PROGRAM DESIGN**

To meet program goals, the original 1992-93 program design stipulated that eleventh- and twelfth-grade students, who were experienced in river water monitoring, would be brought in as “mentors” to work with ninth- and tenth-grade under-served student “trainees.” Student mentors, with their trainees, would be required to conduct weekly chemical and biological monitoring at designated monitoring sites located along the 22 creeks within the City of Austin that feed into the Colorado River. After completion of their water-monitoring duties, time would be provided for students to study, work on their school homework assignments, and/or participate in academic tutoring. Students would receive a stipend check for both their river water monitoring as well as their involvement with school-related work.

## **CURRENT PROGRAM GUIDELINES**

Currently, the program follows most of the original guidelines. However, through the years, a few changes have been made. The first change that was made allowed for student “trainees” to have an opportunity to be promoted to student “mentors.” Following the initial program year, student trainees who had demonstrated a high degree of water monitoring knowledge (through an oral test as well as throughout program activities) were promoted to the position of student mentor. Allowing the trainees to become mentors recognizes their growth in knowledge and skills, and provides these students with opportunities for leadership development.

Another change in the program guidelines allowed middle school students to join the program as student trainees. Similar to the high school student trainees, if the middle school students demonstrate a high degree of water monitoring knowledge and skills, they may also be promoted to the position of student mentor. For the 2008-09 school year, the program did not have middle school student participants. An independent evaluator, Dr. Jeannine Turner, recommended that AYRW focus its efforts on high school students so that AYRW could collect enough surveys and student academic data to be statistically significant. Although an effort is still made to involve middle school students,

high school students are more highly sought after.

### **UNDER-SERVED STATUS**

As stipulated in the program design, the 2008-09 recruiting efforts focused on minority, under-served students—although no student is excluded from participating because of ethnicity or class standing. Students considered to be academically “at-risk” have a greater probability of leaving school before completing the twelfth-grade than students who are not classified as being under-served. The Texas Education Agency (TEA) and Austin Independent School District (AISD) use the following definitions for identification of “at-risk” secondary students:

- Two or more years older than expected for the student’s grade level,
- Two or more years below current grade level in reading or mathematics, as measured by the most recent administration of a norm-referenced achievement test,
- Two or more F’s in a semester,
- Failed at least one of the Mathematics, Reading, or Writing tests in the most recent administration of the Texas Assessment of Knowledge and Skills (TAKS), the state mandated criterion-referenced test.

\* Throughout this document we use the term under-served as opposed to at-risk.

### **MONITORING SITES**

Water quality testing occurred in numerous sites around the City of Austin on the Colorado River and its tributaries. During the 2008-09 school year, Austin Youth River Watch participants conducted water quality tests at the seventeen sites listed in Figure 1.

**FIGURE 1**  
**2008-09 AUSTIN YOUTH RIVER WATCH**  
**WATER QUALITY TESTING SITES**

<b>CREEK/RIVER &amp; LOCATION</b>
Barton Creek @ Barton Creek Habitat Preserve
Barton Creek @ Barton Springs
Bee Creek @ Wild Basin Preserve
Blunn Creek @ Blunn Creek Preserve
Colorado River @ 2.5 mile marker
Colorado River @ Austin Youth Hostel
Colorado River @ Old Ford, Hornsby Bend
Colorado River @ Redbud Isle
East Bouldin Creek behind Jovitas
East Bouldin Creek below El Mercado
Little Bear Creek @ Lower Check Dam, Tabor Track WQPL
Onion Creek @ Lower Falls, McKinney Falls State Park
Waller Creek @ Colorado River
Waller Creek @ Waller Creek Center
Wells Branch @ Metropolitan Park
West Bouldin Creek @ the Colorado River
Williamson Creek @ Dove Springs Park

**WATER-MONITORING PARAMETERS**

Each week, measurements and tests were conducted for seven water quality parameters. The parameters, described in Figure 2, are dissolved oxygen (DO), temperature, conductivity, pH, and nitrate/nitrogen (NO<sub>3</sub>). The results of each water quality testing session were sent to the Lower Colorado River Authority (LCRA) and added to the database of water quality test results that have been conducted throughout the LCRA district.

**FIGURE 2**  
**WATER QUALITY PARAMETERS**  
**TESTED BY AUSTIN YOUTH RIVER WATCH PARTICIPANTS**

Dissolved oxygen (DO) is measured in milligrams per liter (mg/l) and shows the amount of oxygen available to fish and other aquatic organisms.

Temperature is measured in degrees Celsius. The temperature of the water determines how much DO the water can hold.

Conductivity is measured in microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ), determining how fast the water allows electricity to move through it. This conductance measure allows for extrapolation as to the amount of pollution dissolved in water. The higher the reading, the more pollution dissolved in the water.

pH is a measurement of acidity that ranges from 0-14 standard units, with 7 being neutral. The lower the number, the more acidic the water.

Nitrate/nitrogen is measured as milligrams per liter (mg/l) and is a nutrient that can promote excessive aquatic plant growth. It is a product of the natural decomposition of organic material or from excess fertilizer, but it may become elevated downstream from the wastewater treatment facilities.

## **ADDITIONAL MONITORING INFORMATION**

In addition to the water quality test data collected at the sites, students also wrote field-observation notes. These observation notes included information about water color, water clarity, water surface clarity, odor, algae color, algae cover of the surface, and algae cover of the substrate. Other notes that students collected included the flow of the water or water level, notes about animals or people at the site, plants growing at the site, and weather patterns for the day of monitoring. Students also participated in macroinvertebrate identification and classification as a biological assessment method related to water quality.

## **ADDITIONAL PROGRAM ACTIVITIES**

### **SPECIAL ACTIVITIES**

To provide students with the opportunity to get to know each other, build camaraderie, and support knowledge-building with respect to water quality issues, special activities were scheduled approximately once a month. Special activities and field trips always contained a component that links environmental information with educational opportunities. For example, AYRW students participated in field trips such as visiting the SPLASH exhibit near Barton Springs where they learned about the Edwards Aquifer and interacted with educational games and exhibits. Specific information about the events that the Austin Youth River Watch program participated, as well as the number of students who participated in each event, is listed in Figure 3.

**FIGURE 3**  
**EVENTS ATTENDED BY**  
**AUSTIN YOUTH RIVER WATCH PARTICIPANTS**

<b>DATE</b>	<b>NUMBER OF PARTICIPANTS</b>	<b>ACTIVITY DESCRIPTION</b>
September, 2008	50	Students set 3 semester goals each for themselves: school, personal and River Watch. Semester volunteers began.
18-Oct-08	5	Young Women of AYRW tested water in the highland lakes region of the Colorado River at Black Rock Park. These young women participated in the World Water Monitoring Day event that literally involves hundreds of sites all over the planet being monitored by thousands of people. Writer / Artist and AYRW volunteer Margie Crisp visited with the students. And semester volunteer Devi Savam camped with group.
22-Oct-08	approximately 10	Students from Mr. Herring's AP Environmental Science class went to Hornsby and did a benthic macroinvertebrate sampling with AYRW Program Coordinator. The students learned about water quality and about monitoring techniques.
6-Dec-08	12 + 2 volunteers and coordinators	The Young Women of Austin Youth River Watch had a sleepover retreat at the EcoHouse. They had an Owl Prowl: Walking to the end of the driveway the students practiced their Barred Owl calls. They walked quickly back to the house and enjoyed hot cocoa, movies, popcorn and of course, stories.
December 8 - 12, 2008	42	AYRW students evaluated themselves on how they did with their AYRW, school and personal goals for the semester.

January 12 - 16, 2009	37	AYRW students started the Spring Semester by discussing home, school and River Watch Goals for the semester.
21-Jan-09	8	AYRW students planted the Spring Garden with flowers, broccoli, cabbage and onions.
5-Feb-09	community event	AYRW Coordinator visited with Reagan High School community members at a school function.
12-Feb-09	small community event	AYRW Coordinator visited with local supporters of the Earth Island Institute.
21-Feb-09	3	Young Women's Sleepover at the AYRW EcoHouse - owl prowl and movie night.
28-Feb-09	5 AYRW students + approximately 20 other community members	Bob's Bench workday along the Furtado segment of Bull Creek where Bob Furtado, deceased River Watch teacher and AYRW Board Member, to be honored with a Bench and plaque. At this site he imbued his passion for water quality monitoring and for benthic macroinvertebrate sampling on his students.
7-Mar-09	4	AYRW students helped with the work day at Blunn Creek Preserve as part of the Austin Parks Foundation "It's My Park" event.
14-Mar-09	10	AYRW students gathered at the AYRW EcoHouse to get ready for the Spring Break EcoLearning Adventure.
15-Mar-09	7	Seven AYRW students, the two Coordinators and outstanding volunteer and AYRW graduate, Steff Herencia loaded up and headed out on the 2009 Young Women's Spring Break EcoLearning Adventure to East Texas. They drove to Galveston to tour the Aquarium and learn about sharks in an IMAX film at Moody Gardens and then went on to visit the beach. That afternoon they pressed eastward and rode the ferry across to the mainland. They stayed in Beaumont for the night.

16-Mar-09	7	The group visited Village Creek State Park and enjoyed the drive through the Big Thicket. They stopped and saw the Pitcher Plants in bloom in the Big Thicket National Preserve and then traveled on to Martin Dies Jr. State Park where they stayed the next two nights.
17-Mar-09	7	Students relaxed in the morning and then went for a hike on one of the nature trails at Martin Dies Jr. State Park. They saw two different species of tree frogs, lots of birds, and noticed that the tree canopy had hurricane damage. Later a ranger told them that about 40% of the canopy had been severely damaged by the hurricanes. When they got back to camp they went canoeing in the local lake. They saw many birds close up and they also saw what our campsite looked like from a different perspective.
18-Mar-09	7	Park Ranger at Martin Dies Jr. State Park met group near the Head Quarters and opened up the Interpretive Center for them and gave the students a tour and presentation. She showed the students her baby alligator, her snakes, a bee hive made of tree bark, lots of skulls and pelts and talked about her career and life pathway. From there the group drove from the Forest to the Prairie / Savannah to Stephen F. Austin State Park for the last night of the trip. On the way, they stopped at Washington on the Brazos where the students learned about Texas History and ate lunch.
19-Mar-09	7	AYRW Students had a Nature Hike at Stephen F. Austin State Park and then traveled home.

March 23 - 27, 2009	41	Students used local job finder guides, apartment and home buyers guides, the internet and local newspapers to find jobs that pay for the type of lifestyle they want to lead, created a budget, found living accommodations and found out what level of education and experience are necessary for the jobs.
18-Apr-09	7 AYRW students + large community event	Students participated in the Earth Day festivities downtown. All of the students visited other booths to learn about the interesting environmental projects happening in and around Austin, about Eco-friendly products and also talked with people about Austin Youth River Watch when people stopped at AYRW booth. Students demonstrated the water quality monitoring and talked with community members of all ages, races and physical abilities about water quality and the tests they do.
21-Apr-09	Approx 40 students, including 1 AYRW Mentor	AYRW hosted an Earth Day water quality monitoring event for students in the AP Environmental Science classes at the LBJ Liberal Arts and Science Academy (LASA) and one other school. Students learned about chemical and meter based tests, about what freshwater mussels and benthic Macroinvertebrate communities can indicate about longer-term water quality and also about riparian and upland environments. Professional Field Scientists from the City of Austin, the teachers, staff of AYRW, Austin Chronicle Reporter, Katherine Greggor, and others talked with the students about career and life pathways.
26-Apr-09	16	AYRW 2008 - 2009 Graduates attended the Senior Dinner.
28-Apr-09	9	Student TAKS day - toured the greenhouse at Hornsby Bend and saw green tree frogs, bullfrogs, cricket frogs and leopard frogs.

5-May-09	8	AYRW students took the recycling from the AYRW EcoHouse to the Ecology Action Recycling Center downtown.
6-May-09	7	AYRW Students harvested onions, cabbage and broccoli from their backyard garden at the AYRW EcoHouse.
May 4 - 15, 2009	48	AYRW students completed end of year surveys and discussed how they had done on their goals for the semester.
June, 2009	18	AYRW Student Graduations
June 8 - 10, 2009	41	Summer Leadership Program began with group talk about how to stay safe at AYRW in the summer and students discussed their goals.
10-Jun-09	13	AYRW Students tested water at and toured McKinney Falls State Park where they saw two water snakes, many birds and other wildlife.
11-Jun-09	13	AYRW students climbed at the South Austin Rock Gym where they learned the outdoor skill of belaying and helped each other to climb.
16-Jun-09	13	AYRW students tested the water and toured the Nature Conservancy of Texas Barton Creek Habitat Preserve where they learned about two species of endangered birds, the black-capped vireo and golden warbler, that depend on the habitat at the preserve for survival - the black capped vireo and the golden cheek warbler. Students also observed many species of fish and other wildlife at the preserve.
18-Jun-09	4	AYRW students climbed at the North Austin Rock Gym where they learned the outdoor skill of belaying and helped each other to climb.
18-Jun-09	7	Students toured InnerSpace Caverns in Georgetown where they learned about the Edwards Aquifer, cave formation and water.

23-Jun-09	10	Students took the recycling from the AYRW EcoHouse to the Ecology Action Recycling Center downtown near the monitoring location at 9th St. and IH-35
23-Jun-09	6 AYRW Students including 3 from the Summer Leadership Program	AYRW Students met up with other students participating in the PODER Summer Program and helped plant native plants and pick up trash at Oak Springs.
25-Jun-09	7	AYRW students climbed at the the South Austin Rock Gym where they learned the outdoor skill of belaying and helped each other to climb.
June 26 - 27, 2009	12 students + 3 volunteers	The Young Women of AYRW had a retreat. They had BBQ in Zilker Park, toured the SPLASH exhibit about the Barton Springs segment of the Edwards Aquifer and swam at Barton Springs. Then they went back to the AYRW EcoHouse for the night where 4 students participated in an owl prowl.
29-Jun-09	17	AYRW students collected benthic macroinvertebrates and then analyzed their findings.
30-Jun-09	8	AYRW students toured the Texas Natural Science Center at the Texas Memorial Museum, the Natural History museum on the campus of the University of Texas at Austin. Afterwards the students toured the LBJ Presidential Library and Museum.
1-Jul-09	13	AYRW students toured Cave without a Name near Boerne, Texas where they learned about caves and karst features and saw the power of water.
2-Jul-09	15	AYRW students canoed from the Zilker Park Boat Rentals up to Cold Springs.

6-Jul-09	6	AYRW students tested water and learned about the habitat requirements of two species of endangered birds, the black capped vireo and the golden-cheeked warbler at the Barton Creek Habitat Preserve.
7-Jul-09	13	AYRW students found high conductivity in the water at Waller Creek at Waller Creek Center and low Dissolved Oxygen in the water in Waller Creek at the mouth of the Creek at Lady Bird Lake. They called the City of Austin Watershed Protection Environmental Hotline at 512-974-2550 to let them know about these readings.
9-Jul-09	16	AYRW students canoed from the Zilker Park Boat Rentals up to Cold Springs.
July 10-11, 2009	8	Young Men of the AYRW had a retreat and sleepover. They met in the evening and had BBQ in Zilker Park and went swimming at Barton Springs. That evening back at the AYRW EcoHouse at Hornsby Bend, the AYRW students played games and watched movies. In the late evening the students went out in search of night creatures. They called for owls and howled for coyotes and heard some of each call back.
14-Jul-09	7	AYRW students visited and climbed Mt. Bonnell overlooking Lake Austin. There they learned about the source of the drinking water.
July 13-15, 2009	35	AYRW students evaluated how they did on the goals for the summer, produced final version of the Flying Fish Review and finished up the Summer Leadership Program with a visit to Double Dave's Pizza near the UT campus.
16-Jul-09	7	AYRW students canoed from the Zilker Park Boat Rentals up to Cold Springs. They discussed relationships between surface water and groundwater.

## **CAREER EXPLORATION AND LIFE SKILLS ACTIVITIES AND DISCUSSION**

Each Spring, Austin Youth River Watch students participate in a series of career exploration and lifeskills activities and discussions. For example, one week each Spring, the program coordinators provide the students with job guides, apartment locators, and budget worksheets. Students have to find an apartment and a job that pays at least three times as much as they would pay in rent. Students, then, create a monthly budget and provide a written explanation about how they can achieve the education and training required to obtain the job.

### **THE FLYING FISH REVIEW**

The “Flying Fish Review” is the newsletter of the Austin Youth River Watch program. Under the direction of the project coordinators, the “Flying Fish Review” is typically composed of articles, poems, thoughts, photos, essays, and drawings written by Austin Youth River Watch members. The newsletter is printed approximately twice a year and is distributed to Austin Youth River Watch program participants as well as individuals who are interested in the program.

Analysis of the contents indicates participation from multiple AYRW members, especially the several photos depicting students in engaging activities appropriate to the scope of the AYRW, such as camping, canoeing, visiting a beach, and observing at an aquarium. Student drawings indicate a positive sense toward nature, toward collaborating with the group, and toward the program leaders. The drawings also indicate a clear sense of the scientific process involved in testing the waters.

In terms of written content, five student contributors describe their positive experiences surrounding collaboration in the projects and express a high level of enthusiasm. A graduating senior made a profound comparison between her high school experience and her AYRW experience. She explained her “bragging” about how she wouldn’t miss her high school, but that she would have a hard time leaving behind her friends at the AYRW. She went on to describe the value of the caring relationships established among friends and the adult supervisors. She specifically acknowledged the assistance provided by the AYRW in applying to college. Other student testimonials

describe a sense of meaningful belonging and even multi-generational participation in AYRW as a source of pride for their family. Overall, the newsletter demonstrates a sense of inclusion by offering information regarding how other community members, particularly high schools students, may become involved.

## **STUDENT CHARACTERISTICS**

By the end of the 2008-09 school year, a total of 71 students (18 student mentors and 53 student trainees) were involved in the Austin Youth River Watch program. The following sections describe the characteristics of the student participants.

### **GENDER**

Historically, female participation in courses and careers in the areas of advanced mathematics and science has been below that of males. One goal of the program is to influence the participation of female students in environmental issues and career paths. As Figure 4 shows, the number of female participants in the 2008-09 Austin Youth River Watch program was markedly higher than that of males. Of the 71 participants, 50 students (70%) were female; 21 students (30%) were male.

**FIGURE 4**  
**GENDER OF 2008-09**  
**AUSTIN YOUTH RIVER WATCH STUDENTS**

<b>GENDER</b>	<b># OF TRAINEES</b>	<b># OF MENTORS</b>	<b>TOTAL</b>
<b>MALE</b>	19	2	21 (30%)
<b>FEMALE</b>	34	16	50 (70%)
<b>TOTAL</b>	53 (75%)	18 (25%)	71 (100%)

**ETHNICITY**

One of the major goals of the Austin Youth River Watch program is to increase the participation of minority students in environmental issues and to encourage them to pursue technical careers in science and mathematics. This goal seems particularly daunting given that a greater proportion of Latino and African American students are more likely to be classified as being at-risk of dropping out of school than White/Other students (see ORE Pub. No. 91.41).

As Figure 5 displays, the Austin Youth River Watch program appears to be successfully addressing the goal of involving a high percentage of minority students in the program. Indeed, 92% of the AYRW participants are minority students (non-Anglo). Latino students comprised the largest number (n=52, 73%) of minority student participants.

With respect to the percent of specific minority groups represented in the Austin Youth River Watch, fifty-two (52) of the program’s students were classified as being Latino (73% of total), ten (10) were classified as being African American (14% of total), six students (6) were classified as being Anglo (8% of total), one student (1) was classified as Asian (1% of total), and two students (2) were classified as being of other ethnicities (3% of total).

**FIGURE 5**  
**ETHNICITY OF 2008-09**  
**AUSTIN YOUTH RIVER WATCH STUDENTS**

<b>ETHNICITY</b>	<b># OF TRAINEES</b>	<b># OF MENTORS</b>	<b>TOTAL</b>
<b>AFRICAN</b>			
<b>AMERICAN</b>	9	1	10 (14%)
<b>ANGLO</b>	3	3	6 (8%)
<b>LATINO</b>	40	12	52 (73%)
<b>ASIAN</b>	0	1	1 (1%)
<b>OTHER</b>	1	1	2 (3%)
<b>TOTAL</b>	53 (75%)	18 (25%)	71 (100%)

## GRADE LEVELS

In compliance with the grant's objectives, members of the 2008-09 Austin Youth River Watch program represented a diverse population of Austin-area high schools as well as a wide range of ages and grade levels. There was a good distribution of trainees and mentors in all grade levels, with lower numbers for grade 9 students in each category. Figure 6 displays the grade levels of 2008-09 program students.

**FIGURE 6**  
**GRADE LEVELS OF 2008-09**  
**AUSTIN YOUTH RIVER WATCH STUDENTS**

<b>GRADE LEVEL</b>	<b># OF TRAINEES</b>	<b># OF MENTORS</b>	<b>TOTAL</b>
<b>GRADE 9</b>	8	2	10 (14%)
<b>GRADE 10</b>	17	6	23 (32.4%)
<b>GRADE 11</b>	14	4	18 (25.4%)
<b>GRADE 12</b>	14	6	20 (28.2%)
<b>TOTAL</b>	53 (75%)	18 (25%)	71 (100%)

## SCHOOLS

Participants of the Austin Youth River Watch attended a number of Austin schools. This year, all of the participating students were high school students (100%). The schools that Austin Youth River Watch participants attended are displayed in Figure 7.

**FIGURE 7**  
**SCHOOLS ATTENDED BY 2008-09**  
**AUSTIN YOUTH RIVER WATCH TRAINEES & MENTORS**

<b>SCHOOL</b>	<b># OF TRAINEES</b>	<b># OF MENTORS*</b>	<b>TOTAL</b>
<b>AKINS HIGH SCHOOL</b>	6	3	9 (13%)
<b>AMERICAN YOUTH WORKS</b>	0	1	1 (1%)
<b>AUSTIN HIGH SCHOOL</b>	7	1	8 (11%)
<b>AUSTIN CAN</b>	2	1	3 (4%)
<b>CROCKETT HIGH SCHOOL</b>	6	2	8 (11%)
<b>DEL VALLE OPPORTUNITY CENTER</b>	1	0	1 (1%)
<b>EASTSIDE MEMORIAL HIGH SCHOOL</b>	9	1	10 (14%)
<b>GARZA INDEPENDENCE HIGH SCHOOL</b>	1	1	2 (3%)
<b>LANIER HIGH SCHOOL</b>	7	2	9 (13%)
<b>LIBERAL ARTS &amp; SCIENCE ACADEMY (LASA)</b>	0	2	2 (3%)
<b>LBJ HIGH SCHOOL</b>	4	4	8 (11%)
<b>REAGAN HIGH SCHOOL</b>	2	0	2 (3%)
<b>TRAVIS HIGH SCHOOL</b>	8	0	8 (11%)
<b>TOTAL</b>	53 (75%)	18 (25%)*	71 (100%)*

\*Note: One mentor moved at the end of the year to another district.

**SUMMARY OF AUSTIN YOUTH RIVER WATCH PARTICIPANTS**

In summary, during the 2008-09 school-year, 71 high school students (53 trainees and 18 mentors) were actively involved in the AYRW program. Students attended a

variety of Austin-area schools. Specifically, program students represented eight Austin high schools across four grade levels (9-12). Participants also represented a range of ethnic groups, with the majority of students classified as “minority.” Of the total participants, 70% (50) of the students were female. The ethnic composition of students included 73% (52) Latino students, 14% (10) African-American students, 1% (1) Asian student, 8% (6) Anglo students, and 2% (2) was classified as being of other ethnicities.

## **PROGRAM OUTCOMES**

### **OUTCOMES ANALYSIS OVERVIEW**

One of the major goals of the Austin Youth River Watch program is to reduce the dropout potential of students in Austin-area schools. To assess the program’s progress toward meeting this program goal, students’ grades and school attendance were investigated. To obtain student data, consent forms were requested to be signed by students’ parents. Of the total AYRW program students (71), 58 (82%) parent-signed consent forms were obtained. Student data were obtained for each of the 58 students with signed parent-consent forms. Although the majority of the students submitted signed parental consent forms, results should be interpreted with caution. The 58 students, whose school data were obtained from AISD, represented thirteen schools. AISD provided students’ (with signed consent forms) grade-point averages and average absences as well as the average GPA and absences of all AISD high schools. The following sections describe these students’ information.

### **STUDENTS’ SCHOOL ATTENDANCE**

One measure of program effectiveness is students’ attendance at school. Not surprisingly, students often have lower academic achievement when they do not attend school. Low attendance can also lead to leaving school before completing the school year. For the Austin Youth River Watch program, students’ school attendance may indicate the program is having a positive affect on students’ school attendance.

Austin Youth River Watch students' school absences were averaged and compared to the average absences of AISD high school students. As Figure 8 shows, in comparison to all AISD high school students, the average school attendance of AYRW high school participants (whose consent forms were obtained) was higher than the average of all AISD high school students. The program may have had a positive influence on high school students' attendance.

**FIGURE 8**  
**AVERAGE PERCENTAGE OF SCHOOL ATTENDANCE FOR**  
**AISD HIGH SCHOOL STUDENTS**  
**AND AUSTIN YOUTH RIVER WATCH PARTICIPANTS**

<b>AISD</b>	<b>AYRW</b>
<b>HIGH SCHOOL</b>	<b>HIGH SCHOOL</b>
<b>STUDENTS</b>	<b>STUDENTS</b>
87.6%	89.3%

**GRADE POINT AVERAGES**

Many of the Austin Youth River Watch students have been identified by AISD as being at-risk of dropping out of school. One of the main indications of being at-risk is low academic achievement. To help raise the academic achievement of program students, the students are required to work on their homework as one aspect of their “jobs.” Assistance with completing their homework may be obtained by other students, the program coordinators, and/or university student volunteers.

As a general indicator of students' progress, Austin Youth River Watch students' grade point averages (GPAs) were averaged and compared to the average GPAs of AISD high school students. As Figure 9 shows, in comparison to all AISD high school

students, the GPAs of AYRW high school participants (whose consent forms were obtained) were higher.

**FIGURE 9**  
**AVERAGE GPA FOR AISD HIGH SCHOOL STUDENTS**  
**AND AUSTIN YOUTH RIVER WATCH PARTICIPANTS**

AISD HIGH SCHOOL STUDENTS	AYRW HIGH SCHOOL STUDENTS
79.2%	80.5%

**2008-09 HIGH SCHOOL GRADUATES**

The ultimate goal of the program is to have program participants graduate from high school. This year nineteen (19) 2008-09 AYRW seniors graduated, having attended a range of schools in the Austin Independent School District; one is finishing her diploma presently.

**GRADUATING FROM HIGH SCHOOL**

Graduating from high school, (and hence from the Austin Youth River Watch program), is an important accomplishment. It is evidence that the program is meeting its over-arching primary goal and suggests that the program, indeed, helps students to graduate by linking academic subjects within a situated-cognition, service-providing environment. The educational activities provided by the Austin Youth River Watch

program may promote deeper knowledge of environmental sciences as well as inform participants about potential environmental science careers. Additionally, the programs' activities allow for the development of supportive peer- and adult- relationships while helping the community maintain high standards of water quality.

Evaluations of students' perceptions of their involvement suggest that the activities of the Austin Youth River Watch program offer academic support and social support that nurture and promote a supportive "community of learners." The following sections, describing students' perceptions of Austin Youth River Watch activities, provide evidence of the success of the program's approaches and activities.

## **STUDENTS' PERCEPTIONS OF PROGRAM IMPACT**

At the end of the 2008-09 school year, Austin Youth River Watch participants were asked to complete a student questionnaire packet. The focus of the questionnaire packet was the participants' perceptions of program benefits and experiences.

Students were requested to answer 29 Likert items (5-point scale, ranging from 1 = "strongly disagree" to 5 = "strongly agree") and two items that requested a "yes" or "no" answer. There were also five open-ended questions to allow students to provide unconstrained answers.

### **SURVEY RESULTS: QUANTITATIVE DATA**

Of the 71 participants, 49 returned their questionnaires (a 69% response rate). The following sections summarize the results of students' responses to survey items.

**PERCEIVED IMPORTANCE.** The vast majority of students who answered the survey agreed or strongly agreed that their participation in the Austin Youth River Watch program had been very important to them (96%). Additionally, 100% of the respondents agreed (responded "yes") that they would encourage others to participate in the Austin Youth River Watch program. Furthermore, all of the non-senior respondents indicated (responded "yes") that they planned to continue their participation in the program. In response to continuing their participation, there were even seniors who wrote in on the margins of the survey comments such as "if I can," "hopefully," and "intern possibly." For these seniors the end of their senior year was not synonymous with the end of their involvement with the AYRW program in that they expressed a desire to continue their participation.

**PERCEIVED IMPACT ON ACADEMIC SUBJECTS.** Many of the questionnaire items focused on students' perceptions of the program's assistance with respect to their feelings toward academic subjects as well as their perceptions of knowledge gained

because of their participation in the program. Students' perceptions regarding the outcomes of their participation in the Austin Youth River Watch program were positive. Indeed, most students responded that they now knew more about water pollution issues, environmental issues, and science because of their participation in the Austin Youth River Watch program. Specifically, students indicated that they agreed or strongly agreed that program participation had helped them to *know more about*:

- Water issues (96%),
- Environmental issues (94%), and
- Science (82%).

Additionally, most students responded that they were *more* interested in water pollution issues, environmental issues, and science because of their participation in the Austin Youth River Watch program. Most of the participants agreed or strongly agreed that program participation had helped them to *become more interested in*:

- Water pollution issues (96%),
- Environmental issues (86%), and
- Science (67%).

One of the components of the Austin Youth River Watch Program is its emphasis on students' working on after-school homework and/or participating in tutoring. If students are not actively being tutored, they must still spend time on homework or other academic activities. A portion of their payment includes time spent on their individual academic endeavors. Over half (59%) of the students indicated that they enjoyed going to school more than they did before they joined the program. Because of the school-work time they received in the Austin Youth River Watch program, many students agreed or strongly agreed that they:

- felt more confident about their ability in participating in science and/or environmental activities (94%),

- would be better students because of their experience in the program (84%), and
- felt much more confident in their abilities in the areas of science and/or environmental science (82%).

As part of the educational aspects of the program, students indicated that they were more aware of science careers. Additionally, approximately half of the students indicated that they would like to pursue a career within the fields of Science and/or Environmental Studies. Students indicated that they agreed or strongly agreed that they:

- had become aware of careers in Science and/or Environmental Studies that they had not previously known about (86%),
- would like to pursue a career in Science and/or Environmental Studies (51%), and
- would like to pursue a college degree in Science and/or Environmental Studies (43%).

In summary, the vast majority of the questionnaire respondents felt more confident about their ability in the areas of Science and/or Environmental Studies; they indicated they were learning more—and were more interested—in Science (although not as much in Mathematics). Students also indicated that they felt they were doing better in their school work and would be better students in the future because of their participation in the program. Additionally, most of the students indicated that they had become aware of careers in Science and/or Environmental Studies that they had not previously known. Finally, several students indicated they would like to pursue a career and/or a college degree in Science and/or Environmental Studies.

**SOCIAL ASPECTS.** Social relationships can help support students' academic success. In addition to assessing aspects of students' perceptions of the Austin Youth River Watch program's influence on their academic abilities and attitude toward their school

experiences, the student-questionnaire also assessed their perceptions toward aspects of social relationships as well as their perceptions of their developing social competence skills. The majority of the students who responded to the questionnaire thought that they were making more friends, they felt like they belonged to the group, and that the supervisor was supportive. Most of the students agreed or strongly agreed that they:

- felt supported by their supervisor (94%),
- felt like they belonged in this group (84%),
- were making good friends that were outside of their school (78%),
- were making new friends that go to their school (78%), and
- were being supported by new friends (71%).

As part of the social aspects of the program, students indicated that the program was successfully impacting important social skills. Specifically, students indicated that they agreed or strongly agreed that they:

- were more aware of the choices they were making (90%),
- developed leadership skills (86%),
- took more responsibility for their actions (84%), and
- were more comfortable working with other students (84%).

### **SURVEY RESULTS: OPEN-ENDED RESPONSES**

To allow students to give their opinions in a less restricted format, open-ended questions were provided to students at the end of questionnaire. The open-ended questions focused on students' perceptions of how the Austin Youth River Watch has affected them, the most important thing they have learned because of their involvement with the program, what they enjoyed most and least, and how academic subjects tied into their program activities.

Most students answered the open-ended questions, although a few students chose not to respond. The length of the answers ranged from extremely short (one or two words) to quite elaborate (four to six lines). The following pages contain sample statements of students' answers to the open-ended questions.

**PROGRAM EFFECTS.** In answering the question, *“How has participating in the Austin Youth River Watch program affected you?”* participants wrote the following remarks:

- It's helped me direct myself and develop my personal talents in art and pushed me towards environmental activism.
- It's made me more outgoing and comfortable around other people.
- I met new people and I don't want to leave at all. Elisabeth has been such a good person.
- River Watch has gotten me to pay attention to my surroundings and how I affect the world around me. It has made me realize how precious water is as a resource.
- It has [affected me], it's a stress reliever and it's made me a better environmentalist.
- I recycle now!!
- It helped me to understand that the water and animals living in it could be affected by our ways of life.
- When I go out and see rivers and try to preserve the planet.
- I care more about pollution than I did before since I know more about the effects.
- It has taught me responsibility, leadership, and we gained new friends.

**IMPORTANCE OF RIVER WATER.** Participants who responded to the question, *“What is the most important thing you have learned about river water through the Austin Youth River Watch program?”* made the following comments:

- How much pollution there is and what I can do to help and where to go to help.
- I have learned so many interesting facts especially having Elisabeth as our instructor! I am way more aware of pollution and water quality.
- That working with friends to test the water and making sure that it is safe for the environment is important. Also, taking care of my environment.
- The most important thing I have learned is how much people take advantage of clean water. They don't realize what a valuable resource it is.
- The most important thing that I have learned was the quality of water and how things such as animals and the environment [are] affected.
- I learned a lot. I think it's fascinating how things in the water help the living things such as algae.
- The water we test is more important to the environment than what most people think.

**USE OF EDUCATIONAL SUBJECTS.** In response to the open-ended question, “*How did you use the knowledge of math, science, environmental issues and/or English in testing the river water?*” students wrote the following:

- Observing any possible causes to results of tests (i.e. waterfalls, drainage pipes, businesses).
- I used my knowledge by measuring the water and calculating the temperature with conductivity.
- I documented my [tests] on paper and used math to find the average of the water.
- During water-testing activities I have used my knowledge in math by obtaining the average and reading meters. [I used] science when making hypotheses and talking about science overall.
- When being around water I know not to mess with the environment and through knowledge of ecosystems I was careful in [not] destroying anything.

- While doing the tests you have to be pretty comfortable with numbers. I love math, so being able to use it outside of school is very encouraging.

**MOST ENJOYABLE ASPECTS.** In responding to the question, “*What did you most enjoy about your participation in the Austin Youth River Watch program?*” participants made these comments:

- Hanging out with the girls and going to the lakes and testing the water; it made me feel like a scientist.
- Getting to be in the outdoors and study nature and make new friends.
- Learning how to work with the chemicals to correctly test the water and making new friends and working with them.
- The mentors are really helpful. [They’re] always there to help us through anything.
- We are doing something good and having fun doing it.
- The Spring Break camping trip, it was so much [fun] even though we got caught in a little weather situation we made it through.
- Being able to see different parts of the city and learning things about the water/environment that I had never heard of before.
- Doing the D.O. testing was my favorite. Oh wait, the most enjoyable time was when we had a booth on Earth Day.

**LEAST ENJOYABLE ASPECTS.** In responding to the question, “*What did you least enjoy about your participation in the Austin Youth River Watch Program?*” participants made these comments:

- The HUMIDITY of Texas.
- The least I would say would be having to go to the Austin Youth house and eat the same snack, which they taste good, but it’s the same every day.
- When it rained and [we] didn’t get to test water.
- Sometimes the heat would bother me when we go to test.

- Nothing. I absolutely adore River Watch, and I'm going to be so sad when I graduate. I'm really going to miss this.
- The days I couldn't attend.
- I didn't have anything I least enjoyed; it is quite fun and educational.
- It's only one day of the week!
- Poison ivy.

## **SERVICE TO THE COMMUNITY**

In addition to encouraging under-served students to improve their mathematics and science skills, enhance their interest and knowledge about environmental issues, and remain in school, the Austin Youth River Watch mentors and trainees have performed a valuable service to the City of Austin. During the past year, results of each water quality testing session were sent to the Lower Colorado River Authority (LCRA) and added to the database of water quality testing that is conducted throughout the LCRA district.

Through the students' participation in the Austin Youth River Watch program, the water quality database of the Colorado River and its tributaries has been enhanced and expanded. Most importantly, the high water quality was sustained due to the water quality monitoring of program participants.

## SUMMARY AND CONCLUSIONS

This evaluation, as with previous evaluations, has sought to investigate the impact of the Austin Youth River Watch program upon its participants. The evidence, based on an analysis of the Austin Youth River Watch program's outcomes, indicates that the program is effectively addressing the program goals for which it was originally conceived. These positive impacts are apparent in students' perceptions, their attitudes toward learning and school, and the fact that nineteen Austin Youth River Watch students graduated from high school. However, the positive influences of program participation extend far beyond students' perceptions and attitudes. The program's positive influence also includes an array of positive social relationships and the development of students' social competence skills. Additionally, the program has provided students with important environmental information that they will, hopefully, carry with them throughout their lives.

In summary, the 2008-09 Austin Youth River Watch program outcomes, as presented in this report, provided continuing evidence that well-conceived intervention programs that combine the use of student mentors within authentic, situated-learning activities, can effectively address the needs of under-served youth. In addition, evaluation results suggest that the program is meeting these needs in ways that are socially meaningful to the students as well as academically beneficial.

The Austin Youth River Watch program provides a solid example of continued success that others may wish to follow. This program has received national attention by being listed in the American Youth Policy Forum (1999, 2001) publications: *Raising academic achievement: A study of 20 successful programs*, and *More things that do make a difference for youth: A compendium of evaluations of youth programs and practices*.

## RECOMMENDATIONS

Based on the present evaluation findings, the following recommendations are offered. The Austin Youth River Watch program should continue to:

- Recruit and train minority under-served students for river water monitoring and interaction with successful and experienced student role models.
- Tutor under-served student trainees and expose these students to activities that include water quality and/or environmental themes.
- Provide students supplemental educational activities that provide them with a variety of experiences that broaden their understanding of the world as well as prepare them for future academic and professional endeavors.
- Provide students with a safe, positive, and emotionally- supportive environment.
- Provide river water monitoring services for the City of Austin and the Lower Colorado River Authority (LCRA).
- Add to the water quality database of the Lower Colorado River Authority.

Additionally, the Austin Youth River Watch program should consider:

Conducting an additional study, locating past AYRW participants, to systematically investigate the extent to which, and the ways in which, the Austin Youth River Watch provides long-term effects and outcomes.

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