2006 Santa Fe Children's Water Festival Report on Outcomes

April 30, 2006

By Katie Babuska, Barbara Garrity and Wendy Tanner

2006 Santa Fe Children's Water Festival
Report on Outcomes

Since 2003, the organizers of the Santa Fe Children's Water Festival have been committed to implementing an event that delivers effective and meaningful water education. We continually strive to find ways to verify the degree to which specific outcomes have been achieved. These outcomes are based on performance targets that focus on learning and on action.

Goals and Performance Targets
The primary goal of the Children's Water Festival is to educate fourth grade students and their teachers in a fun and interactive atmosphere about water and its relationship to human and other natural resources. Our vision is to lay the foundation for further water instruction by exposing students to new ideas, options and solutions so the likelihood increases that they will make good environmental choices in the future.

Students and teachers attend five activities during the course of one day that help them understand three main concepts:

1) water is an essential and limited resource;
2) water–related facts, concepts and values; and
3) each of us can take action to protect and conserve water.

Performance Targets
We set three performance targets for students and three for teachers.

- Students demonstrate that they can answer Six Big Water Questions:
  - Why is water so important to life?
  - What is the water cycle and why is it important?
  - What is a watershed and how does it function?
  - How do trees, animals, people, soils, and water depend on each other?
  - How do our actions affect water quality?
  - How much water does my family use?
- Students take action to conserve water and protect water quality.
- Students urge their family and friends to take action to conserve water and protect water quality.

- Teachers continue water education in the classroom using the resources and concepts learned at the Teacher Workshop and Festival.
- Teachers utilize new resources, adopt expanded curricula and modify teaching methods.
- Teachers take action to conserve water and protect water quality.

We used three methods to verify performance targets:
Water Conservation Before and After Surveys – Students completed questions about home water use both before and after the Festival. The response rate was 48% for the Before Surveys and 34% for After Surveys. Answers to the questionnaires enabled us to determine the impact of the Festival on water use.

Evaluations – Teachers, students, presenters and volunteers completed written questionnaires after the Festival. In addition, each activity was observed at least once per day by an Activity Evaluator, but most activities were observed more than once on a single day.

Classroom Visits – We visited 17 classrooms to determine the extent to which students could synthesize what they learned at the Festival and answer the Six Big Water Questions. The visits combined evaluation and outreach in an interactive lecture style. As needed, we helped them develop answers to these questions.

Conclusions

The analysis of the results of these three verification methods is presented in this report. Based on these results, we found that all of the performance targets were reached by many of the students and teachers, and that some participants actually reached most of the targets.

Most students demonstrated a solid grasp of animal, plant, tree, human, soil and water interdependency, some actions that cause water pollution, ways to conserve water, and a commitment to personal and familial behavioral change to conserve water. Student understanding of the water cycle and components continues to be limited to evaporation, condensation and precipitation. Students do not understand infiltration/percolation and transpiration, although if prompted they know about the aquifer and runoff but do not connect them to the water cycle.

Two of the Six Big Water Questions continue to be difficult for students to answer:

What is a watershed and how does it function?

How much water does my family use?

There was, however, a marked increase this year in the number of students who could explain the concept and components of a watershed. We attribute this to improved communication by Festival organizers to teachers and presenters about the need to use and define words such as "watershed" and to clarify what constitutes a watershed during watershed-oriented activity presentations. However, a lot of work remains to be done on the subject of watersheds. For example, when asked if everyone in the world lives in a watershed, without exception students responded "No." Also, nearly all students said that a watershed must include mountains. This is probably because mountains are an integral part of their local New Mexico landscape and watershed. Most students are unclear about where their drinking water comes from, unless they get their water from a well on their property. Interestingly, without prompting several students brought up the idea of using "greywater" for landscape purposes, as a way to save water.

Students continue to have no concept of how much water their families use in a day. Their responses were wild guesses ranging from 1 gallon-1,000 gallons. However, when we showed them how to utilize their math skills to predict water use for various household tasks such as flushing the toilet, they quickly grasped the concept and understood their family water use more clearly.

Students did not realize the impact of animal and human waste as sources of water pollution. Again, we used math to show them the incredible number of dog feces (a major source of *e. coli* pollution in the Rio Grande) that could end up in the streams and rivers unless picked up and disposed of properly. They were impressed!

The analysis of the Before and After Water Use Surveys shows that participants are saving at least four gallons per person per day as a result of attending the Festival. This is down from last year by about one gallon per person per day. It is important to note that, even where the survey does not show demonstrable water savings on some questions, the numbers clearly show that many families are conserving water, both before and after the Children's Water Festival.

Teachers gave high marks for the Festival, with 85% rating the event as Really Good or Wonderful. The most common concern is the length of each activity. Some teachers prefer that their students go to as many activities as possible, while others would rather have more time spent on fewer activities. Most said they plan to use the supplemental teaching materials and information during the rest of the school year. All respondents said they will be able to utilize and extend on what their students learned during the Festival in their curriculum.

Nearly all Presenter respondents (88%) rated the event as Really Good or Wonderful. The most common concern was that the facility and/or room set-up was too small or not ideal.

Volunteers had a great experience. In fact, 97% of respondents rated the event as Really Good or Wonderful. Their comments were generally about the fun time they had.

Activity Evaluators rated Festival activities an average of 5.9 for relevance (on a scale of 1-6 with 6 being highly relevant), and 5.2 for student comprehension. Activity Evaluators' comments reinforce the idea that effective presenters 1) minimize the amount of time spent lecturing and maximize the amount of time doing hands-on and/or highly interactive learning, 2) use uncomplicated visuals with large print, and 3) relate well to fourth graders and quickly adapt or explain complex vocabulary and concepts.

The outcomes for water conservation and protection of water quality that will be achieved in the coming months and years can only be approximated, but we believe that the value of the water education that is delivered by the Children's Water Festival is significant and essential.

Before and After Water Use Surveys
Analysis and Conclusions

Teachers were asked to send home with their students a water-use survey before the Water Festival, and to send another survey home after the Children's Water Festival to verify effectiveness of the lessons learned at the Festival. The survey requires the student to enlist the help of an adult in filling out the responses, which, in itself, reminds them of the lessons of conservation from the Children's Water Festival.

Conclusions
Based on the survey results that follow, water savings of at least 4 gallons per person per day can be estimated from shorter showers and turning off the water while brushing teeth. Therefore, the water conservation that resulted is shown in the table below:

	Students	Family*	Students	Family*
Participants	Gallons/Day	Gallons/Day	Gallons/Year	Gallons/Year
563	2,252	9,008	821,980	3,287,920

*Family of 4, assuming conservation of 4 gal/day/family member

These numbers do not include additional savings from future decisions about landscaping or other household water conservation efforts that the students may influence. Even where the survey does not show demonstrable water savings on some questions, the numbers clearly show that many families are conserving water, both before and after the Children's Water Festival.

Survey Analysis
The survey instruments, presented below, have the total number of responses for each question, and the percentage of the total responses for that question. The percentages are helpful in comparing answers from before and after the Children's Water Festival because the number of respondents for the "Before" survey is greater (approx. 271), compared to the number of respondents for the "After" survey (approx. 193).

Indoor Water Use
The survey begins with asking those students that take showers, as opposed to baths, to time their own and a family member's shower. It also asks whether the home has a low-flow or regular showerhead, or whether they do not know. The average times demonstrate improvements in water conservation in the home after the Children's Water Festival. For the student respondent, the average time before the Festival was 9.2 minutes and after the Festival was 8.1 minutes. For the family member, the average time before was 10.8 minutes and 9.3 minutes after the Festival.

To compute the water savings from these improved water conservation habits, we assume an average water flow of 3.75 gallons per minute. Close to half of the respondents both before and after the Festival had low-flow showerheads, which deliver about 2.5 gallons/minute. The other shower heads were either not low-flow or unknown, delivering about 5 gallon/minute. Thus, an average of 3.75 is a reasonable assumption for both before and after the Festival calculations. A student taking a 9.2 minute shower would use 34.5 gallons per shower, and an 8.1 minute

shower would use 30.4 gallons, yielding a savings of 4.1 gallons per shower after the Festival. The family member averaged a savings of 5.6 gallons per shower.

Next we asked students about turning off the water when brushing teeth. There was an increase in students (from 94% to 96%) and increase in family members (from 73% to 76%) turning off the water when they brushed their teeth. These numbers are slightly higher than last year's results, so general awareness has increased.

The number of low-flow toilets (66%) and drippy faucets (12%-14%) remained about the same after the Water Festival.

We continued with a question about whether the dishwasher or washing machine is full when run. The data indicate an increase (from 78% to 86%). The total percentages of positive responses show a strong awareness of water conservation in using these appliances.

After the festival, 86% of the attendees have spoken to their family about ways to save water outside the home.

Outdoor Water Use

Many students in Santa Fe do not have lawns, or do not know if they have "lawns." Of the 54% that do have lawns, more than 75% water them in the morning or evening rather than the afternoon. A small increase in morning watering is shown (from 36% to 40%) after the Festival, along with a small reduction in afternoon watering (from 23% to 21%).

Native plants in the student's yard are reported to have decreased after the Festival, although more than half of the families report having some native species planted. Rain barrel use remained about the same, at 26%.

Before the Water Festival

Do you and your family take baths 14 5% showers 88 33% or both 165 62% ?

If you answered "shower"....
Does your shower have a Low-Flow shower head?
Yes 139 53% No 60 23% Not sure 63 24%

- ✓ Ask a family member to time you when you take a shower.
  My Shower took 9.2 minutes.
- ✓ Now, time a family member when they take a shower.
  His/Her Shower took 10.8 minutes.

Do you turn off the water when you brush your teeth?
Yes 251 94% No 14 5% Not sure 3 1%
Does everyone in your house turn off the water when they brush their teeth?
Yes 198 73% No 29 11% Not sure 43 16%

Is the toilet in your home a Low-Flow Toilet?
(Look between the tank and the seat. If it tells the number of gallons, like 1.6gpf, it is a Low-Flow Toilet.) Yes 178 66% No 39 14% Not sure 53 20%

Look around the house for dripping faucets. Did you find a drip?
Yes 33 12% No 224 84% Not sure 9 3%

Does everyone in your family make sure the dishwasher and washing machine are full before running them? Yes 206 78% No 20 8% Not sure 38 14%

Do you have a lawn? Yes 142 54% No 94 35% Not sure 29 11%

If so, what time of day is the lawn watered?
Morning 82 36% Midday 53 23% Night 92 41%

Do you have native plants in your yard?
Yes 153 58% No 79 30% Not sure 30 11%

Do you have a rain barrel in your yard?
Yes 68 25% No 187 70% Not sure 12 4%

After the Water Festival

Do you and your family take baths 11 6% showers 71 37% or both 110 57% ?

If you answered "shower"....
Does your shower have a Low-Flow shower head?
Yes 94 50% No 42 22% Not sure 51 27%

- ✓ Ask a family member to time you when you take a shower.
  My Shower took 8.1 minutes.
- ✓ Now, time a family member when they take a shower.
  His/Her Shower took 9.3 minutes.

Do you turn off the water when you brush your teeth?
Yes 182 96% No 7 4% Not sure 1 1%
Does everyone in your house turn off the water when they brush their teeth?
Yes 145 76% No 23 12% Not sure 24 13%

Is the toilet in your home a Low-Flow Toilet?
(Look between the tank and the seat. If it tells the number of gallons, like 1.6gpf, it is a Low-Flow Toilet.) Yes 126 66% No 35 18% Not sure 31 16%

Look around the house for dripping faucets. Did you find a drip?
Yes 26 14% No 163 85% Not sure 2 1%

Does everyone in your family make sure the dishwasher and washing machine are full before running them? Yes 158 86% No 11 6% Not sure 15 8%

Have you talked with your family about ways to save water outside your home?
Yes 130 68% No 43 23% Not sure 17 9%

What time of day is your lawn watered?
Morning 64 40% Midday 34 21% Night 64 40%

Do you have native plants in your yard?
Yes 100 53% No 59 31% Not sure 31 16%

Do you have a rain barrel in your yard?
Yes 49 26% No 126 66% Not sure 15 8%

Student Evaluations

Number of Schools: 16
Number of Classrooms: 27
Number of students: 563
Schools and number of students returning evaluations: 10 schools (62.5%) and 16 classrooms (59%), with 236 total student evaluations (42%) received. Also, one class wrote letters and one class had pictures that the children then wrote to describe what was happening.

What were your favorite activities at the Children's Water Festival and why?
The students completing the surveys attended all activities. Due to handwriting and comprehension issues, those activities that were undecipherable were not noted.

- Twenty four students indicated they liked all the activities. Water Jeopardy received the most favorite votes (48), with Swimmin' in the Rio Grande next (27). Other favorite tally's were: Weather or Not (26), Meet Water Bugs Up Close (22), Rolling River (16), Incredible Journey (14), What's in Your Water (12), Rio Grande Bosque Water Cycle (11), Perfect Little River and Long Haul (10), Waterfowl & Shorebirds (5), First in Time (3), and Down by the River's Edge (1).
- The most common reasons given for liking activities were that they were "active" and "fun."

  "We got to be any fish we wanted."
  "We got to do cool stuff."
  "It was fun and it required you to pay attention."
  "When we made the puzzle."
  "We got to get really involved in what was happening and we got to put everything on the model."
  "It taught me a lot of things and it was fun."

What were your least favorite activities and why?
The highest score in this category was none (45).

- Other scores: First in Time (26), Rolling River and Perfect Little River (18), Down by the River's Edge (15), Incredible Journey and Meet Water Bugs Up Close (12), Swimmin' in the Rio Grande (10), Water Jeopardy (7), Waterfowl & Shorebirds (6), Long Haul and Weather or Not (5), Rio Grande Bosque Water Cycle and What's in Your Water (2).
- The most common reason for a least favorite activity was that it was boring or they didn't get to do anything.

  "I didn't learn anything new about conserving water."
  "I was rushed too much and too much information."
  "I am not fond of bugs."
  "They kind of did more talking instead of getting right too the game."
  "It wasn't that fun."

Why do you think learning about water is important?
Both water conservation and water quality were mentioned, though water conservation was most often noted.

"I learned that if we leave the water on, we waste water for the plants and animals."
"I think its important so we don't waste all the water and go thirsty and die."
"So we know how to save it, so there will be water forever and not to pollute the water."
"Because Santa Fe is very dry."

What are you doing that is different, concerning water, that you did not do before the Festival?
Most said they had changed a habit or use of water. Some wrote how they were polluting less.

"I wasted water a lot. And now I use just a little bit of water when I take a bath."
"Collect the oil."
"Using less water."
"Saving water in shower, dishes, and a bath."
"Taking shorter showers."
"Picking up poop."
"Stopping the water when I brush my teeth."

Have you talked to your family and friends about conserving water and protecting water quality?
Of the 236 surveys, 180 (76%) of the students said they had talked to someone about what they learned at the festival, 42 (18%) said they had not talked to anyone, and the final 14 (6%) said either not yet, maybe or left the question blank.

"Kind of"
"Yes"
"Not yet, but I will."
"Yes, I told my family that we need a low flow shower and toilet."

Teacher Evaluations

Number of Schools: 16
Number of Teachers/Classrooms: 27
Number of Returned Evaluations: 13 (48%)
Schools Represented: 9 - Acequia Madre (1 of 1), Alvord (1 of 1), Carlos Gilbert (1 of 2), Cesar Chavez (1 of 1), EJ Martinez (1 of 3), Kaune (2 of 2), Kearny (3 0f 3), Larragoite (1 of 1), Wood-Gormley (2 of 3)

Which activities were most effective in teaching your students about water? Why?

- "Bosque Water Cycle" – learned the most
- "Down by the River's Edge" – dynamic presenter
- "Incredible Journey" – children were in the water
- "Long Haul" – visual aids, small step presentation; hands on
- "Meet Water Bugs Up Close" – hands on investigation of real bugs; good hands on
- "Perfect Little River" – hands on; very good
- "River's Edge" – the demonstrations were very effective
- "Rolling River" – children could actually see water flow, water erosion, and water flooding
- "Swimmin' in the Rio Grande" – very informative in a fun format; board game; hands on; fun, good to have small group activities
- "Water Jeopardy" – engaging and quizzed them about what they learned that day – and remembered!; all the different areas were together
- "Weather or Not" – learned the most; effective activities, hands on and visual
- "What's in Your Water" – learned the most; watershed visuals; visually stimulating

Which were not effective and why?

- "Down by the River's Edge" – rushed lesson, too much info in short amount of time
- "First in Time" – lecture and theory are too advanced for elementary; too long and boring for 4th graders. No action. Great for adults though!
- "Long Haul" – the activity was last that day in room without windows, otherwise, maybe more engaging (but all kids couldn't see what was happening; could involve some predicting by students or somehow more involvement. Just going back and forth to carry water was a bit dull.
- "Rolling River" – cold and noisy, but presenters sure did a great job
- "Water Jeopardy" – took too long to learn the rules before playing; too many students in the room; little classroom management and the answering of questions was arbitrary – it did not alternate from team to team. Also, my students overheard the teacher of the other team telling her students how much smarter they were than our class. I had to miss our next session because one of my students in tears. Maybe next year the class could be divided into two and play against each other instead of against other classes? Keep to just one class – group is too big and 'competition' within a class better than between classes.

Do you have any suggestions for new activities?

- Break up Down by the River's Edge into a few sessions
- Possibly longer time frames for activities
- Maybe something on how we clean water

Was the teacher workshop useful? If so, how? If no, how could it be improved?

- Yes, good briefing for the upcoming festival, meeting organizers.
- Yes, thanks for shortening it.
- Yes, we knew what to expect and how to prepare our children.
- Without the workshop the day may have been confusing.
- Yes, reminded us to get started on water! Good ideas. Keep it brief, as teachers are so busy.

Do you plan to use the materials in the Resource Kit during the rest of the school year?

- Yes
- I sent the shower timers home already. If we ever get rain we'll use gauges.
- Absolutely. I've used all of them already!
- Yes – we already have and will continue to.
- We always use the publication "conserve water."

Will you be able to utilize and extend on what your students learned during the festival in your curriculum? If so, how?

- Yes, we do a unit on land and H_2O, water festival fits in nicely.
- Yes – the students remember what they saw or heard.
- Yes – we did a lot of "pre-work," and we will continue to work on the concepts of watershed and water cycle.
- Oh Yes- we have a grant for rainwater harvesting off our portable roof and are going ahead full steam!
- Yes – it provides a good, visual foundation to teach life science.
- We will use the survey and give it to the 3rd, 5th and 6th grades.
- Yes, we do recycling and water conservation/recycling. Water poster contest now that we have a better feel for water knowledge.
- Water is always an important part of our curriculum. It is also one that can be reinforced throughout the year.
- Yes, through our science and even social studies curriculum. Through projects and experiments and other field trips.
- It is a good parallel to our paper recycling project.
- Depending upon time constraints kids make water filters, do experiments to see how ground water gets contaminated.

What are you doing that is different, concerning water, that you did not do before the Children's Water Festival?

- Include water demonstrations in our science fair.
- Teaching water concepts better.
- Shorter showers, turning of water in the kitchen between rinsing.
- Talking about it more.
- Saving dripping/excess sink water for our plants.
- Give more vocabulary and concepts and helping children understand more about their future.
- Have always valued water and have experienced the consequences.
- I was already trying to conserve water before the festival.
- Students and I are more conservation conscious.
- Composting more!! Use pre-shower water to water plants. Use hand sanitizer in classroom instead of soap and water.

What suggestions do you have for improving the Festival next year?

- Have a general meeting area (big open room) and address everyone at the beginning of the day.
- Include more activities than five so we can try more.
- Make sure it is a full day. Make the activities longer. Don't cut activities to make fewer longer.
- Maybe each presenter could submit a list of vocabulary words so children will learn them and listen for them.
- Longer time frames for activities, and possibly staying later in the day.
- We need evaluations and surveys in Spanish please.
- Could we add 5 minutes to each station, it felt very rushed. Some of the activities would be better with smaller groups (Perfect River, Jeopardy).
- Change the last question on student evaluation to: "What will you share with your family and friends about conserving water and protecting water quality" or ask them three things they learned.
- Spread classes around so that one class isn't stuck in a traditional sit and listen setting more than 1 or 2 max.

Overall Rating (on a scale of 1-6 with 6 highest):

4 Wonderful
6 Really Good
1 4/5
0 Good
0 OK
1 Needs Work
1 Not rated

Additional Comments and Suggestions:

- Thank your for the work!
- Thanks for letting us come. We all enjoyed it, and so did the parents
- Excellent Festival!
- It is a great program for everyone

Presenter Evaluations

Activities Presented – 13
Presenter Evaluations Returned – 8 (6 activities or 46%)

Evaluate your activity. Was it appropriate for the age group? Did it work effectively in the time frame? Did it involve student participation, and if so did they engage in the activity?
All respondents felt their activities were age appropriate. Several suggested a longer session time would be helpful, and one noted a need for a clear five minute break between each session to prepare for the next class. All indicated that students participated and all of the students seemed engaged.

What could you do to improve the activity for next year?
All but one noted the desire to take into account the evaluation feedback in order to improve their activities. One received a request for a vocabulary sheet for the teachers, and plans to develop a handout. One is hoping for a better poster of the watershed to have available. Another suggested instructions and educational materials in the activity should have Spanish translations.

What could Festival organizers do to help make your job easier? Were you satisfied with the set up of the room? Did you have everything you requested?
The Incredible Journey needs a bigger room. The Rolling River was not an ideal setup, and the wind on the second day really was hard on the presenters. Water Jeopardy requires a more flexible room setup for the teams to effectively work together. Weather or Not could have used more room, and their room was not setup for them. What's in Your Water would like more information about which class is coming in, and needed a sink in the room.

What general comments about the Festival did you hear from teachers, students, parents?
In general, all comments heard were positive. Comments such as "it was fun" and "what a positive experience" were reported.

What did you enjoy the most about the Children's Water Festival?
Comments include: "The diverse group of kids and the great organization." "Meeting new teachers. Meeting parents. Seeing kids on task, involved, and excited about science." "I really love the moment when the lights go off in the children's eyes and they begin to understand what we are presenting!" "The students, of course!" "Everything!" "Seeing the 'light bulb' go off." "Getting students excited about science." "The excitement and energy of the students."

Do you have any suggestions for improving the Festival as a whole?
A couple of presenters commented that a larger venue would be helpful. Two suggested that the activities be reduced from five to four, so that the kids have more time to absorb the information. Another suggested their activity would like to become a two-session activity so there is more time. One said it would be nice to have a break to see the other activities and asked for a poster of the hydrologic cycle.

Do you have any ideas for new activities?
No new activity ideas were noted.

Would you be interested in presenting at the 2006 MRG or 2007 Santa Fe Children's Water Festival?
All indicated interest.

Overall Rating (on a scale of 1-6 with 6 highest):

4 Wonderful
1 (5.5)
4 Really Good
1 (4.5)
1 Good

Facility – OK (3)

Additional Comments and Suggestions:
"Let's not let the facility discourage us… yes, we had some problems, and certain promises were not carried out as we expected but they are things we can overcome making things even better next year!!!!"

"Thank you for putting on a very necessary and enjoyable event."

Volunteer Evaluations

Number of Volunteers: 19 each day; 34 total (4 volunteered both days)
Number of Returned Evaluations: 29 (85%)
Organizations Represented: NM Environment Dept., Office of the State Engineer, PNM, State Land Office, NM Dept. of Game and Fish, Surface Water Quality Bureau, Santa Fe Planning Commissioner, City of Santa Fe

How did your volunteer assignment help the Children's Water Festival?

- 13 volunteers served as classroom guides, 3 as activity assistants, 1 as a photographer, 1 at the welcome desk, 1 as lunch setup

  "Provide a fun, knowledgeable tour guide."
  "Helped keep the class organized (teacher was alone)."
  "..plus got the students to their sessions on time. Didn't lose any."
  "Assisted in the watershed model."
  "Provide visual material of the event."

How were you affected by the experience?

- Volunteers were all positive in their responses.

  "Kids were very well behaved. The event was WELL organized!"
  "Great learning experience."
  "Rewarding."
  "Learned more on water conservation."
  "The children are a real joy to be around."

What could Festival organizers do to help make your volunteer job easier?

- As usual, there were few comments made to this question, and several simply noted it was wonderful. Suggestions for improvement were as follows:

  "Less paper in hand."
  "Provide clipboards and pens."
  "Maybe a little bit more time per activity."
  "Provide an agenda which describes the classes being taught."
  "Clocks in every classroom."
  "Never ask me to be the non-breathing bug!"

Do you think teachers and students benefited from their day at the Festival?

- Those who answered all said, "Yes." A few suggestions follow:

  "Expand the subject matter."
  "Yes, although it was rushed."
  "I was with a bi-lingual class where over 1/3 of the class were Spanish speaking. Some of the teachers did not know how to handle the pause to translate, and in fact some seemed irritated."

Do you think the Children's Water Festival would be valuable next year?

- All the volunteers said, "Yes," and several said, "Absolutely."

Overall Rating (on a scale of 1-6 with 6 highest):

- 17 Wonderful
- 1 between 5 & 6
- 10 Really Good
- 1 Good

Additional Comments and Suggestions:

- Eight volunteers added comments and suggestions. Half were kudos, and the other half specific suggestions.

  "Keep up the good work."
  "What a fun way to educate kids."
  "This was my first time volunteering, I really enjoyed it and look forward to returning next year."
  "Thanks for inviting us to participate in this event!"
  "Might be good to have a learning theme. As there are many overlapping discussions. One or two consistent experiential lessons.
  "Each class should be a little longer."
  "Possibly more advertisement about the event and why it is being held."
  "I believe some of the instructors could use a children's teaching style orientation."

Activity Evaluations

There were 13 unique activities presented. Each 4th grade class had the opportunity to participate in five activities. Two activities were offered only one day, and simply alternated between the two days of the festival. Four activities were new, and one was revised.

PioneerWest provided evaluators for the activities, some from the Santa Fe Steering Committee, others from within the staff of PioneerWest. Over the two-day festival, 33 evaluations were performed. On the first day (2/15/06) thirteen evaluations were performed. On the second day (2/16/06) twenty evaluations were performed.

A matrix of the evaluations is presented below. The number in parentheses before the presentation style is the number of evaluations performed for the activity. The relevance and comprehension numbers are based on a scale of 1-6, with 6 being the highest. The number listed is an average of the evaluator's ratings for each category.

It is important to note that the mean of relevance scores for all activities was 5.9. Considering the level of expertise in water issues and education in NM on the part of the evaluators, clearly the activities are achieving a high level of relevance. Also, the mean of comprehension scores was 5.2. This is a more subjective score, as it asks the evaluators to judge the children's comprehension. This score can more easily be interpreted when looked at in tandem to the classroom evaluations.

Activity	Presentation Style	Children	Level	Relevance	Compre-hension
Down by the Rivers Edge	(3) Combination	Interested, involved, attentive	On	6	5.7
First in Time, First in Right (New)	(4) Mostly Lecture, Combination	Involved, interested, sometimes restless, mostly attentive	On, a little over	6	4.1
Incredible Journey	(3) Mostly Hands-on, Combination	Interested, involved, restless at the beginning	On	6	5.5
The Long Haul	(2) Combination	Interested, attentive, involved, some restless	On	6	6
Meet Water Bugs Up Close (Wed Only)	(1) Combination	Interested, involved, restless	On	6	4
Perfect Little River (New)	(2) More Hands on	Involved, interested	On	6	6
Rio Grande Bosque Water Cycle (New, Thu Only)	(3) Combination Hands On	Involved during movements, bored during lecture, interested, attentive	On	6	5
Rolling River	(2) Combination	Interested, involved, attentive	On	6	5

Swimmin' in the Rio Grande	(3) Combination Largely Hands-on	Involve, involved during game, restless during lecture, interested, attentive	On	6	4.7
Water Jeopardy	(2) Lecture/Q&A Combination	Interested, involved, attentive	On	6	5.3
Waterfowl and Shorebirds of NM	(2) Combination Hands-on	Interested, fascinated, restless	On	4.5	5.5
Weather or Not (Revised)	(3) Hands-on Mostly Hands-on Combination	Interested, involved, fascinated, attentive	On	5.7	5.3
What's in your Water (New)	(3) Hands-on Combination	Involved, interested, attentive	On	6	5

Each activity had a number of useful evaluator comments. They are presented in brief below.

Down by the River's Edge: good experiments and good engagement with the kids, have a gift at translating complicated concepts in a simplified way, get a good map and present accurate geographic descriptions, maybe use green cotton balls, the lead presenter is a dynamic speaker.

First in Time, First in Right: could use more with color, hard to see photos on laptop – use a projector, less jargon – put concepts in language children understand, the presenter was good, the topic is important, use a map, introduce and explain map, more visuals, provide vocabulary list for teachers before, hands on addition good, more time for water negotiation, add information about Santa Fe River fish, made really hard concepts basic and easier to understand, really good job with really hard topic.

Incredible Journey: great analogy at start (doctor's office), some large pictures would enhance the talk, good communication skills with the kids, very clear presentation style, kids had a lot of fun but not sure they understood why they were playing the game at the beginning.

The Long Haul: could student initially guess at how much water is used by an activity? Could student have to organize their own haul (trade themselves), with gallons empty perhaps the challenge is one person having to haul all 6 or 12 gallons, good anecdotal stories, sweet way to impart conservation information give the houses funny names, little emphasis on outdoor water use, presenters could suggest they go over water bill with family for average use per family member per day.

Meet Water Bugs Up Close: the rock was a good touch (a bit of real habitat), one rock in each tray would be useful.

Perfect Little River: could add some more visuals, explain how the trees help clean up pollution, lead presenter was adept at providing short, translatable concepts.

Rio Grande Bosque Water Cycle: not enough cards, nice to involve parents, as the activity evolved the demand and supply was very evident, students tended to play with the water during the "middle" lecture, explain that there are two different situations – before people and after people, explain why some people have teaspoons and others have cups, get more feedback from kids to understand their level of comprehension, is it fair to portray the SF & Abq aquifer as being currently overdrawn? maybe a poster or picture for each station to illustrate it.

Rolling River: provide teacher with vocabulary list of terms used, good job with question style – guide and discovery, nice addition of paper (crumpled) and how water flows down, nice addition of trading places so all kids can participate, good review of new words, good emphasis on three words and concepts- watersheds, models, water cycle.

Swimmin' in the Rio Grande: illustrations are good, game seems fun, emphasize the significance of the trout – connect it to the big picture, add a map of NM water and where the trout lives, great having board in English and Spanish, good wrap up, have a contingency segment of the activity prepared for times when a class arrives early, all have worked together to improve this activity greatly, it is important to have a participating adult at each table.

Water Jeopardy: could read the board easily, nice addition of the Spanish on the blackboard, vocabulary list for teachers, good analogy with coffee pot and infiltration, "minds-on" cooperative teamwork.

Waterfowl and Shorebirds of NM: map on floor is great, tie it more to water/river, text is really long – especially Spanish text, really good at giving the students a chance to respond to questions, consider reducing text to bullet lists, great use of space, the mask activity a great way to encourage the children to observe details of bird's features.

Weather or Not: add one or two groups to get smaller group sizes, advise children not to try experiments with matches unless with parents, managed to make science fun and cool and explains some of the mysteries of the universe in 25 minutes, those bubbles were effective, more cautionary words about matches, miss the information about floods and not driving through flood waters, good visuals, kids very interested, nice volunteer system with color cards, break down explanation of cloud making a bit more, great experiment.

What's in Your Water: good distribution of students to table, teacher was great at helping with the wrap up, liked the way prior knowledge was utilized for concepts, ask the class what activity they just came from, good initial explanation of watershed and time to think of answers to questions.

Classroom Visits

Total Number of Classrooms Participating in Festival: 27
Total Number of Classrooms Visited: 17 (63%)
Elementary Schools Visited: 10 (Acequia Madre, Carlos Gilbert, Eldorado, Escuela de Esperanza, EJ Martinez, Kaune, Kearney, Turquoise Trail, Wood-Gormley)

Classrooms were visited in March and early April, 2006. A minimum of two evaluators were present in each classroom, one to take notes, the other to lead a discussion with the students. During the visit, presenters would reinforce the information available at the Water Festival. Each visit lasted about 45 minutes. It was noted that at least three classes had the water cycle poster provided on display.

Did anyone learn anything new?
The children's responses ranged from general statements about the importance of water to very specific information that revealed which activities the children attended at the water festival.

- Not to use so much water and save some
- Trees suck up water and sprinkles it… cottonwood
- Where Santa Fe river is
- There are so many types of trout
- All different kinds of water bugs
- Helps plants grow
- Help animals
- Water carries disease
- That trees clean water
- How we got in the drought
- Water goes through factories to get clean
- Birds go different places to survive
- Plants keep river banks from eroding
- How much our earth gets polluted
- To take 5 minute showers instead of 10
- Rio Grande starts in Colorado
- How many things can pollute the water that you don't notice

Why is water so important to life?
This is a concept that the children truly understand.

- We'd be dead without it
- Animals and trees, the whole planet needs it
- We wouldn't have oxygen
- We need to drink enough water or we won't have enough energy
- Most of your body is made up of water
- You can only go around three days without water
- The trees would die and there would be fire
- Nothing can live without water
- Most of the world is covered with it
- We can't make artificial water

What is the water cycle and why is it so important?
The students understood the idea of a cycle and how water has a cycle. They consistently know precipitation, evaporation and condensation. Transpiration, infiltration and runoff are unknown concepts and words.

- It's the thing that happens to water when it goes around
- Precipitation, evaporation, condensation, precipitation – no prompting
- Water is in the river then evaporates and turns into a cloud, then rains and goes to the river
- There is no beginning and end to the water cycle
- Transpiration is water comes out of the plants, the plant takes in the carbon dioxide and with the oxygen the water comes back out
- Rain, snow, sleet, hail

What is a watershed and how does it function?
There was a better understanding of this concept this year.

- A group of water, multiple things like lakes and rivers
- It's all the land that the water flows through
- Something that captures water
- It storages water
- The place where water always runs down
- Whole entire place and it has water and stuff
- Not everyone lives in a watershed
- Everyone lives in a watershed
- It's on a mountain and goes into a lake or river
- Watershed gets poisoned by what's dumped upstream

How do trees, plants, animals, people, soils and water depend on each other?
This is another concept the students really understood well.

- Plants need water to grow
- Animals drink water
- We eat plants
- People drink water
- We get oxygen from plants
- Soil cleans the water for plants
- Fish need clean water
- Animals eat plants and can make nests in them
- Cotton comes from trees
- Animals give us food
- Animals live in the ground
- We use plants for shade

How do our actions affect water?
Questions about the difference between water conservation and water quality were voiced by the students. Trash and oil were the two most often mentioned pollutants.

- Walk more, ride your bike more because smoke makes pollution
- Some people throw trash into the river and pollute it. Oil from car goes into river
- If you dump garbage in the water the animals don't like it
- All the poops wash into the ocean or the gulf
- Control pollution
- Bad pollution can go into the air, attach to water vapor and come down as acid rain
- Check for pesticides
- Plants can be bad, willow tree has big roots and when it gets thirsty and goes into the cottonwood
- Don't throw stuff out of the car

How much water does my family use? What are you doing that is different?
Students did not have a realistic grasp of volume usage. The range of guesses was from 1.5 – 1200 gallons per day. The presenter used water math to give a more realistic grasp of volume.

- Areas where we can reduce water use: shorter showers, wash dishes without leaving water running, brush teeth without running water, water yard less, bath in less water, wash hands without leaving water running, capture roof rain, fix drippy faucet, fix leak, install water saving toilet, capture cold shower water to water plants, use rain barrels.

Have you talked to your family and friends about conserving water and protecting water quality?
In some classes none of the students responded positively but in other classes almost all of the students had talked to family and friends about what they learned at the water festival. The presenter reviewed the estimated water savings if everyone shared the information.

Summary of Student Participation
Approximately 71% of the students participated sometimes or often in the discussion.