New Mexico Science and Engineering Fair 2007 New Mexico Bureau of Geology and Mineral Resources "Excellence in Geoscience" Award

New Mexico Institute of Mining and Technology in Socorro has hosted the New Mexico Science and Engineering Fair since 1953, three years after the first National Science Fair was held in Philadelphia. Science fair is one of several educational programs developed by the nonprofit organization Science Service (http://www.sciserv.org/), founded by the publisher E. W. Scripps in 1921 to advance the public understanding and appreciation of science among people of all ages. Through Science Service Scripps hoped to bridge the gap between scientific achievement and the public's knowledge of such achievement. Science Service began this task by presenting unsensationalized, accurate, and fascinating scientific news to the public, by forming Science Clubs of America, and by publishing its own awarding-winning weekly news magazine, *Science News*, now in its 85th year. In addition to science and engineering fairs, Science Service administers the Intel Science Talent Search (formerly the Westinghouse Science Talent Search), the Discovery Channel's Young Scientist Challenge, and the Web site Science News for Kids.

The New Mexico Science and Engineering Fair is one of 550 affiliated fairs held in all 50 states and 40 nations. Middle and high school students and their parents and teachers came to Socorro from across the state to participate in New Mexico's and New Mexico Tech's 55th annual Science and Engineering Fair April 13–14. Participation in New Mexico's Science and Engineering Fair is meant to:

- encourage inquisitive students to explore their environment in a systematic, logical manner,
- stimulate students' interest in science and technology while simultaneously promoting the development of the life skills of communication, decision making, evaluation of alternative solutions, and critical thinking.

New Mexico's senior division grand award winners in the physical and life sciences were among approximately 1,500 student finalists competing in the International Science and Engineering Fair, which this year was held in Albuquerque in the Convention Center, May 13–19. Exhibits were open to the public on Thursday, May 17, from 9:00 a.m. to 9:00 p.m. and on Friday, May 18, from 9:00 a.m. to noon. For more information go to the Web site http://www.intelisef2007. org/.

New Mexico Bureau of Geology and Mineral Resources is

proud to be among the more than 50 organizations, companies, and individuals who sponsored special awards recognizing New Mexico students' contributions of knowledge and hard work. The bureau's "Excellence in Geoscience" Award is supported solely by the employees of the bureau and is presented to New Mexico students in the junior (grades 6 through 9) and senior divisions (grades 9 through 12; ninth graders may choose the division in which they wish to compete). *New Mexico Geology* is pleased to acknowledge this year's recipients of the bureau's Excellence in Geoscience Award, to print the abstracts of their research, and to congratulate them on their other honors.

This year's winners of the bureau's Excellence in Geoscience Award are Jinhie Skarda in the junior division and Shandiin Copeland in the senior division. Both Shandiin and Jinhie received a cash award of \$100.00, a certificate, and 1year subscriptions to *New Mexico Geology* and *Lite Geology*. The bureau's junior division award winner, Jinhie Skarda, also received an honorable mention in the junior division in the category Chemistry, and she was awarded \$100.00 from the Rocky Mountain Water Environment Association.

The bureau's senior division award winner, Shandiin Copeland, placed first in the senior division in the category Earth and Space Science. Shandiin also placed first in the senior division of the Research Paper Competition sponsored by the New Mexico Academy of Science, INTEL, and Sandia National Laboratories/Lockheed Martin. The American Vacuum Society also honored Shandiin for her research paper. Her exhibit won \$100.00 awards from the New Mexico Geological Society and the New Mexico Garden Clubs, Inc. She won \$50.00 awards from the New Mexico Water Resources Research Institute and the New Mexico Network for Women in Science and Engineering. Shandiin received a certificate from the National Oceanic and Atmospheric Administration and a certificate from the Association for Women Geoscientists for high standards of innovativeness and scientific excellence in the geosciences. Additionally, Shandiin received the John Harty Award for the project that makes the best use of readily available materials.

For a more complete list of the 2007 New Mexico Science and Engineering Fair exhibitors and their awards, go to the Science Fair Web site, http://nmt.edu/~science/fair, and click on "Results 2007."

Would you drink this? by Jinhie Skarda Mountain Elementary School, Los Alamos Winner, Junior Division

The purposes for doing this experiment were to study (1) how the water quality of local water sources compared with that of tap water, and (2) to find out how clean I could get muddy water using two homemade filters. My hypotheses were (1) the water quality of tap water when compared with local water sources would be very different, and (2) homemade filters would work but would not get muddy water as clean or clear as tap water. To prove or disprove my hypotheses, I tested four local water

sources (Ashley Pond, Rio Grande, Animas River, and melted snow) and tap water using an environmental water quality test kit. I then built two filters. One filter was simple,



and the other was more complex. I filtered tap water and muddy water. I made about 200 chemical measurements of nine different water samples.

The complex filter cleaned the muddy water clear as tap water. The simpler filter didn't work as well as the complex one. The top layer was fine sand. This was a bad thing. When I poured the water through the filter, the fine sand got pushed into spaces between the coarse sand. The simpler filter filtered slower than the complex filter.

My conclusions were (1) the water quality of local water sources is similar to tap water, and (2) I can filter muddy water using homemade filters to be as clear as tap water, but not drinkable.

Stream channel dynamics in Largo Canyon, 1882–2005 by Shandiin Copeland Kirtland Central High School, Kirtland Winner, Senior Division

In the 1880s, arroyo channels began to intensely erode, widen, and deepen in much of the American Southwest. Different theories about what may have caused this erosion cycle include changes in precipitation, overgrazing, or a combination of both.

- The Byran–Antevs model argues that arroyo cutting is associated with drought and poor vegetation and arroyo filling with higher rainfall and improved vegetation cover.
- The Martin–Schoenwatter model states that arroyo cutting is associated with increased summer rainfall when there may actually be greater annual rainfall and increased vegetation cover.



Nearly 125 years of Largo Canyon channel size data, precipitation, homesteading, and livestock data are available to examine this question. Using 1882 survey data, 70 years of 20th–21st century aerial photography, GIS, historical records, and statistical analysis, can it be determined what effect precipitation, homesteading, and livestock usage had on the arroyo channel of Largo Canyon?

The hypothesis is that there will be an association between channel size and acreage, and the variables of precipitation, homesteading, and livestock numbers in Largo Canyon.

As a result of the analysis, the hypothesis is not rejected. There appears to be strong association between livestock numbers, homesteading, and erratic precipitation, including very dry years, with a measurable increase in the channel of Largo Canyon between 1882 and 1935, and as livestock, principally sheep, declined in numbers, a filling in of the Largo channel after 1935.