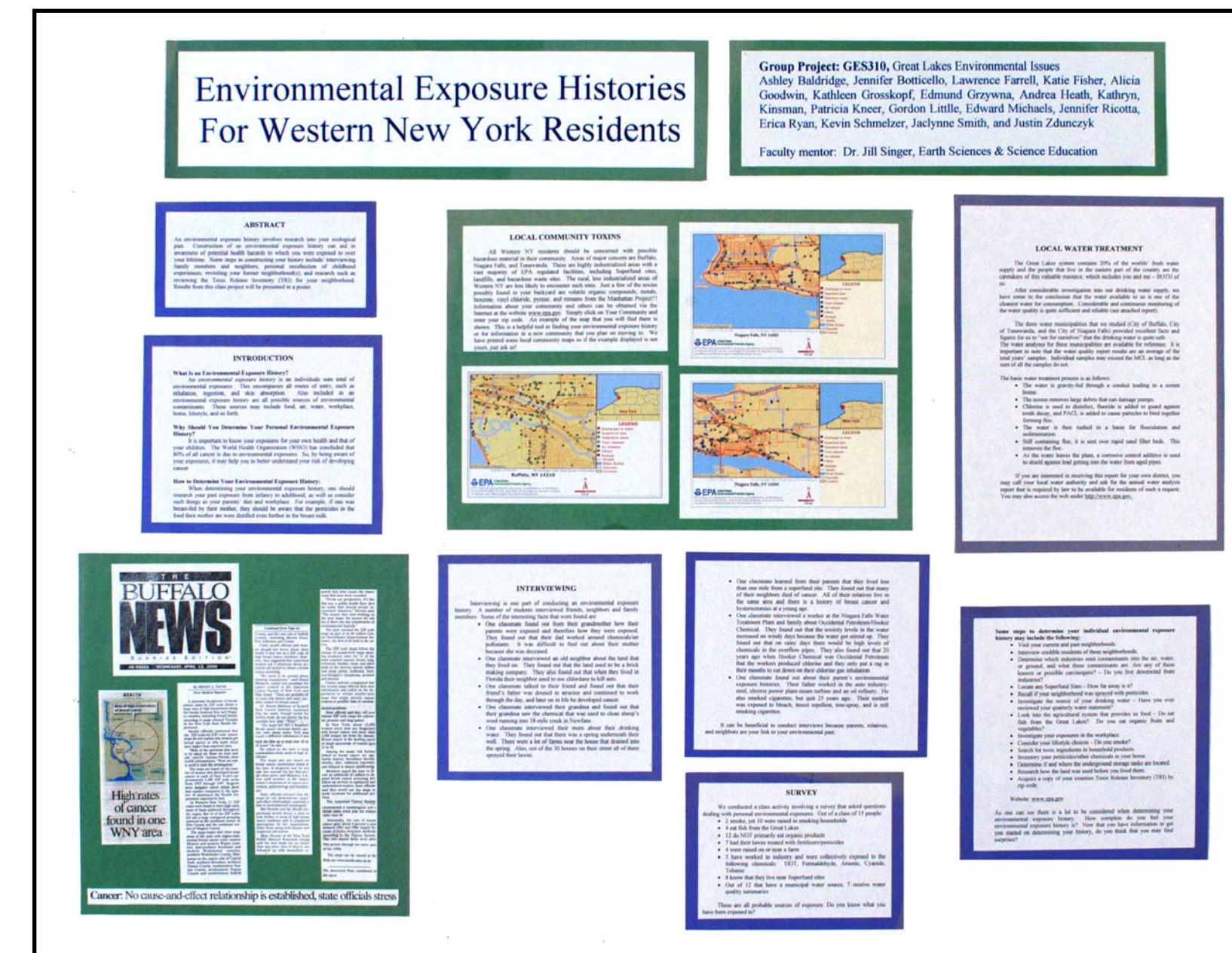


Geology and Human Health: Teaching and Research Opportunities

Jill Singer, Department of Earth Sciences, Buffalo State College

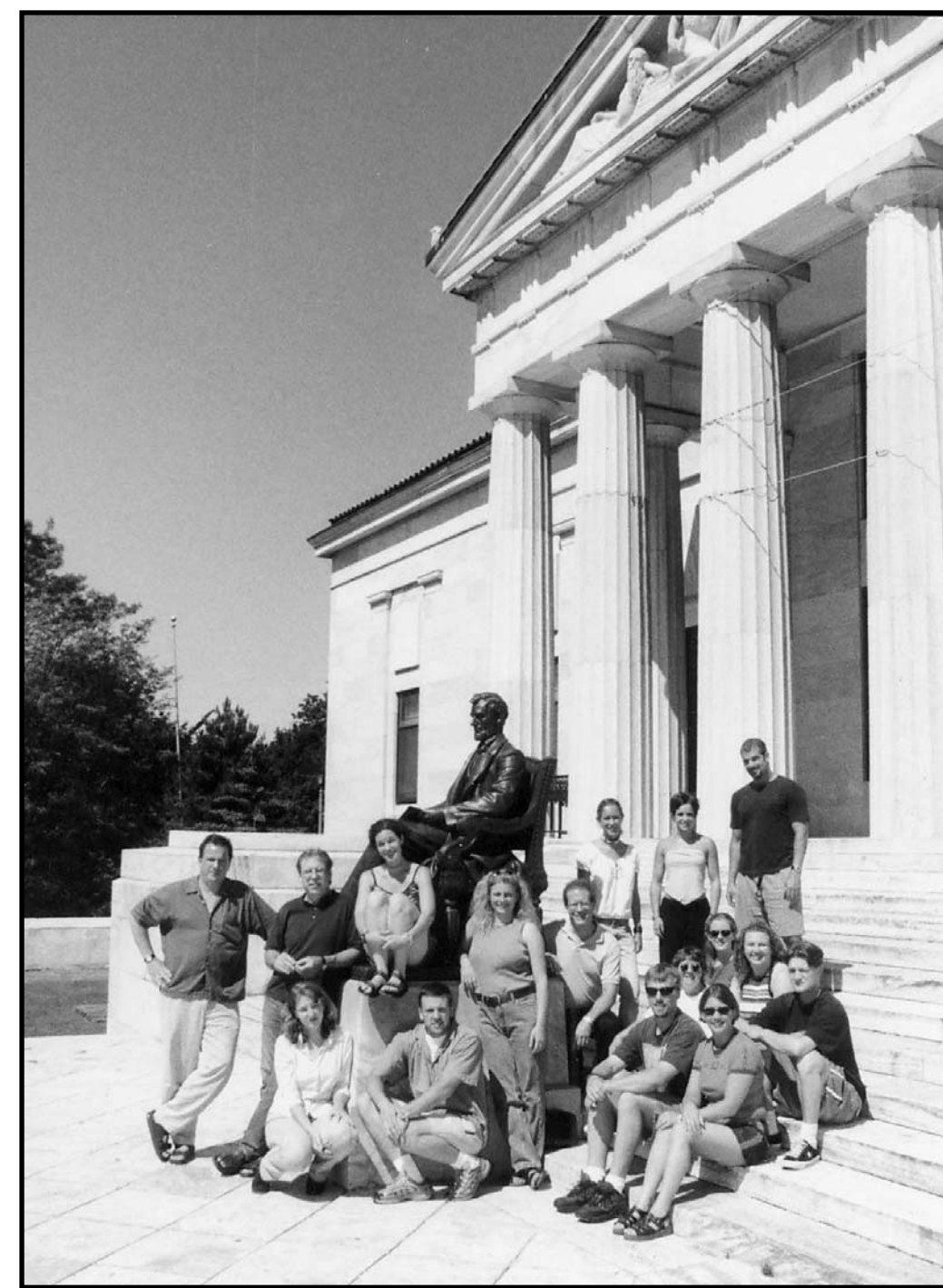
Construction of Environmental Exposure Histories

Seventeen students completed a poster assignment as part of the course work in GES 310, Great Lakes Environmental Issues, an upper level earth science course that is an elective. Each student conducted their own environmental exposure history to aid in increasing their awareness of potential health hazards to which they were exposed to over their lifetime. The steps they took followed the approach outlined in Living Downstream (Sandra Steingraber, 1997). All projects involved the compilation of data obtained from the TRI (Toxic Release Inventory), analysis of exposure pathways (air, water, soil), interviews with family members and neighbors (if possible), revisiting their former neighborhood(s), and recollection of childhood experiences. The posters were presented during class with students alternating between presenters at their poster and the audience for their classmates. Each student was assigned a time to be by their poster and given ample time to visit other posters. The students were expected to answer questions about their poster and were responsible for writing critiques for two other posters. After a class discussion, the students created a 'composite' poster highlighting information and personal stories drawn from the individual posters, wrote an abstract, and presented their poster during Buffalo State's second annual student research celebration (held in April 2000).

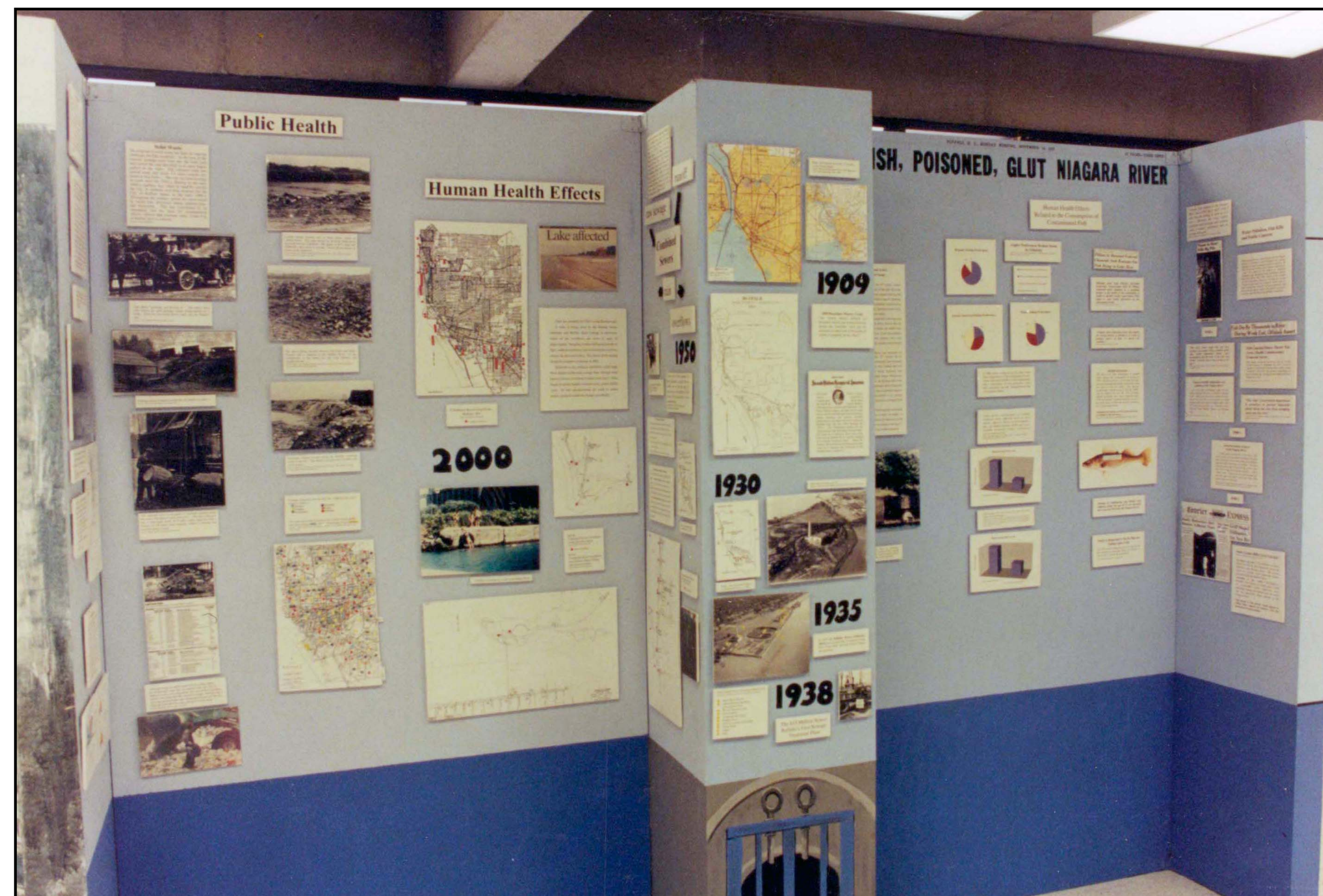


Interdisciplinary Research based on Buffalo's Environmental History

Buffalo State College received NCUR/Lancy funding in 2000 and 2001. The central theme of the interdisciplinary collaborative research focused on environmental and social changes in Buffalo over the past century. This two-year undergraduate research program supported a wide range of research projects, several of which directly related to earth and environmental science and human health.



- Examination of public health issues and how these issues contributed to major public works projects, the shaping of public health policy, and how daily life changed from the turn of the century to the present.
- Documentation of water quality including the over-enrichment of waters due to phosphates, growth of environmental activism in the Western New York area, and health concerns related to exposure to pollution.
- Documentation of the pollution of the local waterways, over-fishing in Lake Erie, and growing health concerns related to fish consumption.
- Study of the construction of the Buffalo Harbor and waterfront including physical changes to the harbor, construction of breakwaters, and the environmental consequences of more than a century of development and modification.



Presentations:

15th National Conference on Undergraduate Research, March 15-17, 2001, University of Kentucky, Lexington, KY

16th National Conference on Undergraduate Research, April 25-27, 2002, University of Wisconsin, Whitewater, Whitewater, WI

Publications:

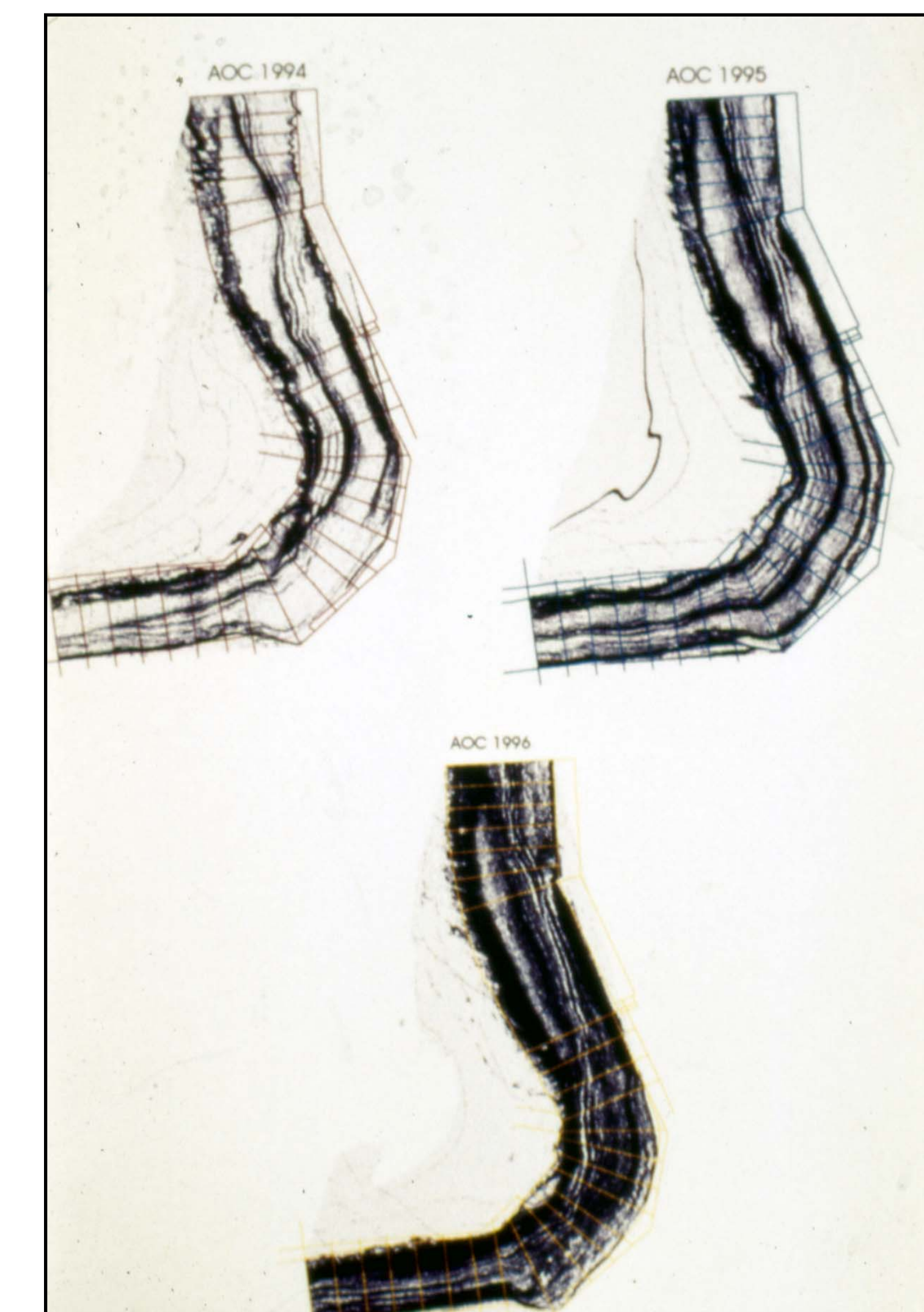
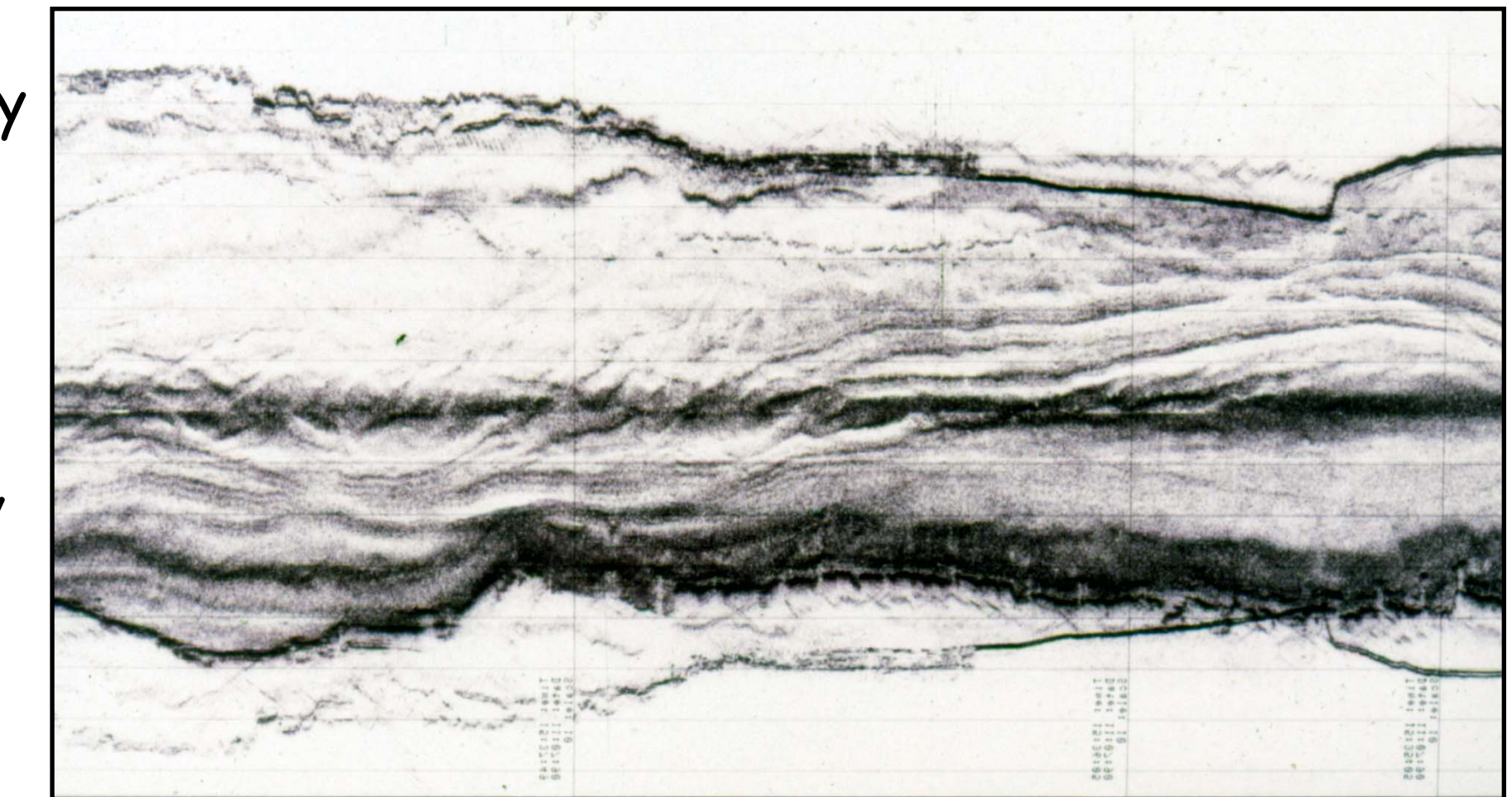
Singer, J., Mernitz, K., Beckley, C., and Krieg, E., 2000. The Centennial Celebration of the Pan-American Exposition: A Research Opportunity for Undergraduates at Buffalo State College, Council on Undergraduate Research Quarterly, v. 21, no. 1, p.12-16.

Ronco, S., Singer, J., and Werner, T., 2004. Results from the NCUR/Lancy Program, Council for Undergraduate Research Quarterly, accepted for publ.

Documentation of River Bottom Morphology

Changes in the bottom morphology of the Buffalo River have been documented by working with Dr. Patricia Manley, Middlebury College. Our approach has involved the use of side-scan sonar and the comparison of surveys from year-to-year. This multi-year effort has resulted in two senior theses (Middlebury College), several research projects (Buffalo State College), and several presentations (see titles below). Students have identified areas of sediment erosion and deposition and have documented slumping following removal of sediment by maintenance dredging.

A particularly interesting feature discovered through side-scan sonar mapping was sedimentary furrows. Furrows are longitudinal bedforms that have been identified in a number of diverse sedimentary environments including the deep sea, estuaries, and large lakes. Their origin has been attributed to secondary circulation in the bottom boundary layer. The furrows in the Buffalo River persist from year-to-year along a 1000 m section of the river. Biannual to annual surveys within this field reveal changes in the convergence and divergence of individual furrows, as well as the



addition of new furrows and disappearance of others. Furrow migration involves both sediment erosion and redeposition and it is important to understand furrow dynamics in the Buffalo River because of the potential for resuspending contaminated sediments. Research projects undertaken by students include characterization of furrow morphology and annual changes in appearance and number.

Examples of Presentations

(Underline denotes undergraduate)

Manley, P., Fuller, L., and Singer, J., 1992. Bottom morphology and environmental implications for the Buffalo River: Evidence from side-scan sonar, Abstracts with Programs, International Association for Great Lakes Research.

Ruhl, S., 1993. A detailed study of the morphology, behavior and formation of sediment furrows in the Buffalo River, Buffalo, NY, The Green Mountain Geologist, v.20, no. 1, p.9.

Singer, J., Grant, J.A., Jeziorski, E.C., 1997. Use of ground penetrating radar to study the origin of sedimentary furrows in the Buffalo River, Abstracts with Programs, International Association of Great Lakes Research, Buffalo, NY.

Singer, J., Manley, P., Grant, J.A., and Pepe, W.J., 1996. Sediment dynamics and bottom morphology in the Buffalo River area of concern, Buffalo, NY, Abstracts with Programs, Geological Society of America Northeast Sectional Meeting, Buffalo, NY.

Skeen, B. and Singer, J., 1996. Changes in sedimentary furrow morphology: Buffalo River, Buffalo, NY, Abstracts with Program, Geological Society of America Northeast Sectional Meeting, Buffalo, NY.

Sweet, J. and Singer, J., 1994. Bathymetric changes in sedimentary furrow morphology: Buffalo River, Buffalo NY, Abstracts with Programs, Geological Society of America Northeast Sectional Meeting, Binghamton, NY.