OUTREACH EVENT REPORT AND RECOMMENDATIONS

Attendee's Name and Report Writer:

Joseph Kerski, Geographer: Education/GIS, USGS, Denver, Colorado.

Location: Missouri Botanical Garden, St Louis, Missouri.

Event: Conduct Two Workshops for program "Mapping The Environment With the USGS."

Dates: 30 November - 1 December 2001

Gateway Arch before dawn on the first of December.

I have been working with Dr Bob Coulter from the Missouri Botanical Garden, for over a year. I met him at the International Conference on GIS in Education at the California State University-San Bernardino, in 2000.

Through a grant from the Litzsinger Road Ecology Foundation, I conducted two workshops for K-12 and university educators under this program. The program's grant paid for my lodging and airfare from Denver to St Louis, which was much appreciated.

The number of science and math education programs for teachers and students that the Missouri Botanical Garden is varied and numerous. Since I met him in 2000, Dr Coulter and the Missouri Botanical Garden staff have impressed me with their commitment to providing the educational community with innovative programs and lessons. These programs are not confined to botany and biology, as one might expect, but involve water resources and natural hazards. They actually encompass all sciences that the USGS is concerned with.

The Garden's motto is "See the World," and their programs are helping students, researchers, and educators do just that. Recently, the Garden was named the regional hub for the JASON project, which links students in grades 4-9 with scientists in the field. The Education Division works with over 2,700 teachers each year. This includes training for over 500 teachers each year from St Louis Public Schools as part of the Urban Systemic Initiative, a multi-year program funded by NSF.

The Missouri Botanical Garden, one of the premier research centers of its kind in the world. They also manage an off site Litzsinger Road Ecology Center (where the GIS workshop was held) and the Shaw Nature Reserve at Gray Summit, Missouri, a 2,400-acre natural area outside the city.

I have been particularly impressed at the breadth of the Garden's emphasis on spatial technologies such as GIS and remote sensing. Indeed, the title of the workshops that we conducted for this report were advertised as "Mapping The Environment with the USGS." Over 1,000 students from the region are using GIS to gather and map data for an environmental monitoring program of the Deer Creek watershed. The Garden staff are involved with the GLOBE project, where students take environmental measurements designed by NASA and NSF, and share the data on the Internet with students and scientists around the world. The Garden serves as national teacher training site for Journey North, a global study that uses the Internet to track seasonal changes and movements of butterflies, eagles, whales, and other species. The USGS has also been involved with Journey North, JASON, and GLOBE.

Entrance to the Missouri Botanical Garden in mid-town St Louis, Missouri.

I received a personalized tour of the grounds of the 79-acre Missouri Botanical Garden, a beautiful area and also a center that offers a wealth of educational programs.

One workshop focused on the use of GIS in the curriculum; and the other focused on the use of USGS Map Mysteries in the curriculum.

Dr Bob Coulter at the Litzsinger Road Ecology Center.

One of the workshop participants, a professor from Southwest Missouri State University.

The GIS workshop focused on collecting GPS coordinates with attributes and bringing them into GIS software (ArcView), examining USGS DEMs, DRGs, DOQs, and DLGs, examining worldwide earthquakes, and examining census data by county including historical data dating back to 1900. I also provided a summary of the types of USGS data that can be used in the classroom for teaching and research.

We collected GPS coordinates and brought them on top of a DRG and DOQ from Terraserver within GIS.

The Litzsinger Road Ecology Center is a wonderfully diverse site, including a restored prairie, wetlands, Deer Creek, and many different types of flora and fauna.

"Map Mysteries" involves analyzing the physical and cultural environment with USGS topographic and thematic maps. In other words, how can I analyze settlement, watersheds, landforms, natural hazards, and other phenomena through topographic maps, satellite images, aerial photographs, USGS Internet resources, and thematic maps? How can I use these maps beyond contour line interpretation, scale, and coordinate systems?

For example, a study of New Orleans illustrates the contrast between site and situation, how humans have caused the land to sink below sea level, drainage versus irrigation canals, and the imprint of the French long lot system on the landscape.

In mid-afternoon, we regrouped in the computer lab and examined the USGS sites concerning wildfires, Terraserver, real time streamflow, and the National Earthquake Information Center, among others.

Materials

I shipped and distributed teachers packets, GIPs, sample maps, maps for the workshop, fact sheets, circulars, posters, and map indexes. We did hands-on work with the Digital Landforms map of the USA, Geologic Map of the USA, Tapestry in Time map, This Dynamic Planet, St Louis, Callaway Nebraska, and New Orleans topographic maps, satellite image maps, the Central Region earthquake maps, the Bay Area Earthquakes map, among others.

Reasons for Attending

1) The Missouri Botanical Garden is an excellent organization to partner with. They are greatly enhancing the ability of K-12 and university educators and their students throughout the region to effectively use scientific data and methods in their courses. The former assistant director of the NSF is the Chief of the Education Program at the Garden, indicating the high caliber of their organization, Dr Luther S. Williams. He has a PhD in biology from Purdue and was recently been named to the National Black College Hall of fame for outstanding achievements in the field of science.

2) The USGS provides great input to publications, data sets, software, and other items related to social studies education. Our main educational emphasis is on science, but I believe that the social studies is also a good bridge for the USGS to help teachers of geography, history, economics, and government use our resources.

3) The value-added in our involvement with the lifelong learning focus area of educational outreach is that we work with educators to demonstrate ***how*** our products can be used in conjunction with national science and geography standards. It is not enough to tell ***what*** products are available.

Teachers already know how to find most resources and they have access to a great deal of material. When we get involved with teachers--getting their input and working with them--we can understand how to best meet their needs.

Participant Comment

Below is a response I received from one of the participants that illustrates the positive impact we can have on educators with these types of partnerships with science organizations such as the Missouri Botanical Garden:

> Thank you for a wonderfully organized and informative workshop. I learned a lot. I hope to see you in early May. Joseph, I hope to be at AAG in March. Maybe I will see you there.
> Alan

Dr. Coulter explains the technology behind GPS, as well as coordinate system, to the institute attendees.

4) Geography education and science education are flooded with new teachers, with ever-increasing attention to

interdisciplinary linkages (particularly to math and science, because the connection to history has always been strong), the national science and geography standards (*Geography for Life)* and state standards. USGS research has excellent ties to human-environment connections, and we can therefore demonstrate how to bridge cultural and physical geography, and how to bridge geography and science.

Joseph Kerski explains the idea of exploring cultural and physical geography using USGS topographic and thematic maps.

Recommendations:

These are exciting times for science and geographic education, with the resurgence of public interest in the subject, and the new national K-12 standards in geography.

I believe that the USGS should play a major role in preparing teachers and students to use our data. I definitely feel that our partnership with the Missouri Botanical Garden is worthwhile and needs to be continued and supported.

Next Steps

The next major activity will be to test the Mapping the Environment lessons that Dr Coulter has created during my own workshops. After that, in May 2002, I have been invited to speak to the National Council for the Teachers of Mathematics in the region, and to conduct another GIS workshop with educators in the region.

Computer laboratory and attendees at the Litzsinger Road Ecology Center.

Site for the "Map Mysteries" workshop; the facility that houses part of the Education Program staff. They will be moving down the street sometime in 2002.

Acknowledgements

I appreciated the USGS' support of the time for my attendance at this event. I thank the staff of the Missouri Botanical Garden for their professionalism and support of education, particularly Dr Bob Coulter. I look forward to working with Dr Coulter and the staff in the future. I thank Mark Newell from the USGS in Rolla, Missouri, for sharing his time and expertise with the group.

Geography Geopardy was enthusiastically received, as evidenced by photographs of Mark Newell and the participants.

Teachers examine USGS maps during the Map Mysteries workshop.

end of report