

# GIS NEWS AND INFORMATION

August 1995 (No. 5)

## Public Health GIS Conference and Training Opportunities

### CDC/ATSDR

1. Given the strong staff turnout for the GIS Short Course at the 1995 CDC and ATSDR Symposium on Statistical Methods, a sequel GIS program focusing on advanced spatial statistical techniques is planned for **September 12**, at Clifton Road. Dr. Luc Anselin, Professor of Economics, Regional Research Institute, West Virginia University and formerly with the National Center for Geographic Information and Analysis (NCGIA), is a nationally recognized geographer and economist for his innovative work in spatial data analysis and modeling. His course will cover the basics of spatial stochastic processes (spatial scale, spatial weights, spatial lags, spatial autocorrelation, spatial filtering, spatial dependence in regression residuals, etc.) and their application using GIS. He will use Arc/View and his own SpaceStat software to demonstrate these principles. Please reserve this date. This course is free to CDC/ATSDR staff. The instruction will be videotaped for subsequent viewing by interested staff located at other CDC sites. Information on attending will be forthcoming shortly from **Jay Smith and Don Betts**.

2. NCHS will offer a 1-day abbreviated workshop by Dr. Anselin similar in content to that offered in Atlanta. It is entitled "Exploratory Spatial Data Analysis Using Geographic Information Systems (GIS)" and is scheduled for **September 21**, in Hyattsville, MD. This workshop will be videotaped as well for CDC/ATSDR staff use. Please contact **Chuck Croner** for enrollment information.

3. From **Danika Holm**: ATSDR is co-hosting the Superfund XVI Annual Conference, Nov. 6-8,

sponsored by the Hazardous Materials Control Resources Institute at the Sheraton Washington Hotel in Washington DC. ATSDR's Division of Health Assessment and Consultation will be presenting a paper entitled, "Geographic Information Systems: A Critical Resource in Exposure Assessment," during the Health and Safety session on Nov. 7. This paper, co-authored by **Danika Holm, Morris Maslia, Juan Reyes, Bob Williams, and Mustafa Aral**, outlines various GIS methodologies utilized by ATSDR's GIS staff in its exposure assessment activities. ATSDR primarily applies GIS spatial analysis techniques in two areas of exposure assessments: 1) identifying areas of concern around hazardous waste sites, and 2) analyzing potentially impacted populations living in the vicinity of hazardous waste sites. This paper describes various GIS techniques used to 1) delineate areas of concern using both measured environmental data and environmental transport models and to 2) characterize potentially exposed populations using 1990 STF 1B Census data. It also presents two case studies in which these methodologies were applied. Copies of the presentation can be obtained from either Morris Maslia, 639-0674, or Danika Holm, 639-6066.

4. **Allen Hightower, Frank Richards, Jacquelyn Roberts, Robert Klein**, and the staff of CDC/Guatemala will conduct a two-week course on Public Health Applications of GIS at the CDC field station in Guatemala City. The workshop is funded by the Special Program on Research and Training in Tropical Disease (TDR) and presented by the Latin American Tropical Disease Research Training Consortium (LADDRTC). Ten teams of 2 students each, from research institutions in Latin America, were chosen on the basis of projects and computer expertise. There will be guest lecturers from NASA/CHAART, WHO-TDR, OEPA, and ESRI. Atlas GIS (DOS) and Import-Export will be taught, with case-studies also being presented.

Students will receive reduced versions of all GIS's presented in case studies, create their own GIS systems as part of class exercises, learn to digitize maps, conduct geographic analyses, and incorporate GPS readings into a GIS. Students will have time to work on their own projects and consult with the instructors. Arcview 2 will be taught by a Spanish-speaking instructor from ESRI for 2 days of the class. All student-teams will receive copies of Atlas GIS-DOS, Import-Export, Arcview 2, a digitizing tablet, a Global Positioning System, and a complete set of class notes. There will be followups to monitor the progress of the student-teams after completion of the course. The goal of the course is to develop GIS as a tool for the public health worker and researcher in Latin America.

#### Non CDC/ATSDR

5. From Fred Broome, Chief, Geospatial Research and Standards Staff, Geography Division, Bureau of the Census: Fred communicated to me that he recently presented a 2-day program of instruction on GIS, TIGER, STF files, environmental justice and related GIS topics to a training seminar of **Historical Black Colleges and University Faculty**. This program is sponsored by the U.S. Park Service and U.S. Geological Survey. It has been in existence for about 7 years and was hosted this year by N.C. Central University, in Durham. Jack Dangermond, ESRI, also provided support to the seminar in presenting a free copy of Arcview 2 to the 16 college representatives in attendance. Fred can be reached at (301) 457-1056.

6. From Associate Professor Sara McLafferty, Department of Geography, Hunter College: Please keep me in mind if you hear of anyone who needs health-related GIS work done for NYC or neighboring areas. We had a small contract with CDC to do mapping and analysis of rat bites in NYC, and it would be great to continue with that type of work. Sara can be reached at (212)772-5268.

#### News from CDC/ATSDR GIS USERS (Please communicate directly with your colleagues on any issues)

##### General News

1. From **Gilbert Chavez**: We are having a meeting of state MCH epidemiologists in Atlanta on September 27, 1995. Most of the participants do some GIS related work. The group would like to have a 3 hour session focus on a discussion of small area analysis of MCH data and GIS applications. We would like to present some of the work we do and have the group discuss the work. We would also like to have an expert comment on what we do and hopefully provide some insight on better ways to do GIS type work in MCH epidemiology. Do you have any idea of who inside or outside CDC may be a good person to bring to our meeting? Any ideas will be greatly appreciated. Thanks.

2. I am a Orkand contractor working in DVRD. The people in DVRD are interested in having me learn GIS for application in their areas (we will be using ARC/INFO). I noticed that you publish a newsletter called "GIS News and Information." How could I sign up to receive that publication? Also: Are there any GIS groups that meet at CDC? Any information that you may have would be of great benefit, especially if you know of any individuals using ARC/INFO here at CDC. Thank you very much. **Kent Wagoner**

3. I am an Oak Ridge Fellow in the ATSDR Washington Office. My mapping professor at George Mason, Dr. Grady Meehan, suggested I contact you about Medical Mapping. I completed my Masters in Public Policy, concentrating in Environmental Policy, at Georgia Tech last year. Now I am working on a Ph.D. in Environmental Science & Public Policy. Presently, I have decided on a dissertation topic and I am trying to plan my research. I am interested in Environmental Justice, and how that can be incorporated into risk assessment. With the current mood of Congress, I feel this issue is very timely. My topic is:

Improving Public Participation at Contaminated Sites. I would like to locate several communities, have them define their own neighborhood boundaries, and collect their own data for a community health profile. I will then utilize their data in a risk assessment to determine if the risk figures will be different for communities of color as opposed to the "Average American". I would like to take the risk data and layer it into a GIS to show a spatial relationship between location of pollutants and risk. Lee DeCola at USGS has agreed to work with me on that part. I am writing you today to request your assistance and/or recommendations on how I should proceed with a data search in terms of existing health data on communities around these sites. At ATSDR, I have access to health assessments that have some information; but I need to do a search on all available data sets. Your help will be greatly appreciated. From **Cynthia Warrick**.

4. Correction from **Chet Moore**: I note that I had a typo in Geoffrey's e-mail address. It should be 'Geoffrey.M.Jacquez@um.cc.umich.edu'; My apologies to anyone who tried to contact 'Jeofrey.M.Jacquez@um.cc.umich.edu'. [Editor: This regards obtaining reprints on disease clustering methods from Geoffrey Jacquez.]

5. From **Roger Rochat**: The Office of Perinatal Epidemiology, Georgia Division of Public Health uses AtlasGIS for mapping data from vital records and other data sources. We usually map by county only...but there is a clear demand for mapping at lower geographic levels...especially for urban areas like Atlanta. We also use SURFER for mapping contour lines when we wish to hide the outrageous number of county boundaries we have.

6. From **Allen Hightower**: (1) The DPD Kenya Field station in Kisumu was visited by **Dr. David Satcher**, Director, CDC on July 19-20, 1995. **Dr. Ruth Berkelman**, Deputy Director, NCID had previously visited the Kenya Field Station during 17-21 June. Both officials witnessed how field

personnel used Global Positioning Systems in differential mode (DGPS) to obtain the longitude, latitude, and altitude of households, roads, and other objects of interest with an accuracy of about 2 meters. The staff explained that the resulting map of the field site (covering 70 square kilometers with a population of about 25,000) will be linked to the large databases generated by DPD's AID-funded longitudinal study of the development of natural immunity to malaria in young children. This data base includes detailed immunological, clinical, and epidemiological information, as well as data on entomological inoculation rates and population genetics of both malaria parasites and mosquito vectors. Drs. Satcher and Berkelman were given a brief introduction to preliminary spatial analyses of the Asembo data set using Atlas GIS. Both officials came away with a better understanding of the power of GIS/GPS to answer epidemiologic questions. This project is one of the prize-winning applications recognized in the August, 1995 issue of GPS World on the basis of interest, technology, and importance.

7. From **Ralph Bryan**: In case you know of anyone still looking for epi positions, I ran across the following ad in the New Mexico Border Health Council Newsletter this week: The Border Health Office [New Mexico Dept. Health, Las Cruces, NM] is recruiting for the following position: Epidemiologist. Will be responsible to manage and lead the Border Epidemiology Team. Primary responsibility to complete analysis and research as needed in the planning, development, and operation of the Integrated Border Information and Surveillance System (IBISS). Responsible to plan, design, and implement systems for epidemiological investigations and assessments in support of program objectives. For further information contact the Border Health Office at (505) 646-7966". I know a little bit about this office and its staff, but no further details on the job or what it pays. Administratively, it is in the Division of Public Health, which is not the same as the Division of Epi that the state epidemiologist, Mac Sewell, directs. I will know

more after a visit there later this week and would be happy to share thoughts with anyone who might be interested.

8. From **Lillian Ingster**, NCHS: I've got a request but I don't know who to ask. I'd like to get nutritional information by geographic area, perhaps from FDA or USDA. I'm looking for the distribution and quantities of processed foods throughout the US post WWII. Got any ideas where I can find this info?

9. From **Janet Hale** (NIOSH, DRDS, EIB): **Steve Game** of NIOSH (DRDS) gave me your name as a contact point for mapping software packages. I am interested in purchasing a package. As a first time user, I'm not sure which package would be best for me. The types of maps we would like to do are US maps with various breakdowns (zip code, county, etc). If you could possibly give me some guidance and information on ordering a package, I would appreciate it. If you have any questions that I forgot to address, just ask. Thanks for your help in advance. [Editor: Anyone out there have some mapping software to possibly share and help Janet on her mapping/GIS way? Please let me know if you assist in any way. Thanks]

10. **Steve MacDonald**, NCEH was asked to comment on a proposed draft GIS short course outline from colleagues at the University of Washington in Seattle, sponsored by the School of Public Health's Department of Environmental Health, and suggest speakers for the Seattle area. I asked him for permission to share these observations: Title-New Ways of Organizing Data: Geographical Information Systems (GIS); Course description: A geographical information system (GIS) allows linkages of data, such as geographical and temporal information on county health care system usage, public health surveillance data, and demographic trends. This course will look at hardware and software aspects of GIS and potential applications to environmental and occupational data.

TIME	SPEAKER	TOPIC/TITLE
8:30-8:35		Welcome
8:35-9:15		What is GIS? - History and Context
9:15-10:00		What's the question? Examples of GIS.
10:00-10:20		BREAK (20 minutes)
10:20-11:00		Health Effects with GIS
11:00-11:45		Exposure Assessment with GIS
11:45-12:00		LUNCH Pick up Lunch
12:00-1:00		Speakers Discussion Groups
1:00-1:45		Statistics and GIS, Data linkage?
1:45-2:30		Risk Assessment with GIS
2:30-2:50		BREAK
2:50-3:30		Data requirements and organization for GIS
3:30-4:00		Hardware and Software requirements
4:00-4:30		Future directions of GIS

Steve's response: In my present position in the Surveillance Branch of the CDC National Center for Environmental Health, I think of GIS as an adjunct to analysis of both the three types of public health surveillance data (hazard surveillance, exposure surveillance, and outcomes surveillance) as well as information systems data on intervention activities (clinical and public health performance measures). One way to show how hazard surveillance data can be effectively used would be to invite the folks who are doing the analyses of the "environmental equity" issue; some of them presented at the Yakima meeting last fall, mapping waste sites and linking to minority population distributions (Frank Westrum at DOH Environmental Health might know how to reach them). Folks at the Seattle-King county DPH have been doing some small area analysis of behavioral risk factor survey data (a form of exposure surveillance), and you might call Jim Krieger (296-4994) to see if they would be willing and able to showcase that work. Certainly the use of GIS for the violence data would be a good example of outcomes data: call Angela Zechman at state DOH (360-705-6049). The state Health Services Information System (HSIS) may involve a GIS application to clinical data; you can ask Jim

Krieger about this, since he's on the HSIS Community Health Data Task Force (as is Joel Kaufman). Steve Kelso at state DOH (360-705-6033) might have some idea about the extent to which GIS is viewed as useful for the Public Health Improvement Plan.

Other ideas: It could be very interesting to have someone from the Census Bureau talk about their current plans for the year 2000; the bureau has a Seattle office, and they are in an "outreach" mode on their plans, which will essentially end the traditional decennial census and replace it with a sampling strategy heavily based on GIS data. You might consider inviting a vendor from the private sector to talk about what they can do; try John Schlosser (206-224-0800).

11. **Editor:** The following is taken from the minutes of the March 8-10, 1995 meeting of the *National Committee on Vital and Health Statistics*, Hubert H. Humphrey Building, Washington, D.C. "An activity of future interest to the Committee is the **geocoding of the NHIS** [National Health Interview Survey], which is bringing together census data and the NHIS to generate descriptors of the nature of access problems. This has proved to be more difficult than anticipated, but Dr. Fisher [Gail F., NCHS] said it is potentially a very strong data set." (reference, p.10).

### Technical News

12. **Editor:** David Wolf, geographer and ARC/INFO GIS knowledgeable person, EPA, informs me that they have nearly finalized a prototype "**National Spatial Data Library**" that uses TIGER '92 as the base geography and is direct linked to Census STF3A databases. It will be used to characterize population and demographic user-defined entities such as polygons associated with points or areas which you define in your GIS study. This will be a powerful tool for risk analysis. An "area weighting" procedure allocates population

proportionately to truncated areas based on block (population counts) and block group (population characteristics) statistics. For more information, Dave can be reached at (703) 235-5592.

13. **Editor:** Interesting discussion from SAS-L Group (via **Steve Campbell**); To: Multiple recipients of list SAS-L@uga.cc.uga.edu>; Subject: **ZIP code to Congressional District data mapping**: Some time ago I requested suggestions on the problem of mapping data from 3-digit postal ZIP codes to Congressional districts; this was on behalf of some colleagues who regularly are asked to do this. Mark Miller seems to be the SAS-L resident expert on this. From his reply: This is becoming a very common request. Basically the problem boils down to finding some file which has at least these two sets of geographies (i.e. census/congdist + zip). There are probably several alternatives but I've always suggested use of FIPS Pub 55 (Place Names in the US and territories). The file is available from ICPSR. Although I don't know the vintage of the ICPSR version, I have FIPS55-7 (1986) on tape as raw data and as a SAS file. I'll be glad to ship you a copy if you wish. In August I prepared an extract of this for Larry Van Horn at the Wharton School. The extract consisted of unique place-County-CD/ZIP combinations-about 40K obs which I put into a SAS transport file and then PKzipped onto a single 1.44Mb floppy. Unfortunately I didn't save a copy of this data but I still have the code. If you have more questions-just ask. I'll try to help. Mark D. H. Miller, mdmiller@syr.edu, Faculty Computing & Media Services Tel: (315) 443-2143, 105 Archbold, North, Fax: (315) 443-1865, Syracuse University, Syracuse, NY 13244; NOTE: Somebody advised me to check the SASPAC-L archives, and I did. It turned out that the substantive information there was also from Mark Miller, and pretty much paralleled his direct response to me.

Other suggestions: From:(1) "Alan Neustadt!" <ALAN@bssl.umd.edu>, University of Maryland, College Park; Why don't you give the

Federal Election Commission a call: (202) 219-3440. (2) Common Cause, the Center for Responsible Politics (202) 857-0044. (3) You might want to see what the data archives at U. of Michigan contain. There is a consortium called ICPSR (our university is a member and I can order the tape id we don't already have it). They have tons of data on Congressional voting records that might contain a single zipcode for the representative. I don't know how three digit codes work.(4)From "Richard Denby (HHES)" <rdenby@Census.GOV>; The Geography Division at Census maintains some files with zip-CD concordance. Latest contacts list I have shows **Rose Quarato** as the contact for geographic relationships 301-457-1128. (5)From Steve Doig: This kind of problem is perfect for a Geographical Information System (GIS). Given a map layer of 3-digit ZIPs, and another layer of CDs, a GIS (even desktop flavors like Atlas\*GIS or MapInfo) can aggregate the ZIP economic data into the appropriate CDs. A GIS even will parcel the data (sometimes called "attributes" in GIS-speak) of a split ZIP according to the area of each portion belonging to different CDs (using, of course, the shaky assumption of even distribution of population within the ZIP). I'm sure you know that aggregation gets real tricky if you're working with medians or other summary data rather than the raw stuff. Steve Doig> E-mail: sdoig@mcimail.com; Associate Editor/Research or MCI Mail: SDOIG, The Miami Herald, One Herald Plaza or Compuserve: 71371,763; Miami, FL 33132, Voice: 305-376-3476; Fax: 305-376-2287, "All the news that fits, we print"; (6) From "Christopher W. Donald", <sg92gtmq@dunx1.ocs.drexel.edu>. I am not sure what the problem in aggregation is, unless a zip code can fall into more than one Congressional District. I have used Claritas's Compass system which includes both zip code and Congressional District information. That might be one place to start. Alternatively, you could try placing each zip code into one and only one congressional district based on the geo centroid of a zip code, (though this might not work because you are using three digit rather than five digit zips.)

An observation of my own: almost all Congressional District boundaries changed subsequent to the 1990 census, so for most purposes it is important to have a current version of any mapping file or tool. My colleagues are still in the process of picking a solution, but they are leaning toward a GIS package. They are also trying to get their data re-tabulated, to 5-digit Zip Code instead of 3-digit. This should greatly reduce, but not eliminate, the problem of overlaps. Thanks to all who responded. Howard Schreier, U.S. Dept. of Commerce, Washington, Voice: (202) 482-4180, BITNET: HIS@NIHCU, Fax:(202) 482-4614, INTERNET: HIS@CU.NIH.GOV.

14. From **Arlene Siller**, NCHS: Hi, I just tried out this geography Internet site that was mentioned in one of my listserv groups and it is really NEAT!!!! If you get a chance check it out. Enter the names (zip, fipscode, latitude, longitude,etc) of two cities, what results is the distance "as the crow flies" between those two points. There is also lots of info on the named cities and lots of map stuff. <http://gs213.sp.cs.cmu.edu/prog/dist>

And to Arlene from **Linda Pickle**, NCHS: Thanks Arlene. You might like to look at RockyLink, "a single location from which internal and external USGS customers can browse and access digital spatial data"-- [http://rmmcweb.cr.usgs.gov/public/rockylink\\_top.html](http://rmmcweb.cr.usgs.gov/public/rockylink_top.html); From here, you can look at maps of environmental, cultural, climate data ,etc. not only from USGS.

#### Other Items of Possible Interest

This was picked up by **Thomas J. Mathews**, NCHS, from Usenet: dc.general and forwarded to me. I think it's worth sharing.

Q: I was just wondering about the lousy air quality here around DC. What's it got to do with the heat/humidity ? And how come it really is this bad, and still I don't see anyone complaining.

A: Most of the pollution that is driving the Code Reds in this area is ozone. It is a product of photochemical smog. Although we don't have very many stacks belching the ingredients into the air, we have lots of combustion engines belching various precursors and reactants that lead to ozone production with the addition of sunlight.

When the air stands still, the stuff accumulates and the ozone levels increase. Thermal inversions, where the warmer ground air is trapped by cooler overlying air, can also trap the pollutants. The chemical reactions also run faster in the warmer temperatures, so yes, it is heat related.

Right now, an A.I. of 100 is where Code Red begins. However, it has been said that it was a policy decision (not a technical or health-based decision) that placed Code Red at 100 instead of 85. Too many cities would have been in violation too often at 85.

Humidity aggravates symptoms in a couple ways. First it makes you feel worse in general because it is harder to cool off as the humidity increases. Second, the water droplets can be fairly acidic--- acid foglike. These acid

aerosols are lung irritants and can cause asthmatic-like reactions.

Particulates in the air attract water vapor and a number of chemical reactions can occur in the film to produce various lung irritants. Haze in this area is typically water vapor (humidity) and particulates. In L.A. smog, you can actually see the nice brown nitrogen dioxide on the horizon, or as you fly into LAX.

People do complain when the A.I. goes into Code Red. Statistically, there is an increase in ER visits for serious breathing difficulties. People complain that it is more difficult to breath and that they have eye and throat irritations.

On a chronic basis, oxidant levels will not necessarily accumulate, but the amount of pulmonary damage will. The damage usually doesn't show up until years of exposure have occurred. It's sort of like cigarette smoking. Some people never have problems, but your risk of serious adverse health effects increases as exposure increases.

**Chuck Croner, Editor, GIS NEWS AND INFORMATION, Office of Research and Methodology,  
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**Enjoy the final days of summer...and stay in GIS touch**

