Local Knowledge, Multiple Realities and the Production of Geographic Information: A Case Study of the Kanawha Valley, West Virginia

Daniel Weiner, Trevor M. Harris, and Philip K. Burkhart
Department of Geology and Geography
West Virginia University

and

John Pickles
Department of Geography
University of Kentucky

Introduction

The Kanawha Valley, near Charleston (West Virginia), is one of the largest industrial chemical complexes in the world. In 'chemical valley', as it is known locally, the potential for environmental catastrophe combined with numerous more chronic health risks, are very much part of peoples' everyday lives. Risk management and access to information are, therefore, of major importance. The long period over which chemical plants in the valley have caused problems for residents through accidental emissions and long-term background emissions, and the close proximity of plants and communities in the valley in part resulting from topographical controls, makes this a particularly suitable site for the study of political economy of information.

The research focus will include an analysis of how people gain access to geographical information and how the representation of that information impacts the perception and management of environmental/technological risk. Specifically, this includes investigating the ways in which GI and GIS production processes transform existing power relations and how access to chemical hazard information influences risk perception and management. We will investigate the extent to which geographical

information has been made available, is available, could be made available to the citizens and community groups of the region, and how this flow and control of information has affected the nature of local, community, and plant struggles over environmental regulation.

Research Objectives

Three broad objectives guide this research. They are:

1. Investigating the geography of communities and plants, and the history of conflict over and resistance to chemical industry pollution. This includes the role played by business, agencies of the state, and citizens groups in mediating these conflicts.

2. Analyzing the ways in which geographical information (ranging from basic maps to plume charts to geographical information systems) has been deployed in the area, the history of these deployments, and the social context within which their deployments have occurred. In particular, we are interested in the role being played by “worst case scenario” and “most likely scenario” planning, and the reporting documents that have been prepared by each company for a select number of hazardous chemicals held on site. This includes understanding the potential policy impacts of geographic information that displays conflicting representations of landscape and a better understanding of the opportunities for, and contradictions with, “democratizing GIS.”

3. Broadening the use of computer-based geographical information through a GIS production process that includes community participation. Of particular interest are the ways in which ‘voices from below’ are digitally represented

and how socially differentiated local knowledge might be incorporated into GIS production and use.

Research Design and Methods

The project will begin with interviews with groups in the area, specifically community groups, agencies, of local and state government, EPA officials, trade union representatives, and the representatives of the chemical industry. We already have good working relationships with the National Institute for Chemical Studies on the campus of the University of Charleston, and we aim to continue and strengthen these links. NICS has produced a great many reports on the situation in the valley over the past decade, has organized many of the mediation sessions between industry and citizen groups, and works closely with local and state government agencies. Their databases and community links will be invaluable to the project.

The next stage will include detailed mapping of the proxemics of plant and community. By mapping of these relations, we aim to identify (in conjunction with archival resources we have acquired and have been working through) the most likely sites of toxic emission impacts and community resistance. Our goal will be to tie the history of community resistance to a survey of community attitudes to available health data in these neighborhoods. This is necessary to provide the social, economic, and geographic context within which the political economy of information -- specifically geographical information -- can be located. Our aim, therefore, is to document the different forms of geographical knowledge and spatial representation deployed by various interest groups and parties in the valley in their attempts to deal with the problem of toxic releases, ambient pollution, regulatory requirements, and community fears. At the heart of this research strategy is the question of the extent to which formal Geographical Information Systems have been used in the region (we know, for example, that several chemical plants have their own GIS systems tied to emission monitoring and emergency response mechanisms) and to what extent they are emerging and being shaped as they emerge as a result of the needs of emission

control and/or community reassurance. In other words, what forms do systems of managing, representing, disseminating geographical information take at the present time?

We will also ask the question, what alternative forms and uses of GI and GIS are likely to emerge, and what sorts of demands are being placed by community groups on such systems? In other words, we are interested here in trying to determine the extent to which there are in the community any coherent notions of what types of information would be most useful to mitigate hazards and increase the ability of communities and citizens to monitor the practices of their corporate neighbors. To what extent are existing systems of information management embedded in the companies, or in government offices, and to what extent are they made available to the public? From previous interviews with community activists, we know that questions of access, different reporting regulations, and the possibilities of new on-line technologies for the storage and dissemination of geographical and industry data have all been discussed. The West Virginia Department of Environmental Protection, for example, provides on-line users with access to their detailed databases and will even run basic GIS programs for them on DEP computers through remote access.

In this research we will also explore the definitions, perceptions, responses, and mediations of risk associated with the four social categories of capital, labor, community, and the state. Multiple representations of information are essential to such a pursuit. Local knowledge from the community will be obtained through mental maps, oral histories, and workshops within an ethnographic methodological framework. So-called 'expert' knowledge will be obtained from existing spatial information and environmental legislation and regulations as well as primary data collection from persons associated with the (local) state and capital. Participatory workshops will be a central method for incorporating local knowledge into the GIS production process.

Capturing and encoding local knowledge, which is often aspatial and qualitative, represents a significant challenge to this project, and GIS production more generally. From our work to date we are aware that much local knowledge is spatially fuzzy and

does not conform easily to the spatial primitive paradigm of point, line, and polygon employed by GIS. Oral histories and narrative provide some of the most compelling and informative knowledge to come from the interview-survey process. Not least, the anticipated variety, and possibly conflicting responses, from the socially differentiated groups will provide additional complications for incorporation within the GIS.

A final research component will be the development of GIS-interactive multimedia (IM) linkages. In order to include the variety of narratives, oral histories, anecdotal information, sound, text, photographs, sketches, maps, and video clips which are the tangible materials of local knowledge, we seek to develop icon-driven capabilities within the GIS-IM system to access the full range of traditional and local knowledge available for interpretation. The many relationships between geographical location, data, and the several media modes will be established using an authoring system. Data inquiries will be handled using 'hot link' icons from the GIS based on the hypertext concept. This model describes a set of nodes connected by undifferentiated links, where the nodes can be abstractions made up from any kind of text or graphical information elements. The nodes and the associations between them, the links, form semantic units which may express a single idea or simple data element, or a complex unit such as a map, table, or image. The links tie together the various semantic units and provide a means of navigating through the data.

The development of Hypermaps moves beyond the establishment of links between semantic nodes to include links between spatial location and nodes. The ability of GIS to undertake spatial search functions will be linked to the identification of multiple media objects found within the search parameters. Once identified these objects can be retrieved, displayed, or used as signposts to other sources of information contained within the GIS or multimedia database. This logical movement through the information base utilizes the power of GIS and the flexible nature of multimedia to incorporate information in various media. While these linkages will provide significant freedom to explore the informational relationships contained in the database, one of the main issues involved in the design of these systems revolves around the actual organization, management, and content of these nodes and links within the computer environment.