Mapping Communities: Reporting on the Creation of a Geographic Information System for Health and Human Services in Orange County (CA)

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The Social Ecology of Health & Human Services in Orange County: A Geographic Information Systems Approach to Resource and Need Mapping is an ongoing community collaborative facilitated by the United Way of Orange County. The Academic Resource Team includes researchers and centers at California State University, Fullerton; Chapman University; and University of California, Irvine. The project is supported by a consortium of funders including Fieldstone Foundation, Fluor Corporation, Ingram Micro, Irvine Health Foundation, County of Orange, Orange County Community Foundation, Orange County's United Way, PacifiCare Foundation, Pacific Life Foundation, and the Lon V. Smith Foundation.

Abstract

A powerful analytic tool for understanding and illustrating the landscape of health and human services in Orange County (CA) has been created in response to the need for a comprehensive approach to determining where gaps and overlaps of needs and resources exist in health and human services. The project was developed by a consortium of nonprofit organizations, government agencies, private funders and university researchers. Over the course of the 18-month project, these community entities collaborated to identify 46 social descriptors whose dimensions could be explored by pooling data on health care, social services, demographics, and service providers. The analytic functions of the Geographic Information System allows for multiple characteristics to be processed together and referenced spatially on customized maps. In its pilot phase, first-time users were able to generate custom maps and reports using multiple characteristics to depict the levels and locations of needs for particular services in relation to the locations of providers of those services. For the first time, all those engaged in the various aspects of service delivery have the benefit of working from a single, comprehensive data source which can inform funding, policy, program and other key decisions, and generate benchmarks for measuring outcomes.

This paper reports on the process undertaken to create Orange County's first comprehensive mapping system for health and human services. Issues surrounding data collection and aggregation will be discussed, along with the organizational structure created for each of the project components. Considerations for phase two development, such as devising a cycle for uploading new service delivery and demographic data and defining location and access of user workstations, will be discussed.

Background

When the analytical capabilities and visual power of mapping technology made the leap from the mainframe to the personal computer, social service providers gained access to a level of sophistication in information management and analysis that previously had been the domain of urban planners, geographers, and other technical experts. This newly accessible technology emerged just as the need for achieving greater efficiencies in service delivery intensified the demand for collaborative approaches to client care. This demand was mirrored by the corporate strategies of downsizing and mergers during the economic downturns during the late 1980s and early '90s.

The interest in collaborations became an imperative overnight for service providers in Orange County, California when the county government declared bankruptcy in 1994. With threatened interruptions in public payments for grants and contracted services, and with lost opportunities to receive block grant and matching funds, nonprofit managers and private funders struggled to find new means of ensuring the community's well being and guarding against the impacts of fiscal turbulence. Community leaders acknowledged that a key component of collaborative planning was missing: a foundation of shared information.

In times of stress as well as in normal circumstances the ability of stakeholders to agree on the basic facts about the dimensions of the population and its needs is key to maintaining healthy communities. The county government's Forecast and Analysis Center had been producing county indicators reports since the 1970s to integrate census data with health and vital statistics from county agencies. For other entities, there existed no single means of collecting or interpreting data ranging from client profiles to an

inventory of services provided and locations served. The ability of non-technical users to integrate these data and depict their spatial dimensions did not occur until mapping software for the personal computer was commercially available.

By 1997, when the first phase of this project began, all of the components were in place to build a comprehensive information system for Orange County's health and human services. The project was initiated by a consortium of funders, service providers and community leaders who were searching for effective ways to assess the extent of gaps and overlaps in service delivery across the county's thirty-one municipalities and serving its 2.7 million residents. The goal was to build and demonstrate a Geographic Information System (GIS) that integrates the range of service providers' individual data sets into a single system accessible to all.

We believe the scope and complexity of this effort are unprecedented in the health and human services arena. Several aspects of the project argue for its uniqueness: the composition of the stakeholders group is unprecedented in its scope and numbers in Orange County; the medium of the GIS mapping application makes complex and sophisticated data analysis and representation accessible to both experienced and first-time users; the system offers nearly limitless capacity for adding functions and data; by constantly refreshing the system with new data, it generates "real-time" information rather than static reports.

The project was organized in two parallel tracks: the project budget, timeline, personnel, and design decisions comprised the community planning process; and the acquisition of data, and design and construction of the GIS system comprised the

programming process. This paper describes the steps undertaken by both tracks during the first phase of the project.

Community Planning Process

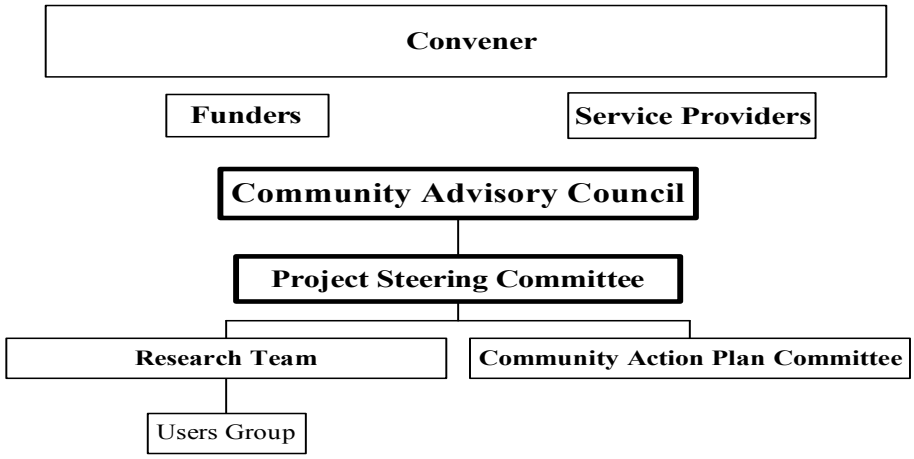
As an unprecedented collaboration among health and social service agencies, government entities, funders, and university researchers, this project owes its success to Orange County's United Way, whose board and staff provided leadership in the critical role of convener/facilitator. Overcoming most of the odds stacked against such an ambitious attempt is the result of that organization's persistence and unswerving focus over more than two years of planning and implementation. Because there was no single "client" for the project, the United Way represented all of the stakeholders as a neutral agent, communicator, and leader.

A consortium of local funders approached the United Way in 1996 to explore the feasibility of such a project and to compile an inventory of models from other communities and research components available locally. From these, a conceptual framework was developed and presented to funders in November 1997.

With funding commitments in place, pledges were sought and secured from key community leaders to serve as committee chairs. The selection of these individuals underscored a critical component of the project's success: the fact that it was driven by the community and not by a single client. The transparency of the project's implementation process and its truly collaborative character produced a coalescence among agency and community leaders that had never before been achieved. An invitation was issued in March 1998 to 36 community leaders to hear a presentation of the project outline; 88 people attended. The committee framework was developed to

capture the intense interest and willingness of those and other participants; a total of fifty individuals served on one or several committees. The committee framework is depicted in the organization chart shown in Figure 1.

Figure 1
Committee Framework
Phase I



The convener's role was to secure commitments from funders and volunteers, to design the committee framework and confirm participants' roles, to schedule and staff committee and sub-committee meetings, to maintain the project timeline, and act as fiscal agent to receive and disburse funds and execute contracts. The most critical function of the convener is to attract and maintain participation by a broad cross-section of the community. Given the vast functionality of the GIS software, and the enthusiasm generated during the initial planning phase, managing high expectations for immediate and wide-ranging results was a challenge for the entire team. The convener was charged

throughout the process with responsibility for maintaining focus on clear and achievable first-phase results.

The convener maintained communications contact with funders and service providers throughout the process, and reported their concerns and contributions back to the pertinent project teams.

The project team included a Community Advisory Council, to which the Project Steering Committee and its ancillary committees reported. The Community Advisory Council was composed of stakeholders representing the funder and service provider groups, as well as members of the education, nonprofit, religious, county government, and academic research communities. In essence, this council functioned as the "client" for the project. Its role was to offer leadership, oversight and community relations support to the project. This committee was designed to be convened at the beginning, midpoint, and conclusion of the first phase of the project, and to achieve broad community representation and "buy-in" among its fifty members.

The Project Steering Committee was a working committee representative of various stakeholder groups. Its role was to provide the ancillary committees with decisions and recommendations on project design and implementation. This committee undertook the major task of deliberating on which social descriptors from among the universe identified by the research committee should be included in the project. Its members reported to their respective stakeholder groups, and the committee reported collectively to the Community Advisory Council. Its fifteen to twenty members were intended to meet monthly.

The Research Team was designed to pool the talents and resources of the area's universities, research centers, and service referral agency. The composition of this group represented an unprecedented level of collaboration among its members. Led by Dr. Gregory Robinson of Cal State Fullerton's Social Science Research Center, the team included Dr. William Gayk of Cal State Fullerton's Center for Demographic Research (and longtime director of the County of Orange's Forecast & Analysis Center), Dr. John Carroll and Dan Walsh of Cal State Fullerton's Geography Department, Dr. Ross Conner of University of California Irvine's School of Social Ecology, Shari Mitchell of Chapman University's Henley Social Science Research Lab, and Mary Ellen Hadley of InfoLink Orange County. The team met as-needed throughout the project. Because a major outcome intended for the project was to increase the community's awareness and understanding of the Geographic Information System technology and capabilities, members of the research team, particularly the GIS designers, attended virtually all meetings of the other project committees to demonstrate the software and the system as it was being developed.

The Research Team convened a meeting of prospective users of the system to act as a pilot group for testing the system. Their role was to provide the Research Team with input and suggestions on the potential uses for the system, preferences on the various functions to be programmed in the first phase, considerations for site locations, etc. This group agreed to be the beta testers of the system.

A major objective for developing the system was to have the ability to identify gaps and overlaps in service delivery in the county. A Community Action Plan committee was formed to develop steps to be taken in response to the needs and resource

assessments derived from the system. This committee's role was to facilitate agencies in understanding the system and processing its data to information that could inform program management, funding decisions, and the location of services and facilities. This committee reported to the Project Steering Committee and met monthly.

Timeframe

The project timeline was conceived in three phases: development and pilot testing in Phase I; expansion and training in Phase II; and annual maintenance in Phase III. Phase I took place during 1998, beginning with the formation of the committees in the spring, and concluding with a technical trial in the late fall. By winter 1999 an analysis of data concerning the selected descriptors had been performed and a report generated as an example of the analytic functions the system would support. A survey of users who accessed the system during its pilot phase in early 1999 was conducted, and a report of their responses was released in fall 1999.

Phase II of the project occurred between fall 1999 and summer 2000.

Phase III comprises future cycles of annual maintenance and enhancement.

Phase I

Launching the project required extensive cross-communication among the stakeholder groups and committees engaged in various aspects of the project. The convener performed this central communications role, and conducted subcommittee meetings of the working teams during the interims between committee meetings. The work progressed in general stages: first, the capabilities of the GIS system to integrate attribute data with spatial representation was explained and demonstrated to generate

discussion of the types and availability of data that the community desired for inclusion in the system.

Next, the research team presented an inventory of available data that could be used to generate various social descriptors. The Project Steering Committee prioritized these descriptors, and the research team assessed each in terms of the cost and effort required to collect the associated data. Based on these considerations, each of the data segments was assigned to a specific project phase. Phase I data were considered foundational to the system and were readily accessible; Phase II data were considered more difficult or costly to obtain; and Phase III data were those requiring significant investments to gather or analyze for integration into the system.

With agreement on the Phase I descriptors from the committee, the research team approached its task in two modes: one group identified, collected, cleaned and integrated the data, and another group programmed the GIS system with a set of designed functions (report formats, map overlays, selection modes and criteria) and uploaded and geo-coded the pooled datasets. Their methods and results are described in the following section.

The Users Group met in the summer of 1998 to advise the researchers building the GIS system on which features and functions would be most desirable. Based on this group's input, the developers determined such issues as the units of measure (census tracts, zip codes, cities, county) that users would be able to select from in the system. The group also provided input on the value of various outputs (maps, reports) and features (roads, legislative district boundaries) offered by the developers.

A technical trial of the system was conducted in December 1998 for the project committees. The research team presented a written report containing an executive

summary of the Phase I methods and results, a description of the project's history and background, a discussion of the sources and structure of social descriptor and service provider data, and a summary of the GIS system's programming considerations. This report also was intended to demonstrate some of the analytic purposes to which the GIS system could be put. For each of the major social descriptors identified in Phase I of the project, data from the GIS system as well as other sources was analyzed to produce documentation of the dimensions of the issue and implications.

During winter 1999 service providers and others were invited to schedule time on the system at the United Way office. By following simple printed instructions provided at the workstation where the system was loaded, non-technical users could build their own inquiries and view or print reports or maps using the programmed menu options. A group of sixteen administrators and service providers who had used the system by April 1, 1999 was surveyed, and their opinions about the system's functionality, contents and prospective users were analyzed and reported in September 1999.

Phases II and III

Phase II of the project occurred in 2000. Its goals were to refine the selection of social descriptors and associated data, to set a schedule for refreshing the data, to resolve technical difficulties identified by beta testers and pilot users, and to begin to develop training materials for system users. Phase I data were updated and new social descriptor data was added, as well as more detailed information on service provider assets and resources. Analysis of the data was performed by the research team, and a new report on descriptors and implications was presented in August 2000.

At press time, some Phase II objectives remain to be addressed. These include devising an access plan for the number and location of user sites for the system. Various issues related to access have been raised but remain to be resolved: licensing and/or rights to the system, data and products generated by it; defining the intended audience and how to restrict access to others; guidelines for use that ensure the appropriate interpretation and utilization of the data; a fee structure for offsetting expenses or generating revenue to be reinvested in system maintenance; whether to consider commercial uses. Although the system was designed with the goal of improving the quality of life in the community by strengthening service delivery, there are many other uses to which it can be put. One unforeseen result of the system's comprehensive amalgamation of data is that some groups may view that information as having a potentially negative impact on the community. While having the ability to assess a broad range of social descriptors will have an undeniably strengthening effect on those engaged in service delivery, the parallel ability to associate certain negatively perceived patterns such as crime and abuse with specific neighborhoods is viewed by some as a threat. Managing the risks associated with perception of the data is an issue of concern as the project moves forward.

Phase III consists of annual maintenance and uploading of refreshed data into the system. Additional functions and expansion of the existing data framework will be performed are considered as optional considerations requiring separate contractual agreements with all parties.

Development of the GIS

As previously stated, one of the desired outcomes of this collaborative effort was to make the data accessible to as many stakeholders as possible. This meant

incorporating the data into a Geographic Information System. Unfortunately, this goal is difficult to achieve given the current state of GIS software development. While most software manufacturers espouse the "user-friendliness" of their products, the reality is that GIS programs remain sophisticated and arcane. Not only is the software itself complicated to learn and utilize effectively, but the geographic assumptions and restrictions involved in developing the database also present potential pitfalls if not thoroughly understood.

The traditional method employed by most companies, agencies or organizations when they decide to take the plunge into GIS technology is to send the personnel who will likely use the GIS off to training. GIS training is costly in both time and money and unless the newly acquired skills are practiced regularly, they tend to be quickly forgotten. This can occur in even the best of cases. In the decentralized environment that the Social Services Mapping System would exist, this approach was untenable. The vast majority of users were not interested or able to commit time for training. Another obstacle to successful implementation was that the pool of potential users was essentially unknown. A different approach was required. Instead, it was decided after the first few meetings, that a custom interface would be developed based upon the needs of identified users. The interface would be created by the Research Team to streamline a set of agreed upon functions in such a way that even a novice computer user could take advantage of the GIS database.

What follows is a brief discussion of the development of the GIS database and description of the interface design considerations.

Database Development

The database consists of two complimentary parts- service needs and service providers. Each will be discussed in turn.

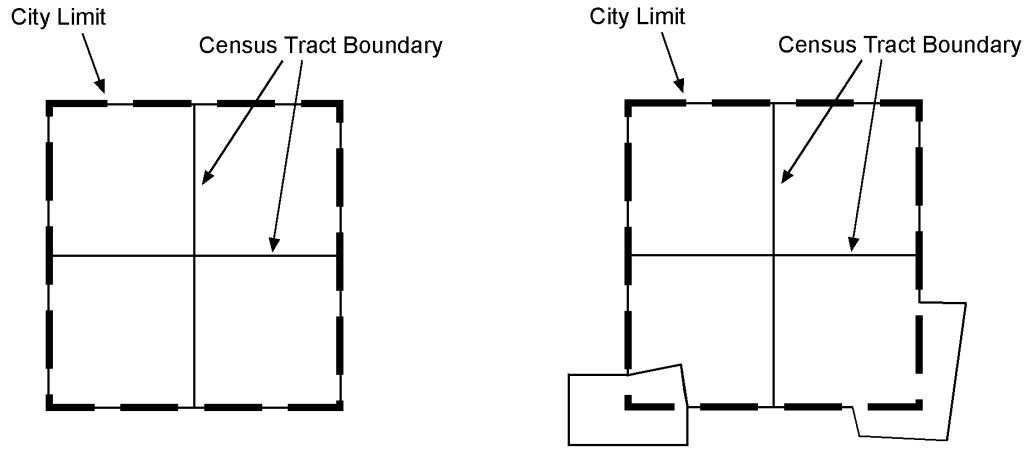
Social Service Needs Data

From a group as large and diverse as the committee structure previously outlined, one would expect a rather exhaustive list of data needed in order to assess social service needs in Orange County. However, it was readily apparent that this "wish list" contained variables that were more accessible than others. For example, *population* and *age of housing* were systematically monitored and regularly updated while information about *truancy* or *substance abuse*, although extremely important, were more problematic to obtain. As mentioned, the Project Steering Committee, in consultation with the Research Team, decided to divide the data integration into phases based on cost and effort of acquisition and incorporation into the GIS.

Another major consideration was at what geographic unit was the data collected. In order to avoid extensive and costly data manipulation and analysis, information must in the GIS must be available in standardized geographic units. Unfortunately, the various geographic units routinely used to collect data are not hierarchically ordered or nested. If this were the case, it would be simple to aggregate data from the finest levels to coarsest. For example, if census tract boundaries coincided with city limits, information collected at the census tract level could be easily aggregated to cities (see Figure 2a). If each of the census tracts in Figure 2a contained 100 people, the population for the city would be 400. However this is more the exception than the rule in most areas and is particularly problematic in rapidly growing regions such as Southern California where new cities are

being incorporated and others are annexing unincorporated land. The concern is with what are called "split polygons." Without exhaustive and expensive field observations, it is impossible to know how much of a census tract's population should be attributed to a particular city if the boundaries do not coincide. In Figure 2b, there is no way to know how much of the population of the lower right census tract is actually within the city limits. It is conceivable that all of the population in the census tract is, in fact, located outside the city limit. Although this is an extreme example, the potential for misallocation of data when splitting polygons is considerable. Currently (with all recent annexations and incorporations) there are 864 split 1990 census tracts in Orange County. The problem becomes much worse when dealing with Zip Code boundaries since their main purpose is to facilitate delivery of mail regardless of city or county boundaries.

Figure 2. Nested and Split polygons



a. Idealized view of nested geographic units

b. Realistic view of geographic units

Since much of the most accessible and up-to-date information was available at the census tract level, the Project Steering Committee agreed that this would be the most appropriate geographic unit for Phase I variables. The list of census tract level variables incorporated into Phase I of the GIS can be found in Appendix A.

Still other important data was available that was not appropriate to map or aggregate to census tracts. These variables included the locations of schools and libraries, freeways and major roads, zip codes, city limits and city names, liquor stores and child abuse incidents. The actual Social Service Providers themselves also fall into this category.

Considerable manipulation and processing was involved to incorporate these data sets into the system. For example, the address list of reported child abuse incidents is highly sensitive and confidential. Therefore, all address information was removed from the database and the actual locations were randomly scrambled to preserve confidentiality. All sensitive data in the system has either been aggregated to census tracts or locationally scrambled to maintain confidentiality. This provision was required by several of the agencies that contributed their data to the system.

Service Provider Data

All of the Social Service Provider data in the GIS came from two sources- InfoLink Orange County and a survey conducted by the Henley Social Science Research Lab at Chapman University. InfoLink is a referral service that maintains a database of over 4,000 agencies that provide social services to Orange County residents. It was decided that for the initial Phase of the project, only Service Providers that maintained a physical presence in the county would be considered for inclusion. This eliminated toll-

free hotline numbers and other agencies that served Orange County from outside the region. Once the list was honed to a subset of the InfoLink database, the addresses were geocoded and other information (see Appendix B) about each agency was processed for inclusion in the GIS. Certain sensitive provider locations (abuse shelters, in particular) were randomly scrambled to protect clients and staff.

Because InfoLink maintains their database for referral purposes rather than research/analytical uses, many items that were considered useful to the project were not available from the InfoLink database. One piece of information that would add considerable analytical potential to the GIS was the ability to map the service areas of the providers. Detailed knowledge of service areas would allow the Research Team to more precisely identify gaps and overlaps in service provision. In order to capture this type of information, a telephone survey of the selected providers was conducted by the Henley Social Science Research Lab at Chapman University. In addition to information regarding service areas, agencies were asked additional questions such as number of clients served, ethnicity and age of clients, staffing figures and other data. A complete list of survey questions is available in Appendix B.

An unfortunate, though not surprising, finding from the survey was that many agencies are over-worked and under-staffed to the point that they were unwilling to participate in the survey and/or became agitated by the intrusion. Another unforeseen result was how politically sensitive some of this information was perceived to be. For example, many of the agencies that responded to the survey stated that their service area was the "Entire County" when in reality the vast majority of their clients came from the immediately surrounding neighborhoods. The perception was that if they did not claim to

serve the entire county, future funding might be jeopardized. They were not being disingenuous. Their doors were, indeed, open to all Orange County residents, but in reality, many of the agencies serve much smaller areas on a regular basis.

Interface Design

Custom designing the actual GIS interface presented significant challenges of its own. To facilitate modification, the Research Team selected ArcView GIS software from ESRI. ArcView was chosen because it because it allows enhancement and modification through its own proprietary scripting language called Avenue. The Research Team then elicited a list of GIS capabilities that would be most useful to the various stakeholder groups. The agreed upon functions are listed in Table 1.

Table 1. Desired Functions for Phase I

- Select and map Social Indicator variables
- Zoom to specific city or to a user defined area
- Map variables not associated with Census Tracts
- Select and map Service Providers by type of service
- Retrieve specific information about Service Providers
- Print listing of Service Providers shown on map screen
- Print map of region shown on screen

The reader that is familiar with ArcView or any other GIS software will realize that any one of these functions can involve a dozen or more steps. Therefore a streamlined interface to the software was designed and created. In order for the reader to better appreciate the enhanced user-accessibility of the custom interface, a series of screen captures are presented in Appendix C.

The standard ArcView interface is a bare bones gateway for the trained GIS analyst, but presents little in the way of comfort or guidance for the intended user of the Community Mapping system (Appendix C1). From screen shown in Appendix C1, a minimum of 3 steps are required to view even something a simple as a city boundary map. That is assuming the user knows where to find the data on the computer system. The complexity of the native software only grows from there. Appendix C2 shows an example of the menu choices and buttons that are part of the ArcView interface.

The streamlined interface (Appendix C3) has five important features presented to the user. The **Map Window** starts with a view of the incorporated cities in Orange County. Any analysis performed at the county level can pe performed without any further manipulation of this window. When the user queries the system, the information in the **Map Info** and **Provider Info** windows becomes visible (Appendix C4). The **Map Info** window shows the legend categories for the map, as well as, the types of Service Providers that are visible. The **Provider Info** window displays information about specific, user selected Service Providers. The **Additional Geographic Layers** window at the bottom of the screen allows the user to turn on or off any of the features listed.

The user interacts with the GIS using the six buttons along the top. The ***Variable*** button allows the user to select which Social Indicator to map from the 46 choices

included in the system. The ***Area*** button allows the user to zoom in on either a specific city of a user-defined region. A simple click and drag of the mouse defines the zoom region. The ***Provider*** button allows the user to map Service Providers based upon the types of services they offer. The 411 Service Providers are classified into 57 categories. Once Service Providers are visible on the map, the "I" tool allows the user to select individual Service Providers and display detailed information in the Provider Info window. The ***Print*** button allows the user to print either the current map, a list of all the service providers visible on the map, or both. The ***Exit*** and ***Reset*** buttons are self explanatory.

The system designers realized that some users of the system may be familiar with the ArcView program and would like to use the full capabilities of this sophisticated software. The ***ArcView*** button reconfigures the screen to the standard ArcView interface for experienced ArcView users.

Conclusion

The Community Mapping project described in this paper represents an unprecedented collaborative effort to assess the need and provision of health and human services in Orange County, California. Shrinking budgets and growing demand have increased the pressure on social service providers and funders in the County. Greater awareness and understanding of the health and human service needs in the area is necessary to better serve Orange County residents. This project represents one step in that direction.

To date, over 300 users have accessed the GIS for a variety of reasons including, grant writing, outreach, research, and to better understand the dynamics of their

community. Orange County's United Way has used the GIS to reallocate their funding priorities based upon their analysis of the data in the system. Other funding agencies have also begun to employ a similar approach to resource allocation.

None of the success of this project would have been possible without the cooperation of all the various stakeholders involved. The funders, service providers, government agencies, researchers, and conveners each played an integral and indispensable role in bringing this project to fruition. We hope that this level of cooperation and trust can continue as this project moves on to its next phase.

Appendix A: Phase I Social Descriptors Data

Description	Date	Source
Population Age 60 years and Older- Total Number	1995	CDR
Population Age 65 years and Older- Total Number	1995	CDR
Population Age 75 years and Older- Total Number	1995	CDR
Population 0-4 years- Total Number	1995	CDR
Population 5-9 years- Total Number	1995	CDR
Population 10-14 years- Total Number	1995	CDR
Population 15-17 years- Total Number	1995	CDR
Percent Population Asian & Pacific Islander, 1996	1996	CDR
Percent Population Black, 1996	1996	CDR
Percent Population Hispanic, 1996	1996	CDR
Percent Households Non-English Speaking, 1990	1990	US Census
Percent Households with a Female Head of HH, 1990	1990	US Census
Single Parent Households, 1990- Total Number	1990	US Census
Percent Population Male, 1996	1996	CDR
Percent Population Female, 1996	1996	CDR
Total Population, 1996	1996	CDR
Percent Population Age 25+ Not Completing High School	1990	US Census
Employment Rate, 1994 (rate per 1000 population)	1994	CDR
Unemployment Rate, 1994 (rate per 1000 population)	1990	US Census
Percent Pregnant Women Obtaining Care in First Trimester	1996	CDR, OCHCA
Percent Pregnant Women Obtaining Care in Second Trimester	1996	CDR, OCHCA
Percent Pregnant Women Obtaining Care in Third Trimester	1996	CDR, OCHCA
Birth Rate, 1996 (rate per 1000 population)	1996	CDR, OCHCA
Fertility Rate, 1996 (rate per 1000 population)	1996	CDR, OCHCA
Teen Birth Rate, 1996 (rate per 1000 population)	1996	CDR, OCHCA
Death Rate, 1996 (rate per 1000 population)	1996	CDR, OCHCA
Median Age of Housing in Years, 1990	1990	US Census
Automobiles per Household, 1990	1990	US Census
Percent Single Family Dwelling Units, 1997- Total Number	1997	CDR
Percent Multiple Family Dwelling Units, 1997- Total Number	1997	CDR
Percent Owner Occupied Housing, 1990	1990	US Census
Percent Renter Occupied Housing, 1990	1990	US Census
Overcrowded Housing (1.51. or more persons per room), 1990	1990	US Census
Persons per Unit, 1997	1997	CDR
Percent Renters Paying >35% Income on Housing, 1990	1990	US Census
Percent of Households with 1992 Income Below $25,000	1992	CDR
Percent of Households with 1992 Income $25,000-$40,000	1992	CDR
Percent of Households with 1992 Income $40,000-$50,000	1992	CDR
Percent of Households with 1992 Income Above 50,000	1992	CDR
Percent of Labor Force in Professional & Managerial, 1990	1990	US Census
Percent of Labor Force in Technical & Sales, 1990	1990	US Census
Percent of Labor Force in Service & Farming, 1990	1990	US Census

Percent of Labor Force in Skilled & Semi-Skilled Occup. 1990	1990	US Census
AFDC Cases per 1000 Household, 1996	1996	CDR, OCSSA
Percent of Persons below Poverty Level, 1990	1990	US Census
Median Family Income, 1992	1992	CDR, SCAG

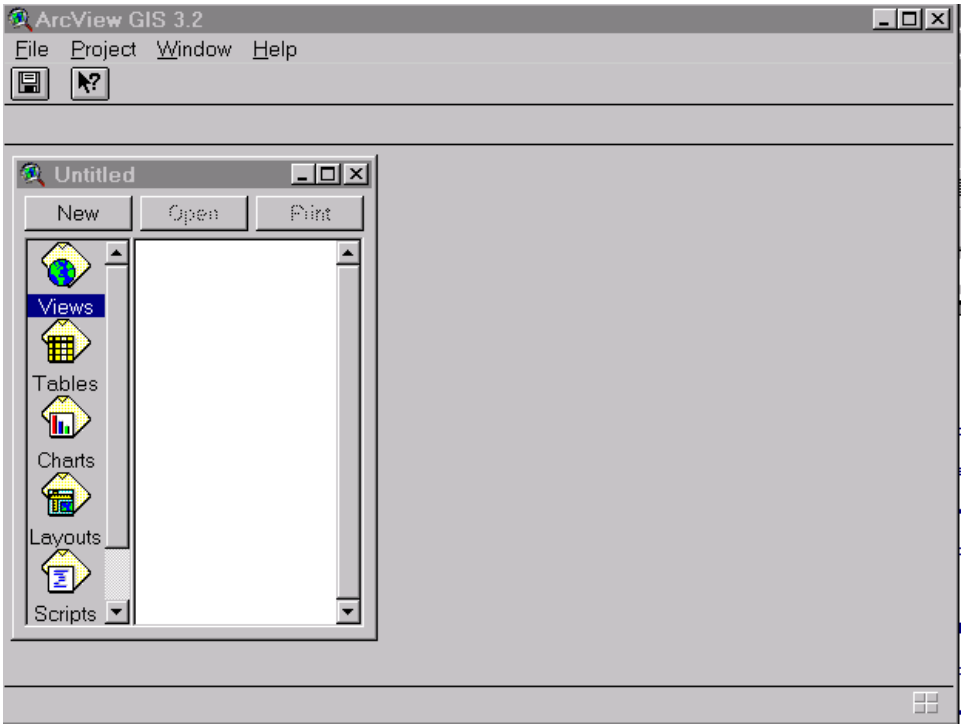
CDR: Center for Demographic Research, Cal State Fullerton
OCHCA: Orange County Health Care Agency
OCSSA: Orange County Social Services Agency
SCAG: Southern California Association of Governments

Appendix B: Provider Information Database Field Descriptions

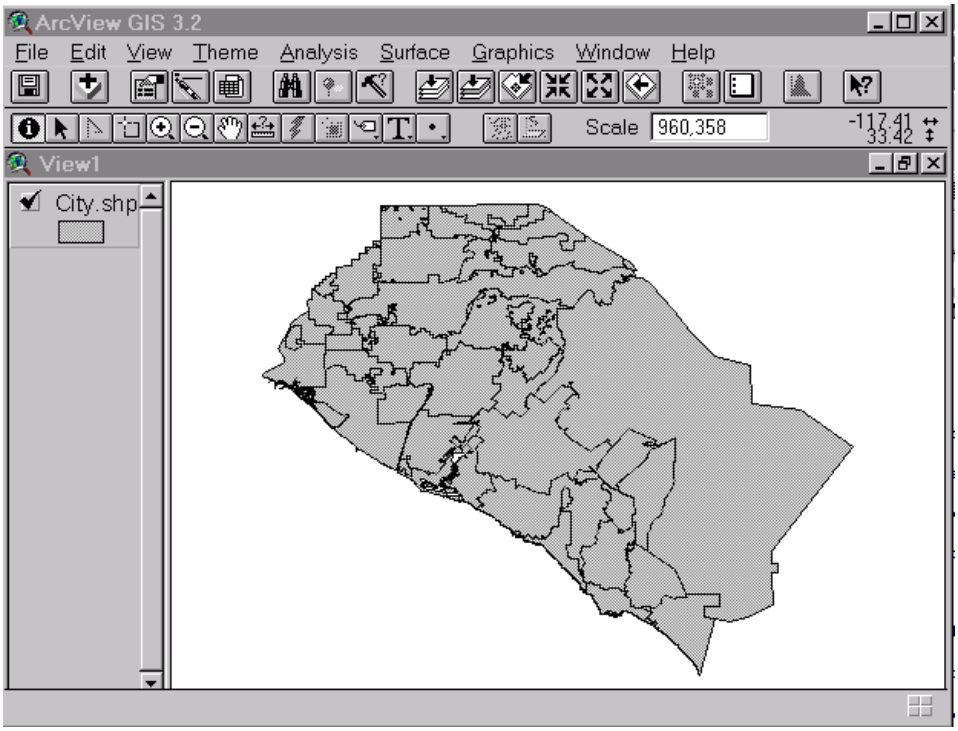
Spanish:	A 1 indicates that services are available in Spanish, whereas a 0 indicates that they are not available.
Fees:	A 1 indicates that there are charges for services, whereas a 0 indicates that services are free.
Sliding:	A 1 indicates that charges for services are based on the client's income, whereas a 0 indicates that charges are at a set rate or are free.
CAT1- CAT5:	Services provided by agencies based on INFOLINK survey.
Q7A1 – Q7A10:	Agency's service area is described in terms of the zip code.
Q7B1 – Q7B10:	Agency's service area is described in terms of the city code. For example, 40 = all county. See CITY1-CITY10 for names.
Q8A:	The year in which the agency began providing services in Orange County.
Q9A:	The estimated number of unduplicated clients that the agency has served in the last twelve months.
Q10A:	The total number of clients served or units of service provided (including duplications) by the agency.
Q11A:	The estimated percent of African American clients served by the agency.
Q11B:	The estimated percent of Asian/Pacific Islander clients served by the agency.
Q11C:	The estimated percent of White/Caucasian clients served by the agency.
Q11D:	The estimated percent of Hispanic Descent/Latino clients served by the agency.
Q11E:	The estimated percent of Native American clients served by the agency.
Q11F:	The remaining percent of clients who do not fit into any of the above categories.
Q12A:	The estimated percent of clients age 0 to 4 years.

Q12B:	The estimated percent of clients age 5 to 9 years.
Q12C:	The estimated percent of clients age 10 to 14 years.
Q12D:	The estimated percent of clients age 15 to 17 years.
Q12E:	The estimated percent of clients age 18 to 24 years.
Q12F:	The estimated percent of clients age 25 to 59 years.
Q12G:	The estimated percent of clients age 60 years or older.
Q13A:	The estimated percent of clients male.
Q13B:	The estimated percent of clients female.
Q14A:	The total number of paid, full-time staff working at the agency.
Q14B:	The total number of paid, part-time staff working at the agency.
Q14C:	The total number of volunteers that work with the agency at any given time.
Q14D:	The total number of paid consultants or independent contractors or other paid staff not included in the above categories.
Q15A:	The total number of hours of volunteer service that are put in at the agency.
Q15B:	This indicates whether the agency or organization is a United Way affiliate. 1= yes, 2 = no, 98 = don't know/no response, 0 = not available
Q15C:	This indicates whether the agency or organization is a United Way grantee. 1= yes, 2 = no, 98 = don't know/no response, 0 = not available
INFOSEEK_I:	The INFOLINK identification number assigned to the agency.
CITY1 – CITY10:	Agency's service area is by city name.

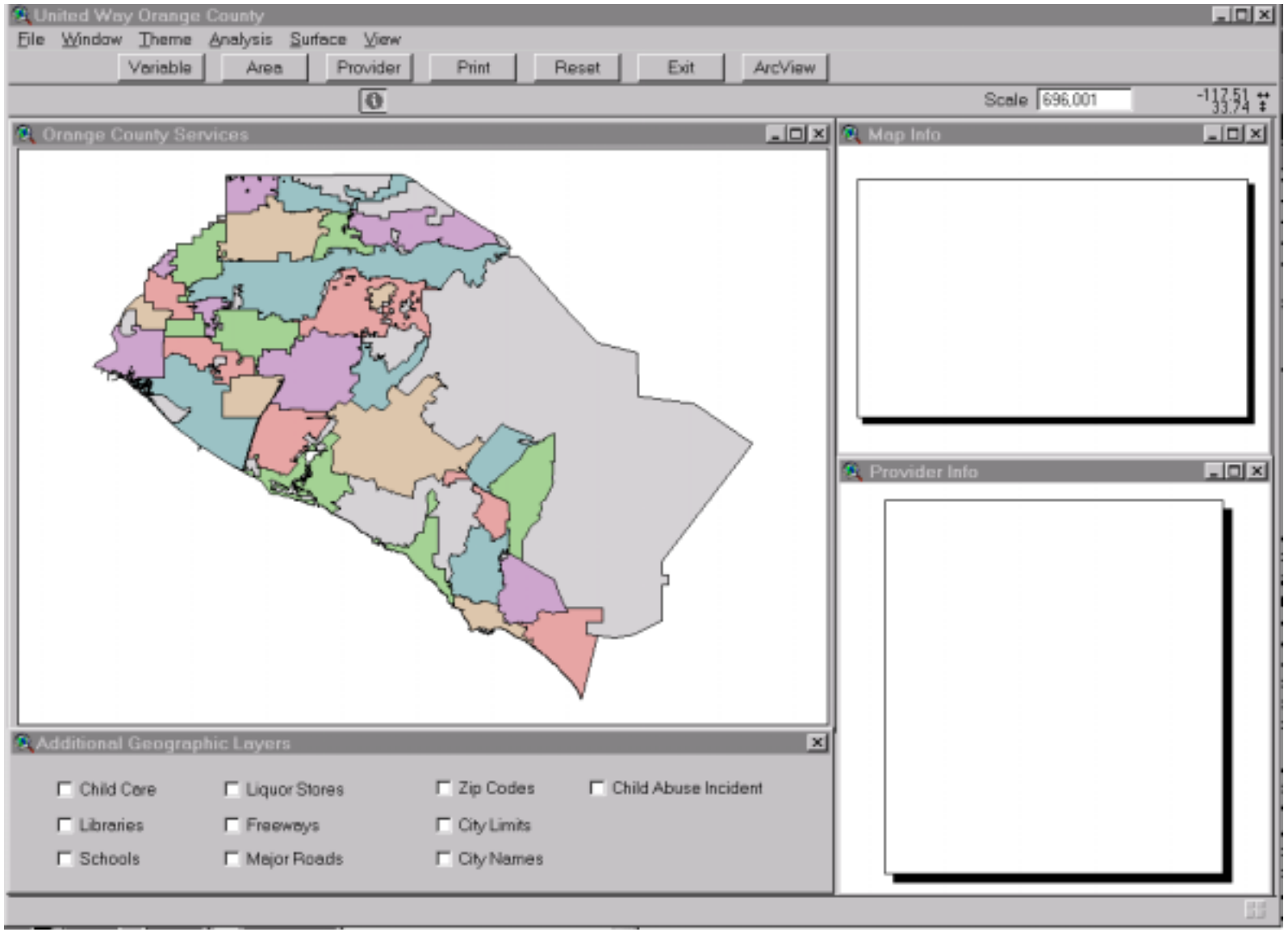
Appendix C: GIS Screen Captures



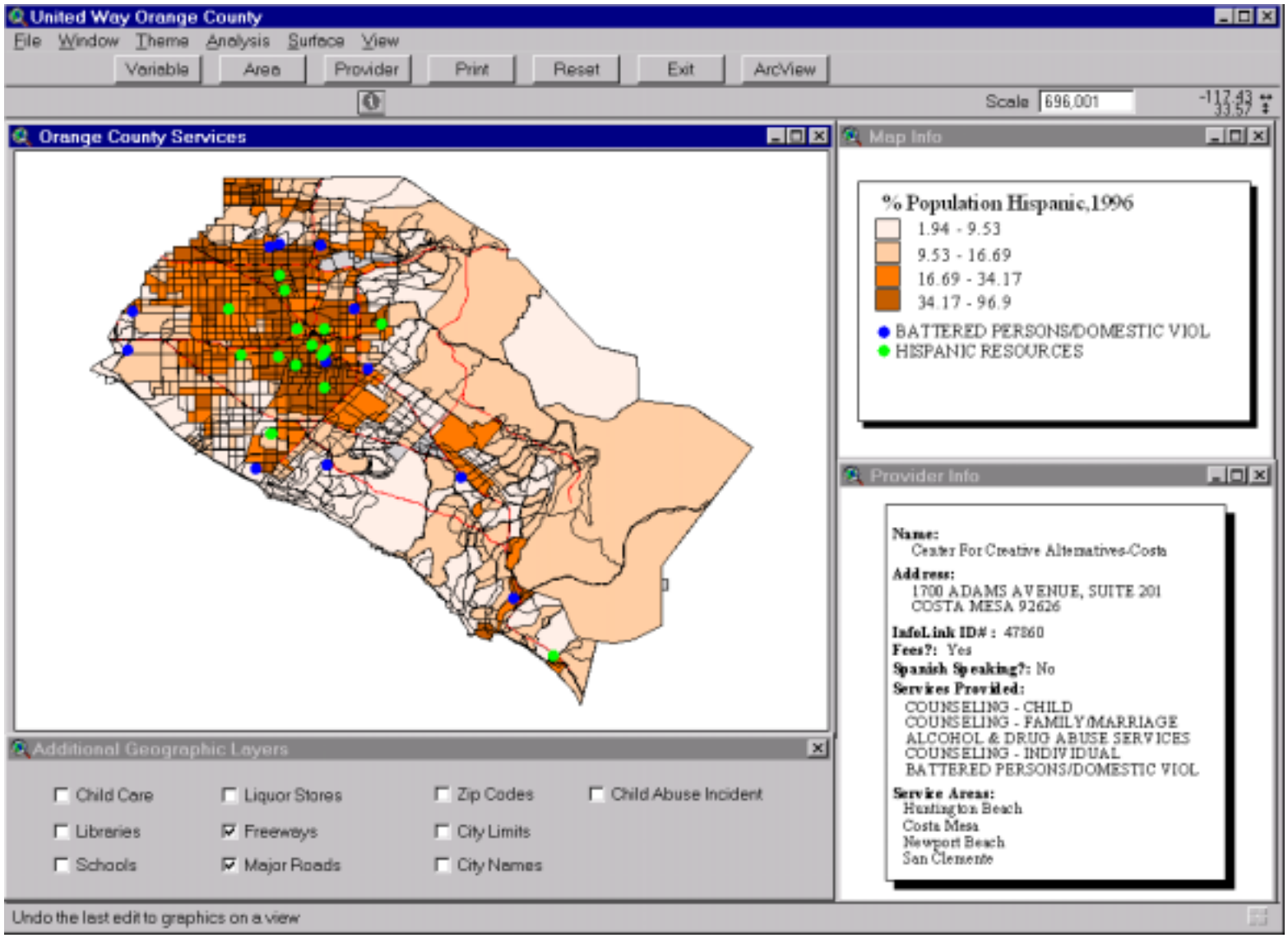
1. ArcView Startup Screen



2. ArcView GIS interface



3. Custom Mapping System Interface Start Up Screen



4. Sample Mapping System Screen