

Draft Cultural/Demographic GIS Implementation Plan for Oregon

1. Introduction

The Oregon Geographic Information System (GIS) framework teams are in the process of establish baseline data products and frameworks for building statewide geographic databases. The framework provides a common base of geographic data that contains data themes and meta-data. These are supported by multiple agencies and/or organizations (Federal, State, local and private) throughout the state. The GIS framework facilitates data integration, sharing, and the establishment of a long-term functioning institutional and business relationships/practices. Specific components of the National Federal Geographic Data Committee (FGDC) Framework Implementation Teams (FIT) are available [online](#) for review.

Cultural and demographic GIS data include one of the three following anthropogenic components ([FGDC, 1998](#)):

1. Describes a human activity (i.e. economic data)
2. Describes a human characteristic (i.e. health or age data)
3. Describes a human societal characteristic (i.e. political or historical data)

Using GIS with culturally based data provides a powerful analytical tool to decision makers, researchers and analysts. Specialized analysis can be completed using GIS techniques by integrate and combining various data sources. A few examples of these analyses include:

- Tabulating employment by Congressional Districts
- Estimating average incomes by voter precincts
- Summarizing the number of hazardous material locations by fire districts
- Mapping disease and health data
- Welfare claimants by school districts
- Crime statistics by ethnicity
- Child services facilities in proximity to welfare recipients

Numerous examples of using GIS with various cultural and demographic data applications have been published and are available on the Internet. Examples include using GIS with [public health](#), [human services](#), [employment](#), [crime](#), and [welfare](#) data. Many other examples of using GIS with cultural and demographic are also available.

Additional information regarding the FGDC framework process for the cultural and demographic subcommittee are available (for comment) at:

<http://www.census.gov/ftp/pub/geo/www/standards/scdd>.

Cultural and demographic GIS data exists in many formats including tabular statistics by political/administrative boundaries, addresses, point locations. Some of major data source will be identified in the next section.

Political/Administrative Data

Several state, federal and private organization publish cultural/demographic data tabulations and statistics by political and/or administrative units such as counties, zip-codes, cities, etc. Some of these data are available online and are outlined in Table 1. These data sources can be downloaded and linked with administrative/political boundaries for thematic (choroplethic) map production. Other data summarizes exist within agencies but are not commonly distributed.

Table 1. Selected on-line data by political/administrative units.

Data Source	Units	Web Address
Oregon Census Data	Block, Tract, County	Http://www.census.gov/main/www/cen2000.html
Demographic Projections	County	Http://www.oea.das.state.or.us
Economic Data	County	Http://www.bea.doc.gov/bea/regional/reis
Building Permits	City/County	Http://tier2.census.gov/bldgprmt/index.html
County Profiles	County	Http://tier2.census.gov/usac/index.html
Business Patterns	County/zipcode	Http://tier2.census.gov/cbp_naics/index.html
Economic Census	County/Zip	Http://www.census.gov/econ/www/econ_cen.html
Accommodations/Food	County	Http://www.census.gov/epcd/www/97EC72.HTM
Agriculture Census	County	Http://www.nass.usda.gov/census
<i>More data to be added – see matrix</i>		

Geo-coding Data

The nature of a large amount of cultural/demographic data is that it is geographically located with an address. Many data sources, and potential databases for future analyses, in Oregon have these attributes. Using geo-locating tools (i.e. address matching) allows this data to be mapped and cross-tabulated by various geographies. Additional spatial analyses can be subsequently performed such as overlaying data, buffering, interpolation, determining proximity (distance between selected features), travel time/cost distances, neighborhood statistical functions, etc.

An example of an on-line database with addresses is the [Oregon Department of Education's school database](#). This file can be downloaded and geo-coded using the street address information. Several agencies in Oregon use address "scrubber" programs that standardized the format of the addresses against the U.S. Post Service street file name, address range and zip code. The Oregon Employment Department and Department of Human Service use a Pitney Bowes product called FINALLIST (currently on the IBM mainframe) for cleaning up the address blocks. Another example of an Internet based address data retrieval system is the Oregon State Fire Marshall's database for [Hazardous substances](#).

GIS address format meta-data standards have been established by the National Cultural and Demographic FIT. A review document is available [online](#). Completing street address matching requires two types of data. One file required is the address file. This file needs to have the specific address number, the street name, street direction, street type, and zone (typically zip code or city name). The second file is a GIS road coverage which is geo-coded with addresses ranges, street names, street types, street directions and zones. The GIS software uses a set of matching routines that will standardize names, directions and spelling errors. Then the address file is parsed to the corresponding GIS street file and specific addresses are interpolated from the address ranges in the GIS cover. A score, related to the address matching process, is associated with each address. Subsequently all addresses are mapped to specific locations.

Point Locations

There are several cultural based GIS databases that have location information for identification. Two examples of this are: 1) the Oregon Water Resource Department [Dam Information](#), and 2) the Oregon Department of Environmental Quality's known or potential contamination from [hazardous substances data base](#). From these web-pages data can be queried and downloads for GIS analyses. Latitude and longitude are used for the positional information.

Issues for Cultural GIS data

Several issues are important to consider with respect to cultural GIS data. One is that most cultural and demographic data are temporal based data themes. Whereas data such as soils and watershed delineations area primarily static in time, most human related data is constantly changing. Therefore, the

nature of the databases is different than other common GIS applications. In addition, confidentiality is often an important issue related to cultural and demographic GIS data.

Time series data

Cultural data attributes that are temporal in nature can have geographic boundaries which may or may not change over time. The 1990 and 2000 Census of Population are two temporal databases that had administrative boundaries that changed between the time periods. Whereas data for county employment is a database that has constant boundaries but has monthly data for several decades.

The [Content Standard for Digital Geospatial Meta-data](#) documentation outlined the importance of documenting the time period of the data represented in the database. The FGDC meta-data standard has specific fields which refer to temporal components. They are in Sections 1.6.4 and are:

- 1.6.4 Temporal -- time period(s) characterized by the data set:
- 1.6.4.1 Temporal Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of temporal keywords
- 1.6.4.2 Temporal Keyword -- the name of a time period covered by a data set

Details on the specifying the time period are outlined in Section 9. This includes all relevant time period information (information about the date and time of an event). Many attribute data may also exist in hierarchical databases that are linked to constant geographies. Because of these underlying complexities in the database designs, the meta-data is critical to the framework plans.

Confidentiality

Numerous public agencies and private organizations collect and maintain data that can be used for multiple purposes. Examples of this include employment locations which is used by local governmental bodies, transportation planners, and other users. Sharing this data is critical to making cost effective solutions and not replicating efforts. However, in many instances the data by one agency is not publicly available or distributable due to confidentiality. Not all data in the framework needs to be available or released but links to the responsible owner (i.e. metadata) of the data need to be documented in the Framework. This points the potential users to the appropriate data steward.

Many of the potential cultural data sources are by their nature confidential data. This data deal with people income, taxes, insurance, etc. This often includes data which is collected and maintained by various local, state and federal agencies. Each organization has multiple methods of dealing with confidential data. Some data can only be released for research purposes (e.g. detailed information on Employers) whereas other data (such as locations of public schools) is public information. In many instances, Memorandums of Understanding for data sharing and exchange exist in Oregon that take into consideration issues of confidentiality. This is of particular interest in cases where cost saving can be obtained by not replicating work. This underlines the importance and existence of complete meta-data. A draft list of potential cultural/demographic data sources and data stewards is outlined in Table 3 (next section). The C-FIT goal is to compile a comprehensive meta-data for the majority of cultural/demographic data sources over the next 2 years. This will allow potential users to effectively identify data sources and contacts in the future.

Several methods exist in the GIS that allow for dealing with data with confidentiality restrictions. This includes methods of protecting anonymity while still being able to release data for making informed decisions. Options include data aggregation and/or generalization such as:

1. Aggregating data in administrative boundaries and presenting statistical tabulations
2. Converting specific geographic locations into areal coverages, so that locations can not be identified (i.e. buffer points into polygons)
3. Allowing data to only be mapped at specific scales. This can be performed by decreasing the resolution of geographic coordinate systems (i.e. locate to within a mile of the actual data)

The FGDC [Content Standard for Digital Geospatial Metadata](#) discusses confidentiality. The meta-data has fields which refer to individual data set's access and use constraints (Meta-data Sections 1.7 and 1.8):

1.7 Access Constraints -- restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set.

1.8 Use Constraints -- restrictions and legal prerequisites for using the data set after access is granted. These include any use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the data set.

Oregon C-FIT members prepared a confidentiality report that was presented to the Oregon Geographic Information Council in 2002. This is available from OGDC.

Future Discussion Topics for the Cultural Framework Implementation Team

The following is a tentative list of issues which the Oregon Cultural Framework Implementation Team will try to address over the next 2 years.

- Cultural theme data pilot project
- Issues related to data sharing and confidentiality
- Establishing protocols/methods for geo-coding
- Inventory of Cultural and Demographic data contacts for Oregon

Additional Data Themes for C-FIT

The attached database is a draft list, and potential data stewards, for future cultural geocodable GIS data themes. Some of these databases exist as address files which can be geo-located, whereas other contain locational data such as latitude and longitude. Some data is estimated and/or tabulated to county, city, zip-code or some other administrative unit. In many instances, this aggregation gets around issues related to confidentiality.

Table 3. Potential Cultural GIS data themes and stewards,

Data	Confid	Agency	Steward/Contact
Employer Data (ES-202)	Yes	OED	K. Lux
Unemployment Claimants	Yes	OED	F. Ritchie
Census (population, housing, etc)	No	OGDC	S. Barnett
Cell Towers	No	FCC	Webpage
Schools	No	ODE/OGDC	S. Barnett
Child Care Providers		OED	D. Trammell
Cemeteries			
Archeology		OPRD	E. Nugent
Unemployment/Employment (county-level)	No	OED	
Taxable Income		Rev	
Welfare		AFS	
Mental Health		DHS	
Workman's Compensation related Data		DCBS	J. Ross-Mota
Drivers (age, sex, marital)		DMV	
Corporations		SOS	
Child Support		DCS	
Economic Data (county)		OECD	
Permits (industrial, facilities, etc)		DEQ	M. West
Hazards/Fires		OFM	
Fishing Permits		ODFW	R. Kepler

Crime Statistics		OSP	
Parolees		DOC	
Senior Services		SSDS	
Historical Sites		SHPO	
Vehicle Ownership			
Building Permits		Counties	
Property values		Counties/Rev	S. Jackson
Health Care Facilities		DHS	
Fire Stations		OFM	
Electric Lines (and substations)			
Gas Lines			
Water lines			
Telephone Lines			
Dams		WRD	B. Harmon
Critical Facilities		OEM	
Demographic		Census	
Alcohol & Drug Abuse (county)		OADAP	
Behavior Risk Factor Surveillance System (Zip code)		OHD	

1.1 Objective

1.2 Scope

1.3 Applicability

1.4 Related Standards

Other states have also worked on cultural and demographic data documentation and frameworks. Table 2 presents the major themes identified in Michigan, Utah and Oregon. Figure 1 presents how the existing GIS themes inter-relate to one another.

Table 2. Other State Cultural and Demographic Data.

Michigan Cultural Themes	Utah Cultural Themes	Oregon Cultural Themes
Nonvisible Census Extensions and Boundaries	Demographics	Demographics
Physical Features (not elsewhere classified)		
Landmarks (from census)		
	Cemeteries	Cemeteries
	Telecommunication	
	Critical facilities	Critical facilities
		Archaeology
		Historic sites
		Address points
		Cities (also in Admin)
		Hazardous materials
		Recreation sites
		Fire water source
		Lookouts

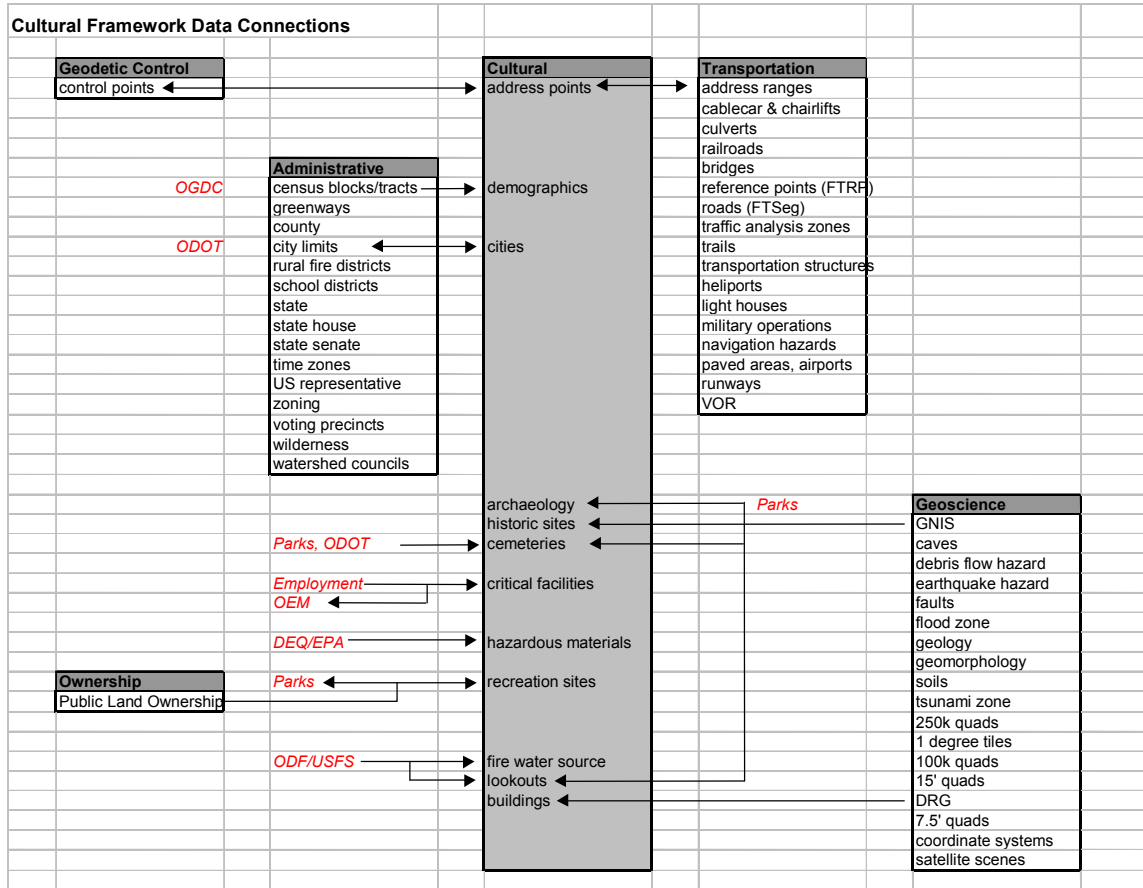


Figure 1. Oregon Cultural/Demographic data inter-relationships and responsible agency.

1.5 Standards development procedures

1.6 Maintenance authority

2. Description of the Standard

2.1 Sub-section

2.2 Sub-section

3. Technical and Operation Context

4. Data Dictionary

5. References

FGDC, 1998, Public Review Draft: Metadata Profile for Geospatially Referenced Cultural and Demographic Data.

Utah GIS Advisory Committee, 2001, Utah Framework Implementation Team Plan, 2001.

6. Appendices

6.1 Normative

6.2 Informative