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Guide Brief 1 – Characterize the Population

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Community Resilience

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Penny Pritzker, Secretary

National Institute of Standards and Technology
Willie May, Under Secretary of Commerce for Standards and Technology and Director

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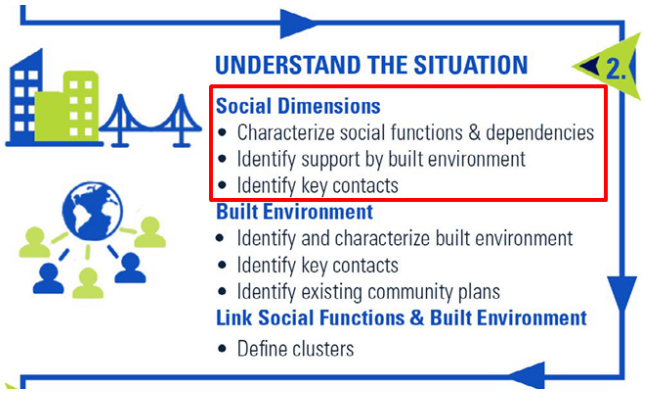
Guide Brief 1 – Characterize the Population

Applicable Section(s) of Guide:	Volume 1, Section 3.1, Characterize the Population, pp. 32-33 Volume 2, Section 10.1, Introduction, p. 10

Guide Briefs supplement the Community Resilience Planning Guide for Buildings and Infrastructure Systems (NIST SP1190)

Purpose and Scope

This Guide Brief provides additional rationale and guidance regarding the first part of Step 2 in the Guide, "Characterize social functions and dependencies," which starts with "Characterize the population." The intended audience is the social dimensions task group of the collaborative planning team. Information is provided for their use in discussions with local experts who interpret social and economic data. Additional guidance is offered for those that use Geographic Information Systems (GIS) to map and present different types of spatial information.



This Guide Brief summarizes the importance of this task in resilience planning, and lists the basic activities needed to characterize the population. It also offers suggestions for how a community might go about this process (e.g., types of required expertise and where to find such expertise in local or regional departments, agencies, or organizations). The Guide Brief includes examples of the types of social and economic indicators and measures that might be used to characterize the population, selected sources of these data, and additional resources for more advanced analysis.

1. Why does a community need to characterize its population?

First and foremost, the community resilience team focuses on the fundamental and time-sensitive needs of community members. The resilience team gathers this information to help accomplish several goals:

- Prioritize human needs
- Identify the means to measure improvements
- Assess hazards and mitigate risk
- Establish recovery time objectives
- Set performance goals
- Develop resilience plans

- Conduct evaluations
- Continually improve the resilience program

As discussed throughout the Guide, in resilient communities the social functions and needs of the community and its members drive the requirements of the built environment. Characterizing the population of a community—the first part of Step 2 in the Guide—may also be thought of as using data to systematically describe a community and those who live there. Communities may also supplement available data with their knowledge of the community population and significant factors/desired outcomes. It can also be used to examine potential future needs of a community as it changes over time.

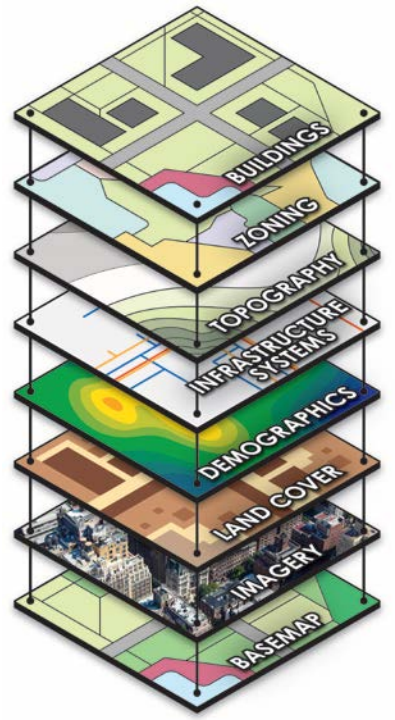
Just as a community needs to understand the strengths and vulnerabilities of its buildings, transportation, communications, and other systems, it also needs to be inclusive and recognize its capacities and vulnerabilities with respect to the social environment. For example, communities need to understand where their vulnerable populations live (e.g., those with low income, older adults, renters, individuals who do not speak or read English, those with limited transportation options) and whether concentrations of those populations are more vulnerable because of their physical location in the context of the built environment (e.g., living in a flood-prone area, living in older or otherwise inferior housing that may not be seismically retrofitted, or not having adequate access to transportation).

Beyond assessing and characterizing its current population, those involved with resilience planning need to recognize how their community may change over time in terms of both social vulnerability and infrastructure. For example, demands on transportation and other systems may increase to support older adults during evacuations or recovery following a hazard event. Similarly, if a community's non-English-speaking population is projected to increase, planners need to consider how this affects risk communication and messaging related to hazard mitigation and other resilience efforts. Understanding other aspects of population growth and decline associated with community development—and being aware of where these changes take place—also helps to inform decisions about mitigation. Understanding these and other factors as they evolve over time is central to long-term resilience planning.

2. What needs to be done to characterize a community's population?

Characterizing the population involves compiling and reviewing existing data and information about the community and, in some cases, gathering additional data requested by the collaborative planning team. Among the types of information needed at this stage in the process are: population demographics (e.g., age, health, education, income, employment status, language); economic indicators (e.g., the industries present in the community, primary types of employment); more specific indicators of social vulnerabilities (e.g., mobility issues, renting, having health insurance, living or working in hazard-prone areas); other measures associated with resilience (e.g., community engagement and connectedness, levels of trust in a community). These data may be linked to geographic locations with GIS and, more importantly, to different aspects of the built environment. However, available data may be provided with different geographic scales, such as parcels or counties, and such linkages may not be easy to make. Some factors may be dependent based on co-location (e.g., average income and housing types), whereas others will require more information to understand the dependencies. If links can be made between the social and built environments, a more complete overview of the community can be used to identify dependencies between the social dimensions of a community and buildings, energy systems, water and wastewater, transportation, and communications.

Many communities use GIS to present social data overlaid on the built environment which helps to graphically highlight both vulnerabilities and strengths for use in resilience planning (see Figure 1).



Many different types of data can be integrated into GIS maps, including parcels, land use zoning, topographical features, wetlands, demographic distribution, land use/land cover, buildings, infrastructure systems (e.g., transportation, water and wastewater, communications), and others. Using GIS to present social data overlaid on the built environment helps to graphically highlight both vulnerabilities and strengths for use in resilience planning. This allows spatial trends and relationships to be more easily identified, which will enable communities to better understand their population characteristics.

Figure 1. Example of layers in a Geographic Information System [Adapted and redrawn, Ontario County, New York, 2016]

3. How can a community characterize its population?

The work of characterizing the population is well-suited to the social dimensions task group of the collaborative planning team, as part of their work to identify, discuss, and report on the community's social needs and priorities. As part of this effort, the social dimensions task group may request assistance from a variety of local and regional entities, such as city or county planning departments, that have expertise accessing, providing, and interpreting social and economic data. The task group may also reach out to research centers, chambers of commerce, consulting firms, area institutes of higher learning (e.g., departments of business, economics, geography, planning, political science, public administration, and sociology in universities and community colleges), and other organizations with data and analysis capabilities in this area who likely have a vested interest in supporting community resilience activities. It might also be helpful to invite individuals with this expertise to serve as formal members of the social dimensions task group.

In most cases the basic data to characterize the population are available online, at no cost to users, through the U.S. Census Bureau (http://www.census.gov/). In other cases, as discussed later in Section 3.4 of this Guide Brief, information needed for resilience planning may require additional data collection. Some examples of useful data sources are listed below.

Potential data sources used to characterize a community's population:
• Bureau of Economic Analysis http://bea.gov/ • Centers for Medicare and Medicaid Services https://www.cms.gov/ • Department of Housing and Urban Development http://portal.hud.gov/hudportal/HUD • Department of Justice https://www.justice.gov/ • Health Resources and Services Administration http://www.hrsa.gov/ • Institute of Health Metrics and Evaluation http://www.healthdata.org/ • Internal Revenue Service https://www.irs.gov/ • U.S. Census Bureau, American Community Survey https://www.census.gov/programs-surveys/acs/ • U.S. Religion Census http://www.rcms2010.org/

For a more detailed analysis, the necessary data or information may be available, but it may not be in a format that is useful or "user-friendly." Or, the data may exist and be available at a cost. It is also possible that data are available but have not been analyzed in the context of resilience planning, meaning more analysis may be required. In these situations, as discussed above, outside expertise might be especially important to include in the planning efforts.

The sections below discuss social data that may be useful to the collaborative planning team. The collaborative planning team should seek the advice of local experts to refine and tailor the list of what is necessary to inform the planning process for their specific community. Moreover, it is critical that they check the data against the current reality within the community. Even data that is five years old may be inaccurate. Note again that later in the process these data are linked to geographic locations to visually identify potential strengths and vulnerabilities in specific areas of the community, as well as dependencies of these population characteristics within the built environment.

3.1. Population Demographics

Example Questions: How population demographics may be used to support planning for community resilience
• Are there geographic concentrations of vulnerable populations in the community, such as low-income households, older adults (ages 65+), individuals living with disabilities, and others? If so, where are these populations located? How might their locations further increase their vulnerabilities in the event of a disaster? • To what extent are identified vulnerable populations represented in community resilience planning? • Is there a substantial non-English-speaking population in the community? If so, is it geographically concentrated in specific areas? To what extent is this population represented in community resilience planning? • To what extent do residents have access to transportation in an emergency? Are there geographic concentrations of populations without the ability to evacuate in the event of a disaster? • To what extent are community residents able to access online information about community resilience planning activities? Does this access include vulnerable populations?

To answer the questions above, there are some common, basic demographic indicators communities involved with resilience planning often use to characterize their population, particularly with respect to identifying vulnerabilities within the community (Table 1). The social dimensions work group may decide to start the process by examining this easily accessible type of information. Moving forward, the group may expand its efforts if more data are needed to better understand the social environment in which they are working.

Table 1. Examples of Population Demographics

Demographic
% Population (25 +) with high school diploma or equivalent
% Population (25 +) with four-year degree or higher
Number of owner-occupied housing units per some number (e.g., 1,000/10,000)
% Population living in same county as one year prior
Voter participation rate
% Households with telephone service available
% Households with Internet access
% Households with at least one vehicle
Number of nonprofit organizations per capita
Life expectancy
% Household income under $35,000
% Household income over $100,000
Median household income (dollar amount)
Ratio of Transfer Payments* to Earned Income
% Households receiving Food Stamp/SNAP benefits
Unemployment rate
Poverty rate
% Population without health insurance
% Population below 18 years of age
% Population 65 years of age or above
% Population with disabilities
% Population that is linguistically isolated (non-English-speaking)
Violent crime rate

*Social security and public assistance

Many of the basic demographics needed for resilience planning are also consistent with indices and measures developed by researchers to understand vulnerability and resilience.[1] For example, measures typically related to community vulnerability include poverty rates; income inequality; crime rates; percentage of households or populations that are linguistically isolated, disabled, without health insurance, aged 65 and over, under age 18; and political fragmentation as measured by the number of political jurisdictions in a community.

Resilience is associated with a well-informed population, community attachment, civic engagement, and population health. Measures of these aspects of resilience include, but are not limited to, percentage of population living in the same county one year prior, percentage of housing units that are owner-occupied, percentage of population with education beyond a Bachelor's degree, life expectancy, voter participation rate, and number of non-profit organizations per capita.

3.2 Economic Indicators

Example Questions: **Using economic indicators to consider resilience-related questions during resilience planning**
• What is the "economic health" of the community? Is the economy growing, or is it in decline? • Is the community economically diverse, or does it depend heavily on one type of business or industry? • Is there a diverse customer base in the community? • Are key businesses and industries located in hazard-prone areas in the community? • How might data about the community's economy and business environment be used to support planning for community resilience? • Is there a large federal presence in the community? If so, how might it be involved with resilience planning? • Are there specific businesses and industries not currently involved with resilience planning that have a vested interest in supporting these efforts? If so, who are their representatives, and what is their involvement the process?

The social dimensions work group also must compile information about the community's general economic profile to address the types of questions listed above. By including the community's short- and long-term economic development plans in resilience planning, for example, the task group will be in a better position to integrate different components to mutually reinforce the benefits of each. More in-depth economic analysis may be performed if the collaborative planning team deems it necessary. Table 2 shows examples of economic indicators identified as important to understanding community resilience.[2]

[1] For additional information about assessing vulnerability and resilience, see, for example, Cutter et. Al 2003, 2010, 2014; Miller, Johnson, and Dabson 2016; Miles and Chang 2013; Norris et al. 2008; Peacock 2009; Peacock et al. 2008; Pfefferbaum, Pfefferbaum, and Van Horn 2011; Renschler et al. 2010; Rupasingha and Goetz 2008; Sherrieb, Norris, and Galea 2010.

[2] For additional information regarding economic indicators, see Cutter et al. 2014; Miles and Chang 2013; Miller, Johnson, and Dabson 2016; Peacock et al. 2008; Pfefferbaum, Pfefferbaum, and Van Horn 2011; Renschler et. al 2010.

Table 2. Examples of Economic Indicators

Indicator
% Major and minor industries by type
% Major and minor businesses by type
% Occupations by type
% Owner-occupied housing units
Employment/unemployment rates
Economic diversity
Net migration
% employees not in farming, fishing, forestry, extractive industry, or tourism
Gender income equality
Race/ethnicity income equality (negative Gini coefficient)
Ratio of large to small businesses
Number of large retail stores per 10,000 persons
Number of licensing boards
Number of labor unions
Number of employment agencies
Number of employment/career centers
Number of professional associations

3.3 Social Capital Indicators

Example Questions:
How social capital indicators support resilience planning and related activities in a community

- What do data about social capital reveal about the level of community involvement and participation in local community service and religious/cultural organizations?
- What do data about social capital reveal about the level of social interaction in the community?
- What do data about social capital reveal about the level of residents' attachment to the community?
- What do data about trust suggest about the community and its needs in the context of resilience planning?
- How can this information about the community's social capital be leveraged or used in the context of planning for community resilience?
- How might resilience planning activities contribute to social capital in the community?

As discussed in the Guide, social capital plays an important role in community resilience (see Volume II, Section 10.2). Social capital describes the networks and relationships that connect members of a community, including the extensiveness and interconnectedness of social networks within the community, levels of civic engagement, and interpersonal, inter-organizational, and institutional trust[3]. As previously mentioned, an increasing number of studies shows that communities with a healthy and well-educated

[3] The National Academies 2006; Aldrich and Meyer 2014

population, sense of community attachment, and active civic engagement—among other characteristics—are in a better position to prepare for, respond to, and recover from disasters [Aldrich and Meyer 2014; Cutter et al. 2014; Groen and Polivka 2010; Miller, Johnson, and Dabson 2016; Ritchie and Gill 2007; Sanders et. al 2003]. Example indicators of social capital are presented in Table 3.[4] Although many of these indicators are widely available (e.g., number of civic organizations, non-profit organizations, and religious organizations), other measures (e.g., level of trust within a community, community member participation in community meetings) may be less so and may require additional data collection if a community wishes to delve more into these issues.

Table 3. Examples of Social Capital Indicators

Indicator
Number of civic organizations and political organizations per some number (e.g., 1,000/10,000)
Number of registered/non-registered non-profit organizations per some number (e.g., 1,000/10,000)
Number of religious adherents per some number (e.g., 1,000/10,000)
Number of religious organizations per some number (e.g., 1,000/10,000)
Number of recreational centers (e.g., bowling centers, fitness centers, golf clubs, sports organizations)
Number of arts and cultural centers per some number (e.g., 1,000/10,000)
Number of professional and business associations per some number (e.g., 1,000/10,000)
Number of registered voters per some number (e.g., 1,000/10,000)
% of registered voter turnout in presidential elections
% population living in same county as one year prior
U.S. Census response rates for the decennial (2,000) population and housing survey
Number of owner-occupied housing units per some number (e.g., 1,000/10,000)
Property crime rate
% of individuals who served on a committee of a local organization in the last year
% of individuals who served as an officer of some club or organization in the last year
% of individuals who attended public meeting on town or school affairs in last year
% of individuals who agree that “most people can be trusted”
% of individuals who agree that “most people are honest”

3.4 Additional Data Collection

Once basic data like those described above are compiled and reviewed, the task group may need more information to identify and prioritize specific community needs. This might involve data collection directly from community members rather than relying on existing information. Such data may be collected through public meetings, hearings, or submission of public comments. More formal methods include interviews with representatives of underserved and vulnerable populations, community surveys,

[4] For additional information about assessing social capital see, for example, Cutter et al. 2014; Miller, Johnson, and Dabson 2016; Miles and Chang 2013; Norris et al. 2008; Peacock et al. 2008; Pfefferbaum, Pfefferbaum, and Van Horn 2011; Rupasingha and Goetz 2008; Sherrieb, Norris, and Galea 2010.

or focus groups, for which professionals should be consulted. For example, the task group might seek expert support from an area college or university or local consulting firms. Importantly, assessment findings may influence what projects are implemented, how information is shared, and the community's engagement at each phase.

3.5 Next Steps in Characterizing the Population – GIS Mapping and Prioritizing Needs

Once the social dimensions task group compiles the types of information outlined above (e.g., in a report, a set of tables, PowerPoint presentation, or maps), they need to carefully review these existing data. Data reviews may require experts to help interpret the information and identify gaps with respect to additional information needed to characterize the community. For example, the group may need more analysis of existing data to understand social capital, capacities that threaten or support resilience, and community vulnerabilities. In addition to examining the current situation in a community, the planning team should consider any projected shifts in the population's social and economic future and account for potential changes in the planning process. The NIST Economic Development Guide can support evaluation of resilience alternatives. Such projections might include information about aging populations or expectations about economic growth or decline in a community.

Linking the data described above to geographic locations within the community is the next step. This task requires individuals, units, or departments with mapping and GIS capabilities. This expertise is likely available within local government, institutions of higher learning in the area, or through consultants.[5] By mapping these data—the social capacities and vulnerabilities in the community—the planning team gains a better understanding of social strengths and opportunities, as well as where the social needs and priorities are greatest, and ultimately can examine how they are related to the built environment.

The output of the social dimensions task group's characterization of the more fundamental and time-sensitive needs of the community members provides input to the other task groups that must identify the links between the social institutions' services and the built environment and infrastructure systems, during business-as-usual and during the recovery process.

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[5] U.S. Geological Survey (USGS) Earth Science Information Centers, located in states around the country, are useful resources in the mapping process. See https://pubs.er.usgs.gov/publication/70039452 for more information.

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