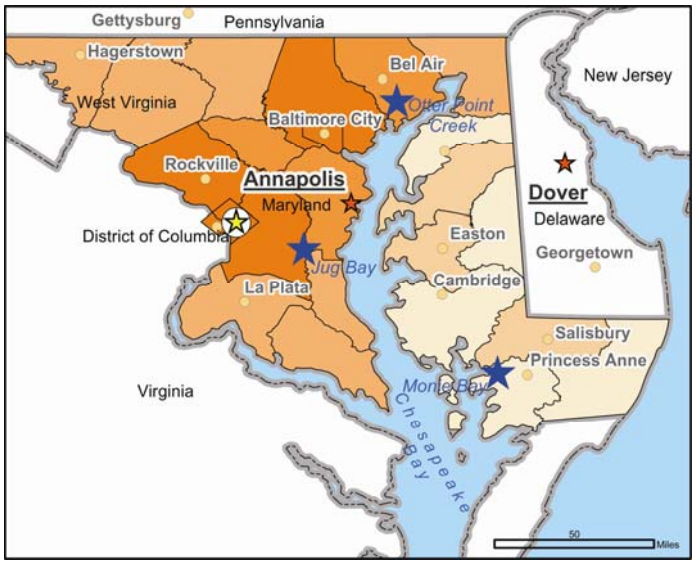
Chesapeake Bay, MD National Estuarine Research Reserve

Community Characterization



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Contents

A. Introduction

The Chesapeake Bay, MD National Estuarine Research Reserve (NERR) is composed of three distinct sites: Otter Point Creek in Harford County, Jug Bay in Calvert County, and Monie Bay in Somerset County (see Figure 1). These three sites are distinguishable in terms of geography, area, biophysical conditions, socioeconomic and demographic characteristics, and governance arrangements. Thus, while the Reserve site is complex and potentially difficult to interpret, it also provides a formidable opportunity to learn about estuarine management in complex human-dominated ecosystems.

This site was selected as a case study for this project because it falls along a trajectory from small, rural site to densely populated urban site. All three of the Chesapeake Bay NERR sites are within 100 miles of major centers of population (Baltimore, MD and Washington, DC). However, they are differentially influenced by these urban areas.

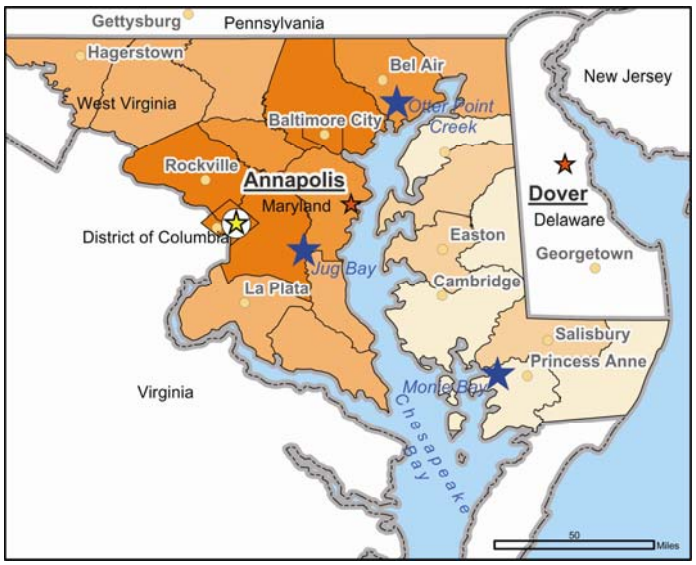


Figure 1. Map of Chesapeake Bay, MD NERR sites

B. Site Description and Needs Assessment

On April 14, 2005, an informal focus group was conducted with representatives of the Chesapeake Bay National Estuarine Research Reserve, and several of its partner organizations. This meeting took place at Jug Bay Reserve, which is located within the Patuxent River State Park. Attendees included 3 representatives of the Patuxent River State Park/MD Department of Natural Resources, MD Seagrant, and the National Oceanic

and Atmospheric Administration. Combined, this group has a comprehensive understanding of the management issues faced by the Reserve, as well as opportunities to address them.

The primary issues identified fell into three categories, one having to do with the complexity of managing a Research Reserve composed of three sites, another with the complex social systems within which they operate, and finally the heavy level of visitor use as it affects the Jug Bay and Otter Point Creek sites in particular. Specifically, visitor use is increasing at Jug Bay, and includes problems associated with all terrain vehicles, high-speed watercraft, trash dumping, keeping dogs on leashes, and unauthorized uses of the eight miles of trails on the site.

The focus group participants felt that the reserve could benefit from a variety of socioeconomic analyses. These include:

1) documenting and analyzing visitor use in order to get a stronger sense of the catchment from which all three sites attract visitors;

2) conducting an organizational analysis to improve coordination among the many partners of the Reserve. This would serve to reduce redundancy, overlap, and reinventing the wheel;

3) having a better understanding of the communities around the reserve sites would allow managers to reach out more effectively to different existing and potential user groups;

4) identifying how the Chesapeake Bay, MD NERR fits into the broader organizational community around the Chesapeake Bay, with specific emphasis on understanding how it can distinguish itself among the many voices speaking to issues regarding the Chesapeake Bay. From research to recreation to outreach and education, the CB NERR is only one of literally hundreds of organizations with compatible missions, mandates, and activities. What makes it different?

This document does not fully address all of these issues. It contributes to improved understanding of the communities around the reserve sites, and provides guidance in terms of how to move forward in addressing the issues identified.

C. Community Characterization

This document characterizes, at a broad scale, socioeconomic conditions of communities around the three sites. Information for these summaries was derived primarily from the 2000 decennial census, which was downloaded and displayed on a series of maps. The maps are included in this community characterization; each sheet includes text interpreting the findings at different scales for the variable it depicts, including state/county, and region/locale around the Reserve.

The maps present data on a subset of variables in the human ecosystem framework (Machlis et al., 1997): under Biophysical Resources, *energy*; under Socioeconomic Resources, *population, labor*, and *capital*; under Social Cycles, *institutional cycles*; under Social Order, *age*, *class, power, wealth*. Figure 2, below, shows the indicators selected for each of these variables, as well as the map sheet on which they are represented. Here, synthesis is intended to detect and present relationships among the variables shown on the maps.

Figure 2.

Variable	Indicator and/or Measure	Sheet Number
Population	Number of persons per census geography	One
Population	Number of people per square mile	Two
Population	Percent change in total resident population between 1990 and 2000	Three
Age	Median age of total population	Four
Capital	Median household income	Five
Class	Percent skilled and professional workers	Six
Power	Percent of households with income over $100,000	Seven
Wealth	Percent persons living below poverty line	Eight
Institutional Cycles	Ratio of population <18 to >64 years of age	Nine
Energy	Time traveled to work	Ten
Informal Norms	Percent of households with own children under 18 years living at home, headed by a single parent (male or female)	Eleven

Because the Chesapeake Bay, MD National Estuarine Research Reserve comprises three distinct sites, three community characterizations are presented here. All three sites are represented on each of the maps described in Figure 2. Below, the findings in these maps are summarized by variable for the three sites comprising the Reserve: Otter Point Creek,

Jug Bay, and Monie Bay. The relationships among these variables are then discussed, by site, to provide a synthesis of findings.

Finally, the strengths and weaknesses of this multi-site reserve are discussed in terms of meeting the multiple goals and mandates of the National Estuarine Research Reserve System network. We conclude with suggestions for additional social assessments that might be of use to the managers of this reserve.

C-1. Population

Population includes both the number of individuals and the number of social groups and cohorts within a social system. It is an important socioeconomic resource as it determines the consumption impacts of people as well as their creative actions. Because development is an important issue at most NERR sites, three indicators of population were measured and mapped for the community characterizations: absolute population, population density, and county-level change in population between 1990 and 2000.

Maryland ranks 19th among the states in terms of absolute population; however, it is the sixth most densely populated state with an average of 542 people/square mile in 2000. The counties in the vicinities of the three Chesapeake Bay, MD NERR sites differ dramatically in terms of absolute population: 150,001-250,000 around Otter Point Creek; 250,001-875,000 around Jug Bay, and 45,000-90,000 around Monie Bay.

I. Otter Point Creek

The populations of the counties around the Otter Point Creek site range from 150-001 to 250,000 people. However, nearby Baltimore City and County have populations approaching 800,000 people each. County level population density in the vicinity of Otter Point Creek ranges from 330-8172 people/sq mi. Some census block groups in the area, however, have much higher population densities: up to 11,534 people/sq mi. The population of Harford County, in which the Otter Point Creek site is located, increased by approximately 20% between 1990 and 2000.

II. Jug Bay

The populations of the census block groups in the Jug Bay area range from 1000-5000 people. However, Washington DC is a mere 20 miles away; and there the population is over 570,000. At the county level, population density in the area around Jug Bay ranges from 330-8172 people/sq mi. The population of Calvert County, in which the Jug Bay site is located, increased by 45% between 1990 and 2000.

III. Monie Bay

In the region around Monie Bay, the population is relatively sparse. Two centers of population 10 miles away are home to 4000 and 8000 people respectively. Salisbury, with 23,743 people, is 20 miles away, and represents the largest center of population in the Monie Bay region. In the census block groups in the area, population density is less than 562 people/sq mi. The county containing the NERR site, Somerset, grew in population by 5.6% between 1990 and 2000.

C-2. Age

Age is an important component of social structure for several reasons. Must of human activity is age-dependent. Mining, for example, is an occupation primarily carried out by the young. Certain recreational activities, such as golf, are often associated with the elderly. Age distribution within a community is also an important determinant of social institutions such as education and health care. Likewise, age can be an important factor in political activity and proclivity.

The median age of the people in Maryland, at 36.0 years, is higher than the national median of 33.3 years. This means that half of the people in the state are older than 36.0 years, and half are younger. The counties along and just inland of the western shore of the Chesapeake Bay in MD, including those containing or adjacent both the Otter Point Creek and Jug Bay NERR sites, are at or below the state median. An exception is Baltimore City, where the median age is 37.7.

I. Otter Point Creek

The census block groups in the area around the Otter Point Creek NERR site are among those with the youngest median age in the vicinity, and

there is a pattern of census block groups with relatively low median ages from the coast directly inland to Belair. This likely indicates that there are many families with young children in the region.

II. Jug Bay

The census block groups in the area around Jug Bay have median ages of upwards of 38.9 to 41.8 years of age, well above both the national median and state medians. This indicates that there may be relatively few families with children at home in this area.

III. Monie Bay

Many of the counties along the eastern shore of Maryland display a high median age, up to 43.3 years. These include the two counties in the immediate vicinity of the Monie Bay NERR site. The census block groups in this area mimic this trend, having populations with a median age of 38.9 or higher. The median age decreases toward centers of population.

C-3. Capital

In the human ecosystem framework, capital is defined as the economic instruments of production; that is, financial resources (money or credit supply), resource values (such as underground oil), and the human ability to manipulate these (human capital). Capital can be measured in a variety of ways; for our purposes, median household income is used to measure capital.

In Maryland's eastern and central counties, the median household income is well above the national median of $41,994 and the state median of $52,868. In particular, the counties along Maryland's western shore of the Chesapeake Bay have higher median incomes than other counties in the region.

I. Otter Point Creek

There is a concentration of wealth in the area around Otter Point Creek, where in some cases the median income is as high as $150,000. However, areas closer to the coast, and along and south of the I95 corridor, including in of Baltimore City, have median incomes among the lowest in the state.

II. Jug Bay

Similarly, there is a concentration of wealth in the area around Jug Bay, where again, in some census block groups the median income is $150,000. This pattern persists for 10 miles in all directions from the Jug Bay site. Median incomes diminish rapidly in the District of Columbia to the west, and there are small pockets of low median income census geographies along the coast to the east of the Reserve.

III. Monie Bay

In the area around Monie Bay, there is a diversity of median incomes by census block group, ranging from quite low ($0-31,199) to quite high ($72,700 and more). However, the majority of census block groups in the area around the Monie Bay site are in the lower two quantiles of the data sets.

C-4. Class

The term, class, is used in various ways in sociology. It usually implies a group of individuals sharing a common situation within a social structure, usually their shared place in the structure of ownership and control of the means of production (Dictionary of Social Science, http://bitbucket.icaap.org/dict.pl).

Class is represented in this work as the percent of the work force who are employed in skilled or professional occupations. These include doctors, lawyers, professors, computer specialists, and so on. In Maryland, 13.7-36.6% by county fall into this category, with highest concentrations located along the western shore of the Chesapeake Bay.

I. Otter Point Creek

In the area around Otter Point Creek, higher concentrations of professional workers can be detected in areas inland from the Bay's shore, near and in Baltimore City. Some of the census block groups in these areas are home to up to 57% skilled and professional workers, well above the national average of 20%.

II. Jug Bay

In the area around Jug Bay, higher concentrations of professional workers (35% or more) are scattered throughout the region, increasing in concentration in the suburban regions near the District of Columbia. Some of the census block groups in these areas are home to up to 57% skilled and professional workers, well above the national average of 20%.

III. Monie Bay

In the area near Monie Bay, higher concentrations of skilled and professional workers tend to cluster in towns such as Salisbury, and diminish in concentration toward the eastern shore of the Chesapeake Bay. The census block groups containing and adjacent to Monie Bay approximate the national average of 20% skilled and professional workers.

C-5. Power

Power is the ability to alter others' behaviour, either by coercion or deference (Wrong, 1988; Mann, 1984). The powerful, often elites with political or economic power, or both, can have access to resources denied the powerless. Here, we measure power in terms of income, with those having a household income of $100,000 or more considered to be more powerful than those with lower incomes.

In Maryland, the concentration of households by county with this income level displays a wide range (4.3% to 32.4%). There is a pattern of higher concentration of power in and around the centers of population along the western and northeastern shores of the Chesapeake Bay.

I. Otter Point Creek

There are high concentrations of power northwest of the Otter Point Creek site, where many census block groups have between 29.5% and 100% households in this range. In particular the areas in Baltimore County near the Baltimore City limit, i.e. the suburban fringe, have very high concentrations of power. In the area immediately surrounding the Otter Point Creek site, this rate diminishes to less than 11% in most census block groups.

II. Jug Bay

Throughout the locale of the Jug Bay Reserve site, most census block groups are home to 29% or more households having an income of $100,000 or more. This indicates a concentration of power in the area around this site, and is particularly prominent in the suburban regions around the District of Columbia and the state capitol, Annapolis.

III. Monie Bay

In the census block groups around Monie Bay, concentrations of powerful households are lower than both the areas along the western shore of the Chesapeake Bay in Maryland, and lower than the national average of 10.9%. Most census block groups in the immediate vicinity of the NERR site have between 5.4% and 10.8% households with incomes over $100,000. There are higher concentrations in Salisbury.

C-6. Wealth

Wealth is access to material resources, in the form of natural resources, capital (money) and credit. The distribution of wealth is a central feature of social inequality and has human ecosystem implications: the rich have more life opportunities than the poor. Here, we measure the inverse of wealth by examining poverty rates in the areas around the research reserve sites. The poverty line in the United States is defined as an annual income of $18,660 or less for a family of four.

In Maryland, there is a wide range of poverty levels, by county, ranging from 0.0-80.0%. Counties with higher poverty levels are those on the eastern and southwestern shores of the Chesapeake Bay.

I. Otter Point Creek

In the area around Otter Point Creek, high concentrations of poverty are found in Baltimore City and south of the I95 corridor. There are several census block groups with high concentrations of poverty immediately adjacent to the OPC reserve site. In the larger vicinity of the Reserve site, however, the percentage of people living below the poverty line is generally 6.4% or lower.

II. Jug Bay

In the area around Jug Bay, there are relatively few block groups with high concentrations of poverty, and virtually none immediately adjacent to the Reserve site itself. These block groups have poverty rates of <6.4%. Within the District of Columbia and its Beltway, there are high concentrations of poverty, up to 80% in some census block groups. The same is true of several block groups in the Annapolis region, although the pattern is much less pronounced in this area.

III. Monie Bay

The area around the Monie Bay Reserve site exhibits varying rates of poverty, ranging from 0.0-3.0% to 17% or more. Most block groups in this area, however, fall into the mid-range: 6.5%-16.9%. The town of Salisbury, however, does have a relatively high concentration of persons living below the poverty line, as compared to the rest of the region around the Monie Bay site.

C-7. Institutional Cycles

Time is both a fixed resource and a key organizing tool for human behavior. Some cycles may be physiological (such as diurnal patterns); others institutional (permitted hunting seasons). Social cycles, such as the set of collective rhythms within a community or culture that organize its calendar, festivals, harvests, fishing seasons, business days, and so forth, significantly influence the distribution of critical resources.

Institutional cycles are critical to human ecosystem functioning, for they provide guidance and predictability to the ebb and flow of human action. Here, we measure institutional cycles in terms of age distribution, since the relative proportion of children to elderly will influence the need for, flow and use of different resources in a community.

In Maryland, counties with the highest ratios of children to elderly are those along the Potomac River, where the range in ratios is 2.11-3.90. The national average is 2.11.

I. Otter Point Creek

In the area around Otter Point Creek, the census block groups immediately around the Reserve site exhibit high ratios of children to elderly, in many cases 4.5 and above. This pattern persists along the I95 corridor and inland from it in a northerly direction. In contrast, in those areas closer to the coast, and between OPC and Baltimore City, lower ratios of children to elderly are present.

II. Jug Bay

The area around Jug Bay displays a southeast to northwest pattern of increasingly high children-elderly ratios. Throughout the region, though, there are relatively high ratios, ranging primarily from 2.11 to 4.49. This trend is particularly prevalent in the suburban areas around the District of Columbia.

III. Monie Bay

In the Monie Bay region, there are few children compared to elderly in the census block groups surrounding the reserve site, and high ratios in the Salisbury area. Given the high median ages of the population in this areas, this is not an unusual finding.

C-8. Energy

Energy is the ability to do work or create heat. Energy is a critical natural resource and is tremendously influential on social systems. The energy available to humans “limits what we can do, and influences what we will do” (Cottrell, 1955). Here, we have used commuting time as a proxy measure for energy consumption. Analysis of commuting data from the US census indicated that a majority of the 128.3 million commuters in the United States travel alone by car, and travel for between 15 and 45 minutes to get to work. The percentage of commuters traveling 15-45 minutes by census geography was measured to give a sense of relative energy consumption patterns.

In Maryland, the average percentage of commuters traveling in this timeframe was 49.9% by county. Higher concentrations are detectable in the counties along the Baltimore-Washington corridor – 55.0%-62.6%).

Almost three quarters of Maryland's workforce (73.7%) drive to work alone each day.

I. Otter Point Creek

In the area around Otter Point Creek, 64.0%-92.5% of commuters are in this category. However, those with the highest rates are located southwest of the Reserve site, close to Baltimore City. Immediately around the Reserve, in particular toward the Bay, 51.5% or fewer commute 15-45 minutes to work. North of Otter Point Creek, there is no clear pattern in this commuting rate.

II. Jug Bay

In the area around Jug Bay, relatively few commuters (in many census block groups, <45%) fall into the 15-45 minute time-frame. However, this does not necessarily mean that energy consumption is lower in this region, since many people could be commuting more than 45 minutes to work, as well as less than 15 minutes.

III. Monie Bay

In most census block groups in the area around Monie Bay, 51.2-63.9% of commuters travel 15-45 minutes to get to work. North of the site, this rate increases to 64.0%-92.5%. In the Salisbury area, relatively few people are in this commuting time-frame.

C-9. Informal Norms

Informal norms are the unwritten, and sometimes unspoken, rules that govern human behaviour. Informal norms are delivered to children as they are socialized; as we age, we continue to acquire expertise regarding structure and function of our social interactions. We are often unaware of informal norms until they have been violated. Here, we measure informal norms by determining the rate of single-parent households. Most single-parent households are, in fact, single-mother households: "Of all custodial parents, 85% were mothers and 15% were fathers" in 2000 (http://www.parentswithoutpartners.org/Support1.htm). Informal norms around family structure and composition are changing in North American families.

In Maryland, up to 43.7% of households, by county, are headed by single parents. There is a higher concentration of single-parent households in the counties along the eastern shore of the Chesapeake Bay in Maryland, than on the western shore. However, Baltimore City and County are among those with the highest concentrations of single-parent households

I. Otter Point Creek

In the region around Otter Point Creek, the rate of single-parent households is relatively low, particularly at distances from the I95 corridor. There, rates are 13.9% or lower in many cases. Along the I95 corridor the rates are substantially higher (35% or more), both north and south of the Reserve site, and particularly dense in Baltimore City and its immediate environs.

II. Jug Bay

In the region around the Jug Bay Reserve site, the rates of single-parent households are relatively low. The most common range in this region is 14.0%-20.2%. These rates increase northwest of the Reserve site, in particular in and around Washington DC, and northeast of the Jug Bay site near Annapolis. There is also a high concentration of single-parent households in the District of Columbia and its immediate environs.

III. Monie Bay

The census block groups near Monie Bay are home to either 20.3%-25.7% or 25.8-35.7% single-parent households. These rates are in keeping with the national average of 25.8%. There is one block group in Salisbury with a lower rate of 13.9% or less.

D. Summary of Findings

I. Otter Point Creek

The Otter Point Creek region displays stark contrasts in demographics and socioeconomic characteristics. The region northwest of the Reserve site is quite affluent, educated (as indicated by the concentration of skilled and professional workers), and home to stable families with children at home. The area immediately around the Reserve site, however, is characterized by lower incomes and less skilled and professional workers. The areas

closest to Baltimore City, to the south along the I95 corridor, are quite disadvantaged.

There are a number of implications to this mosaic of demographic and socioeconomic characteristics. First, because the area around the Reserve site is quite densely populated, and home to those of less advantaged status, it is quite likely that the Otter Point Creek Reserve site, as a relatively urbanized park, is or has the potential to be well-used and much valued as a recreational amenity by local people. This can be a tremendous source of support, volunteer activity, and opportunities to teach local ecology to local residents.

However, the upland portions of the Otter Point Creek watershed are separated from the estuary itself by both geographic and socioeconomic barriers, including I95 and a stark contrast in socioeconomic status. Thus, it is unlikely that the upstream communities have as strong ties to the estuary, and possibly the water courses that drain into it, as those living near the Reserve site. This can cause barriers to integrated watershed management, and make it difficult to protect and enhance headwaters in the catchment.

Third, it is also unlikely that the Baltimore City and County areas have strong ties to this system, because of the geographic distance and the likely socioeconomic disconnect between that highly urban area and this region. Despite the likelihood that many residents of the area around Otter Point Creek commute to Baltimore or its environs to work, the social and cultural connection between urban residents and Otter Point Creek may be limited.

There are likely to be socioeconomic, and possibly cultural, hurdles to overcome in the management and fulfillment of the NOAA mandate at Otter Point Creek. However, there are also opportunities to learn how to better manage the watershed and local environment of an urban/suburban estuary. Given the increasing concentration of population along our coastlines across the country, this is arguably a critical role for the National Estuarine Research Reserve System.

II. Jug Bay

This region displays more homogeneity than the Otter Point Creek site. The locale around the Jug Bay site is characterized by affluence, family stability, and likely a politically influential population. Visitor use management is the most important issue raised regarding this site, which would not be obvious from the socioeconomic characterization using the indicators selected for this exercise.

Home to many professionals, who are likely commuting to the nation's capitol to work, this region provides an opportunity to examine the relationships among power, local resource use and management, and consumption patterns. Often, despite strong environmental values, the affluent consume more resources than the less well-to-do. Likewise, because private land parcels tend to be larger in more affluent areas, individual land management strategies in this region may affect local water chemistry and other biophysical characteristics relatively strongly.

According to staff, the Jug Bay Reserve has a strong core of volunteers. There is an opportunity to examine relationships between socioeconomic status and civil society – the role of volunteers and volunteerism in governance.

III. Monie Bay

The region of the Monie Bay site of the Chesapeake Bay National Estuarine Research Reserve appears in many ways to be fairly average compared to national numbers. It also seems to be ripe for a demographic and socioeconomic transition, although to what type of community is unclear. There is low population density in many areas of the eastern shore of the Chesapeake Bay, average incidence of single-parent households and poverty rates, and relatively high median age. According to staff at the Reserve, the communities in the area are composed of tight-knit families who have lived in the area for generations. This would not be readily apparent from the data presented in the maps; however, there are some clues that this would be the case.

Distance and water separate the Eastern Shore from the rest of the state, likely rendering it other-worldly in many ways. The general impression of this region is that of a place away from the general busy-ness of urban and suburban regions. It is unlikely to become a bedroom community to

Baltimore or Washington; however, it is also unlikely to substantially benefit economically from these cities either.

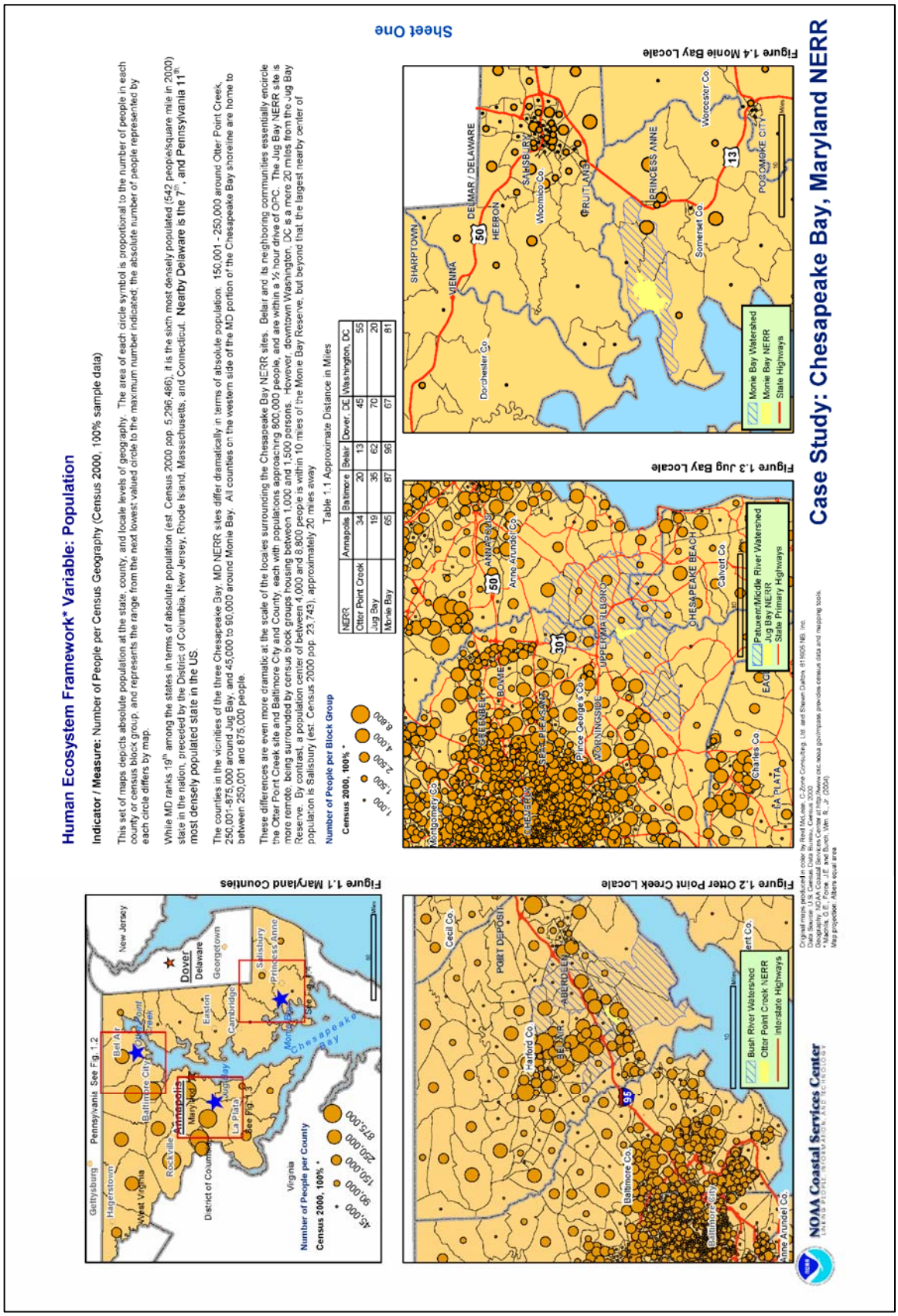
E. Recommended Future Directions for Related Activities at the Chesapeake Bay, MD National Estuarine Research Reserve

The Chesapeake Bay, MD National Estuarine Research Reserve poses many interesting and challenging issues in regard to the multiple mandates of the Reserve system. Because this Reserve comprises three distinct sites, in three very different types of social systems, its managers are, in effect, in charge of three separate Research Reserves. In essence, this triples their workload, requiring management, research, and education plans for the three distinct locales.

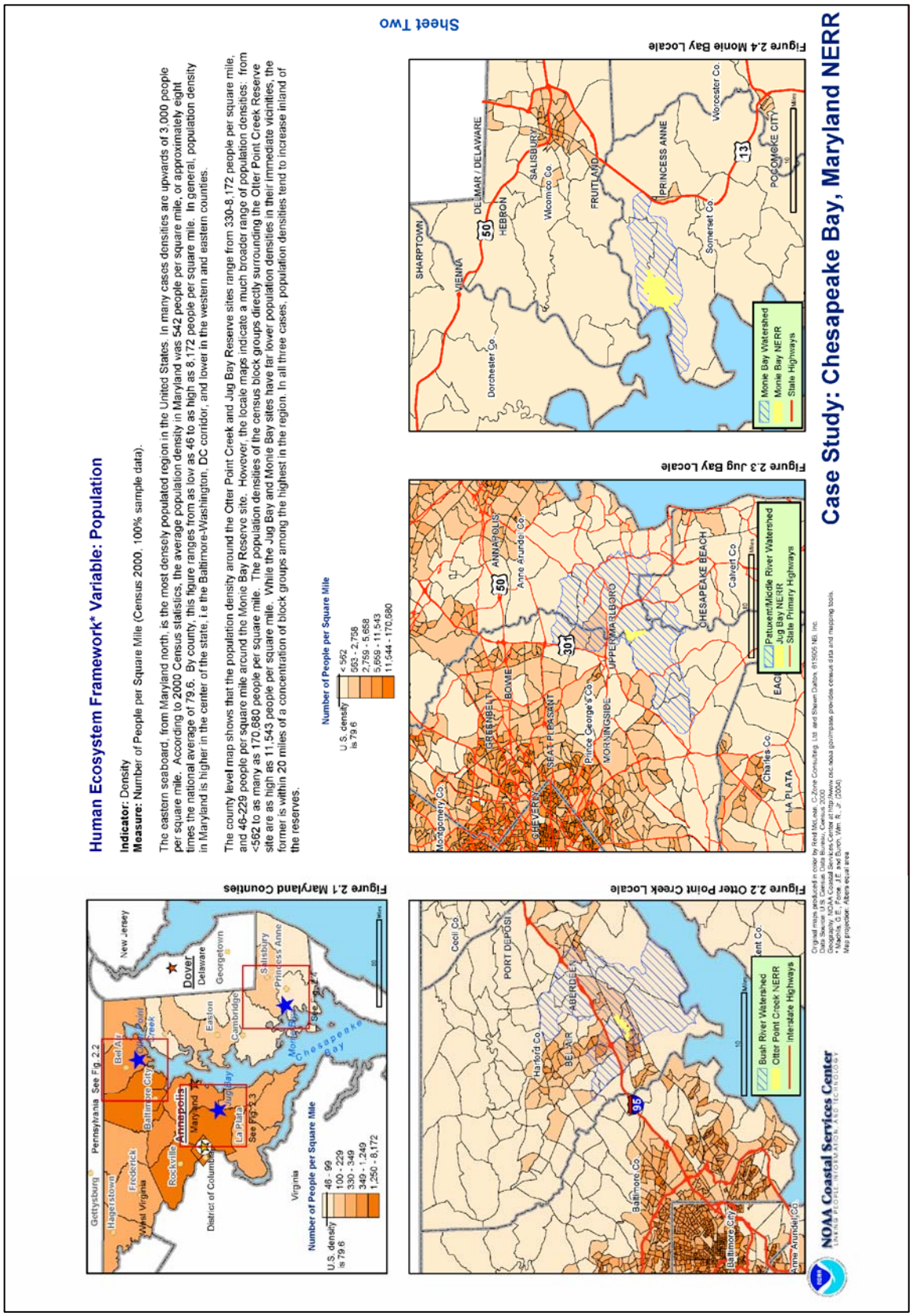
However, because of its variety, it also offers unique opportunities for comparative research in the Chesapeake Bay region. This may be the feature that distinguishes it from the multitude of other organizations studying and working to protect and restore the Bay: because the Reserve is managed by a single, although complex, organizational unit, it can host comparative research into both socioeconomic and biophysical parameters of estuaries through one conduit. This poises this site uniquely to make a significant contribution to urban-rural gradient studies of human-dominated estuarine ecosystems.

F. Maps of Socioeconomic Characteristics: Chesapeake Bay, MD National Estuarine Research Reserve

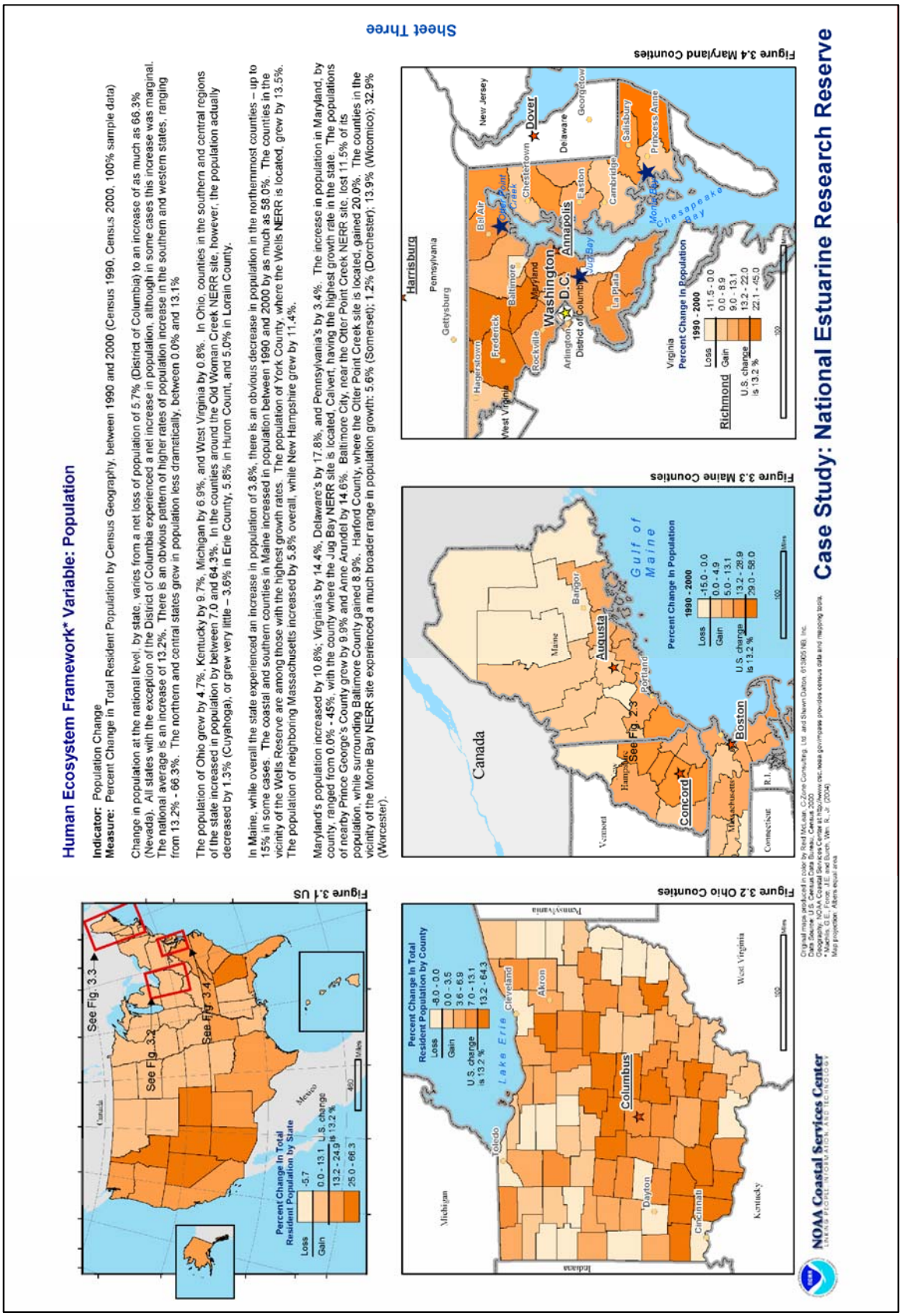
Map 1: Population



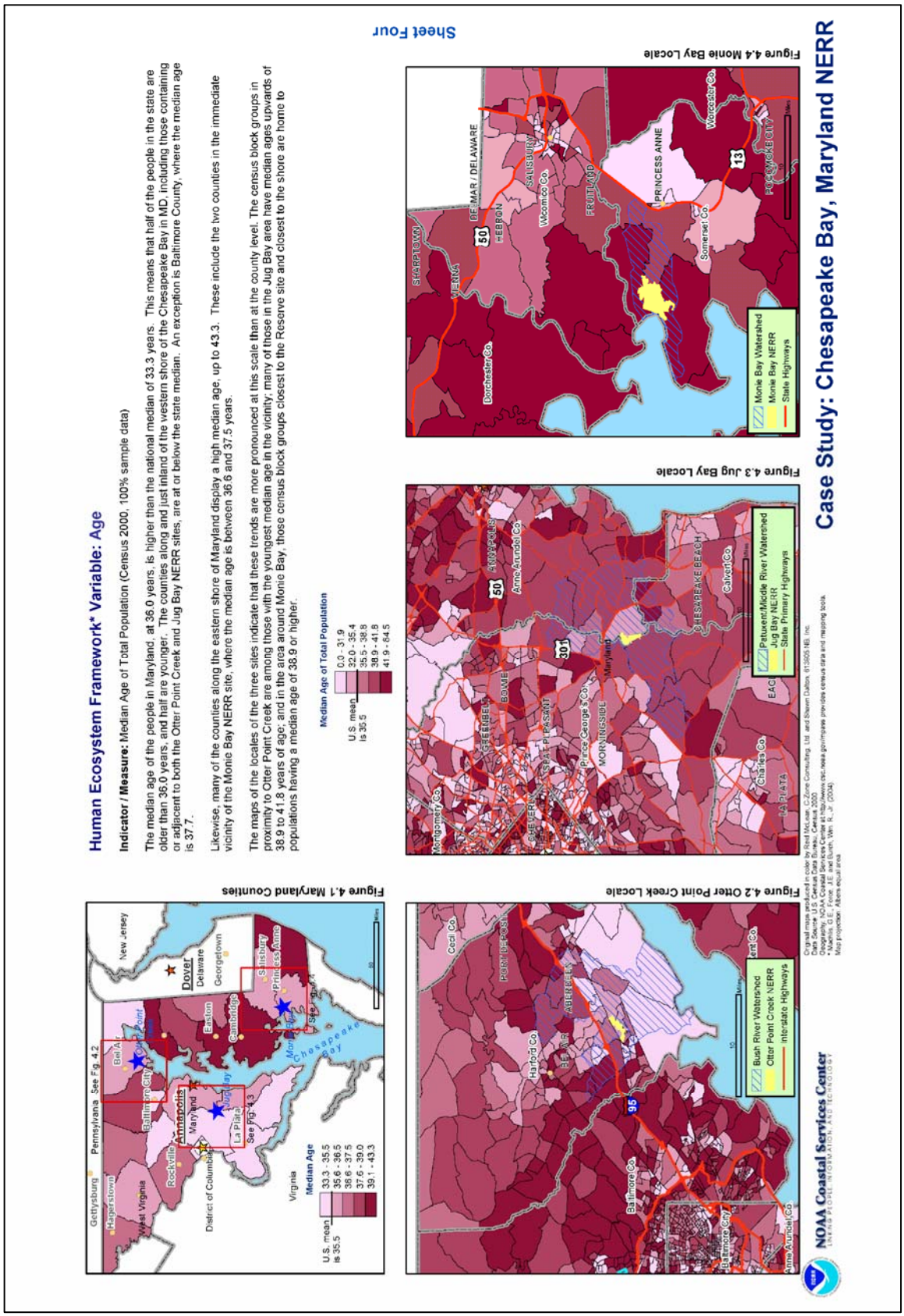
Map 2: Population Density



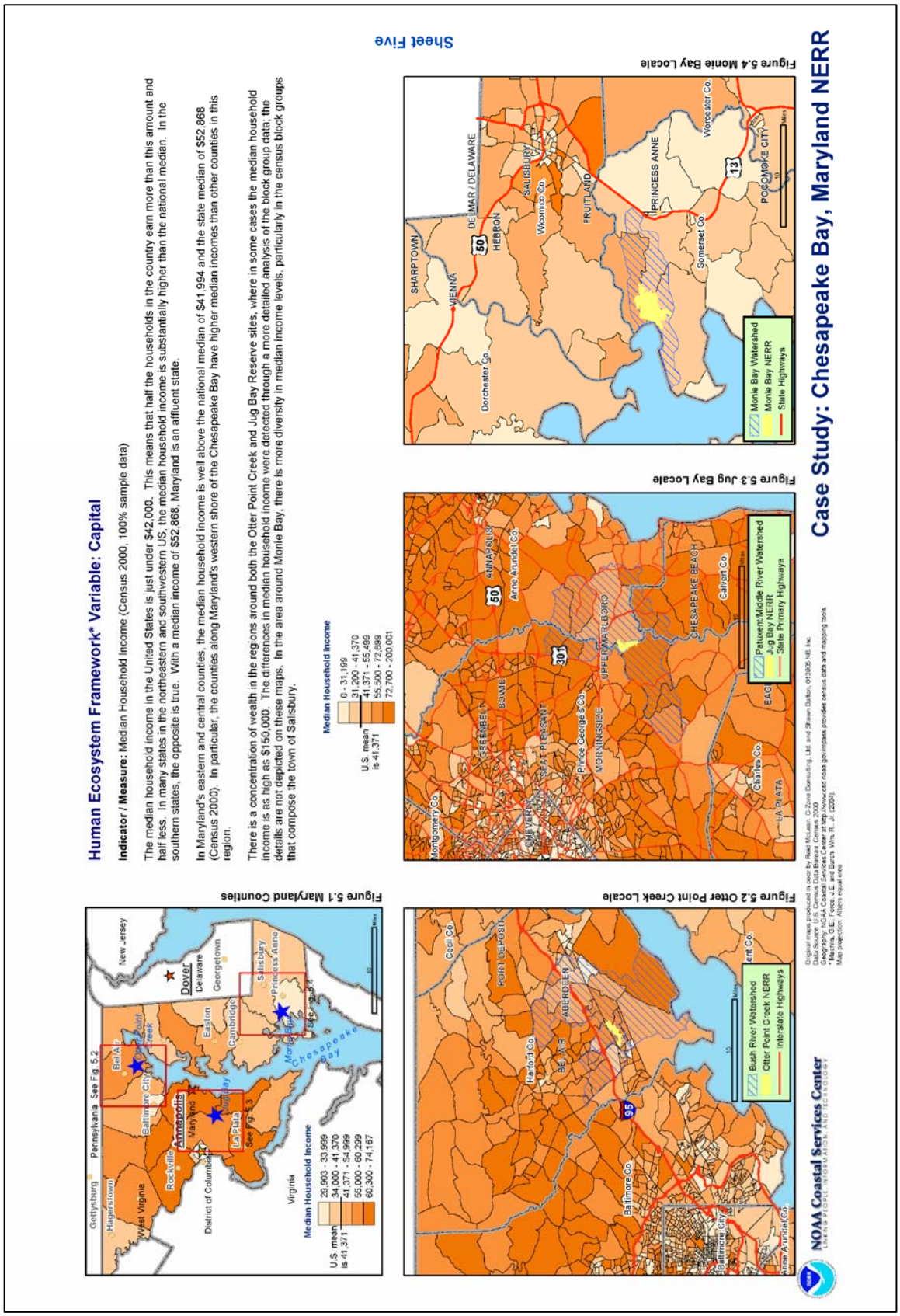
Map 3: Population Change



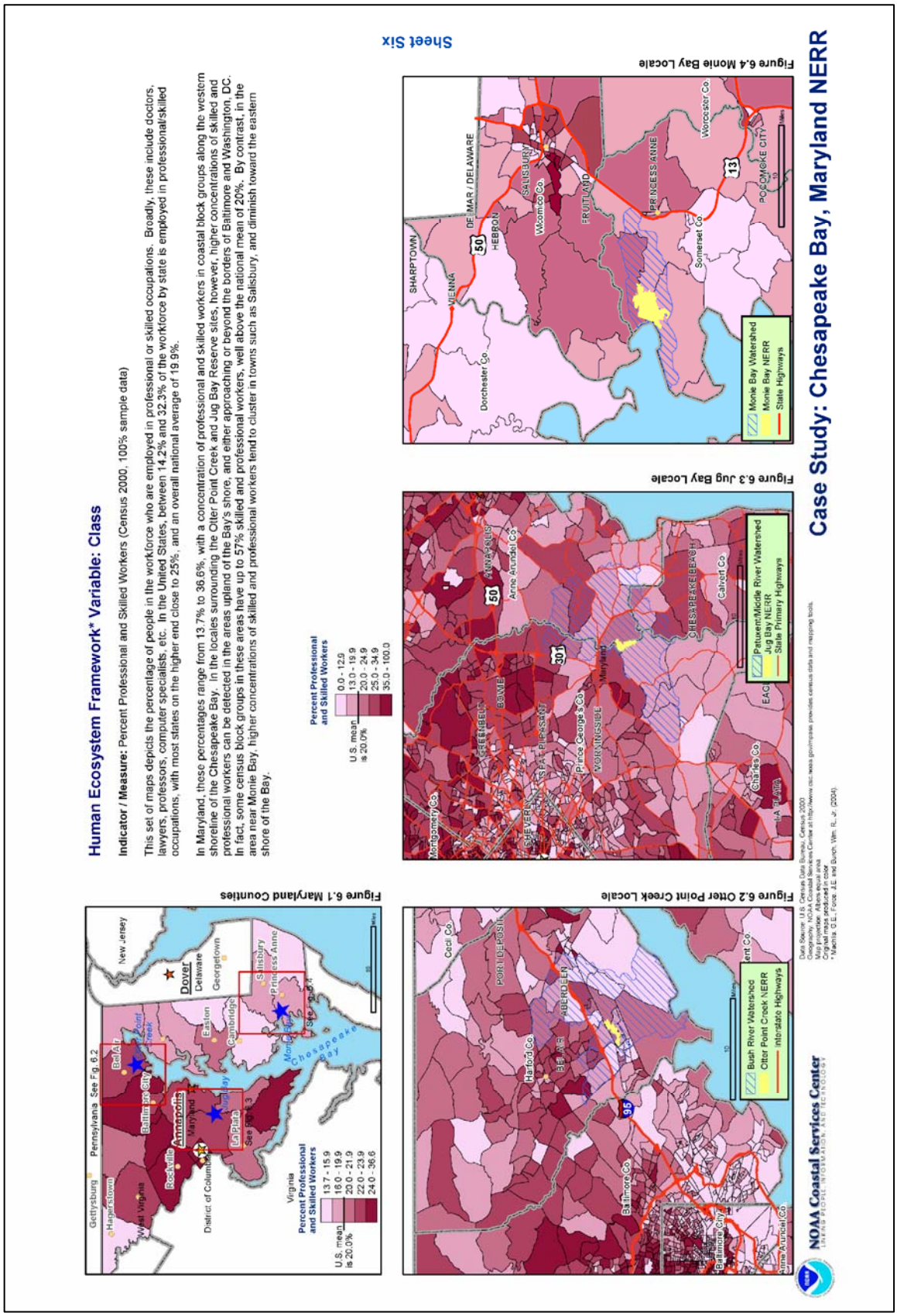
Map 4: Age


Sheet Four
Human Ecosystem Framework* Variable: Age
Indicator / Measure: Median Age of Total Population (Census 2000, 100% sample data)
The median age of the people in Maryland, at 36.0 years, is higher than the national median of 33.3 years. This means that half of the people in the state are older than 36.0 years, and half are younger. The counties along and just inland of the western shore of the Chesapeake Bay in MD, including those containing or adjacent to both the Otter Point Creek and Jug Bay NERR sites, are at or below the state median. An exception is Baltimore County, where the median age is 37.7.
Likewise, many of the counties along the eastern shore of Maryland display a high median age, up to 43.3. These include the two counties in the immediate vicinity of the Monie Bay NERR site, where the median age is between 36.6 and 37.5 years.
The maps of the locales of the three sites indicate that these trends are more pronounced at this scale than at the county level. The census block groups in proximity to Otter Point Creek are among those with the youngest median age in the vicinity; many of those in the Jug Bay area have median ages upwards of 38.9 to 41.8 years of age; and in the area around Monie Bay, those census block groups closest to the Reserve site and closest to the shore are home to populations having a median age of 38.9 or higher.
Median Age of Total Population
0.0 - 31.9
32.0 - 35.4
35.5 - 38.8
38.9 - 41.8
41.9 - 84.5
U.S. mean is 35.5
Figure 4.1 Maryland Counties
Median Age
33.3 - 35.5
35.6 - 36.5
36.6 - 37.5
37.6 - 39.0
39.1 - 43.3
U.S. mean is 35.5
Figure 4.2 Otter Point Creek Locale
Figure 4.3 Jug Bay Locale
Figure 4.4 Monie Bay Locale
Bush River Watershed
Otter Point Creek NERR
Interstate Highways
Patuxent/Middle River Watershed
Jug Bay NERR
State Primary Highways
Monie Bay Watershed
Monie Bay NERR
State Highways
NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY
Case Study: Chesapeake Bay, Maryland NERR

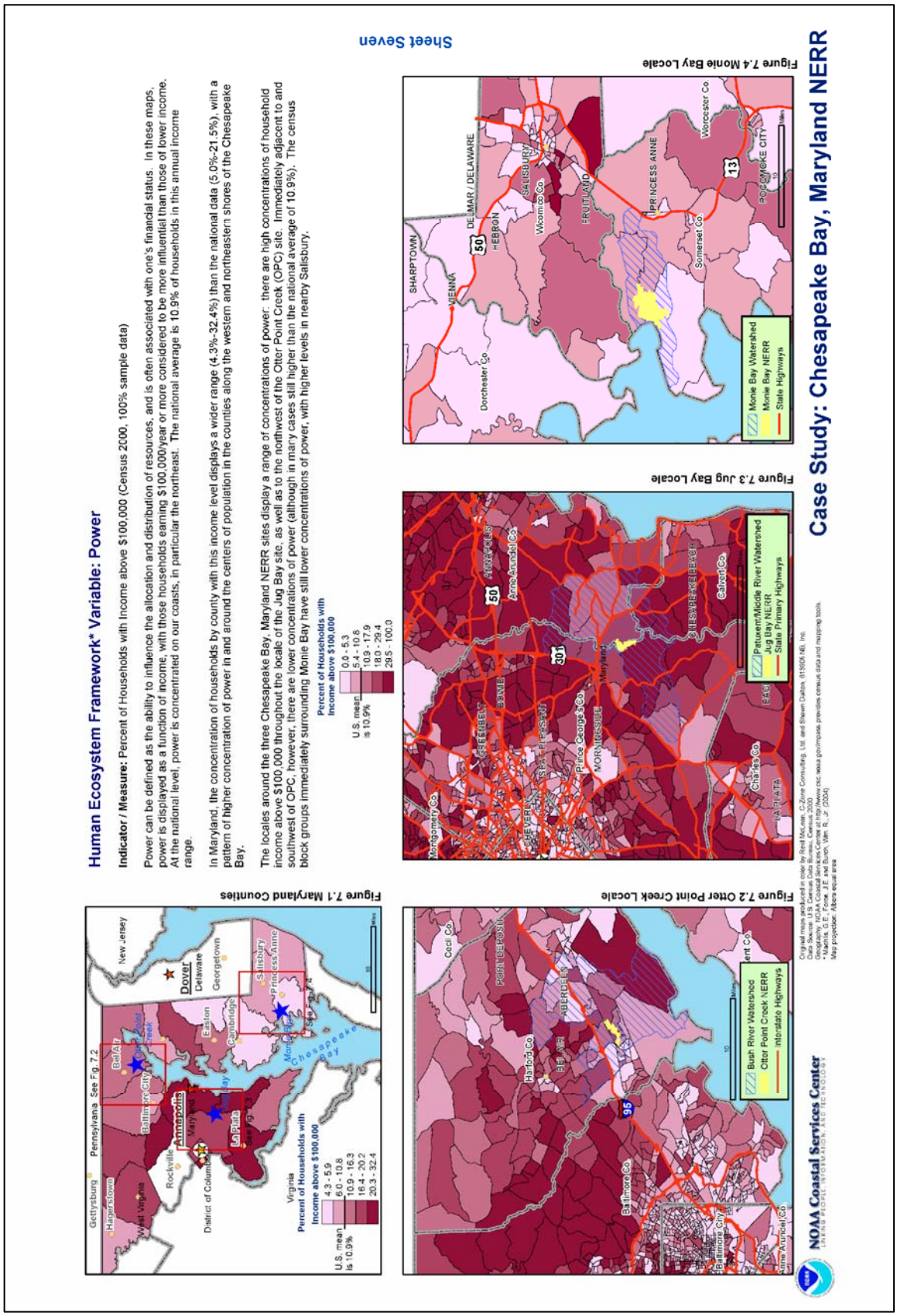
Map 5: Capital



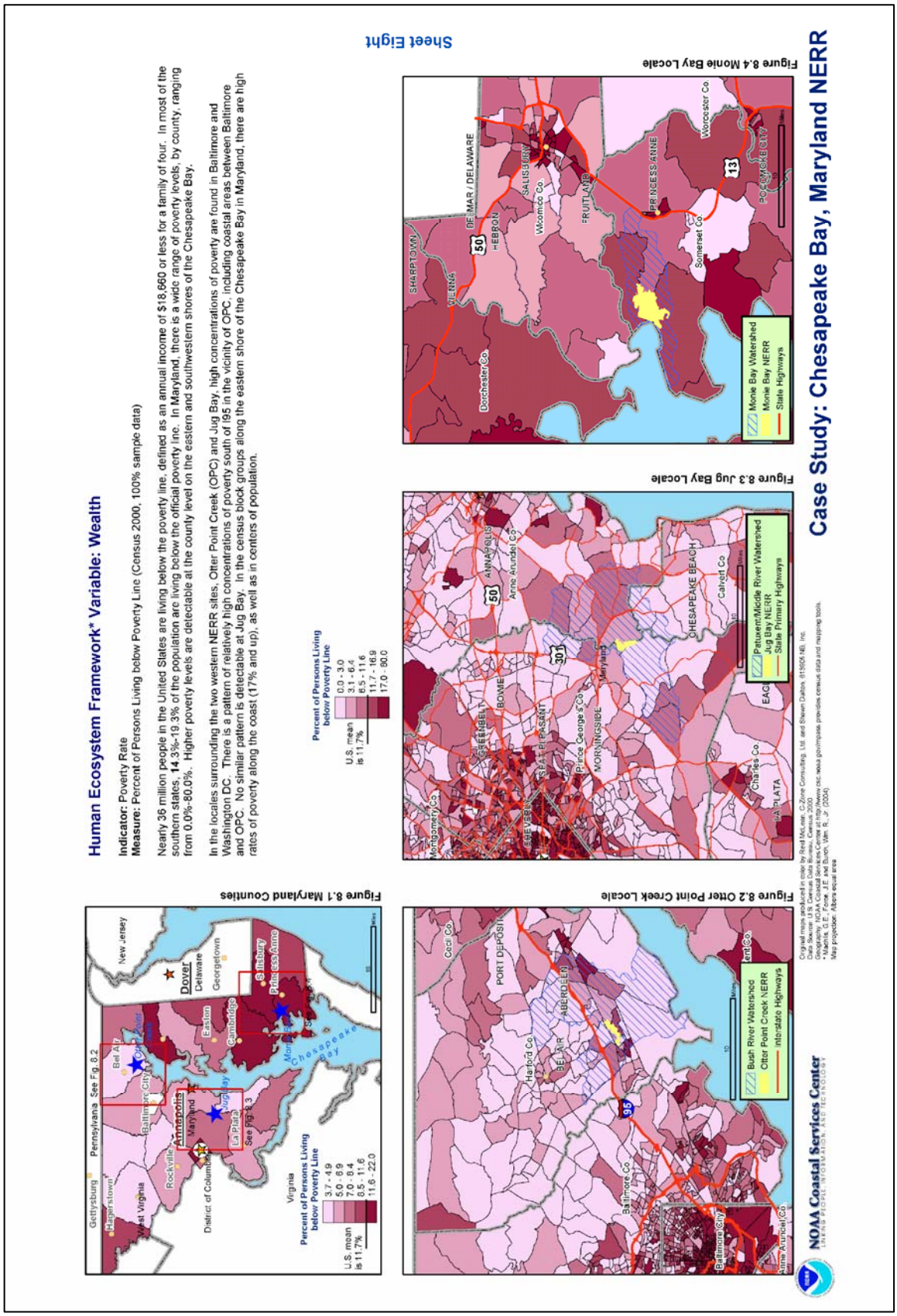
Map 6: Class


Sheet Six
Human Ecosystem Framework* Variable: Class
Indicator / Measure: Percent Professional and Skilled Workers (Census 2000, 100% sample data)
This set of maps depicts the percentage of people in the workforce who are employed in professional or skilled occupations. Broadly, these include doctors, lawyers, professors, computer specialists, etc. In the United States, between 14.2% and 32.3% of the workforce by state is employed in professional/skilled occupations, with most states on the higher end close to 25%, and an overall national average of 19.9%.
In Maryland, these percentages range from 13.7% to 36.6%, with a concentration of professional and skilled workers in coastal block groups along the western shoreline of the Chesapeake Bay. In the locales surrounding the Otter Point Creek and Jug Bay Reserve sites, however, higher concentrations of skilled and professional workers can be detected in the areas upland of the Bay's shore, and either approaching or beyond the borders of Baltimore and Washington, DC. In fact, some census block groups in these areas have up to 57% skilled and professional workers, well above the national mean of 20%. By contrast, in the area near Monie Bay, higher concentrations of skilled and professional workers tend to cluster in towns such as Salisbury, and diminish toward the eastern shore of the Bay.
Percent Professional and Skilled Workers
0.0 - 12.9
13.0 - 19.9
20.0 - 24.9
25.0 - 34.9
35.0 - 100.0
U.S. mean is 20.0%
Figure 6.1 Maryland Counties
Figure 6.2 Otter Point Creek Locale
Figure 6.3 Jug Bay Locale
Figure 6.4 Monie Bay Locale
Case Study: Chesapeake Bay, Maryland NERR
NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

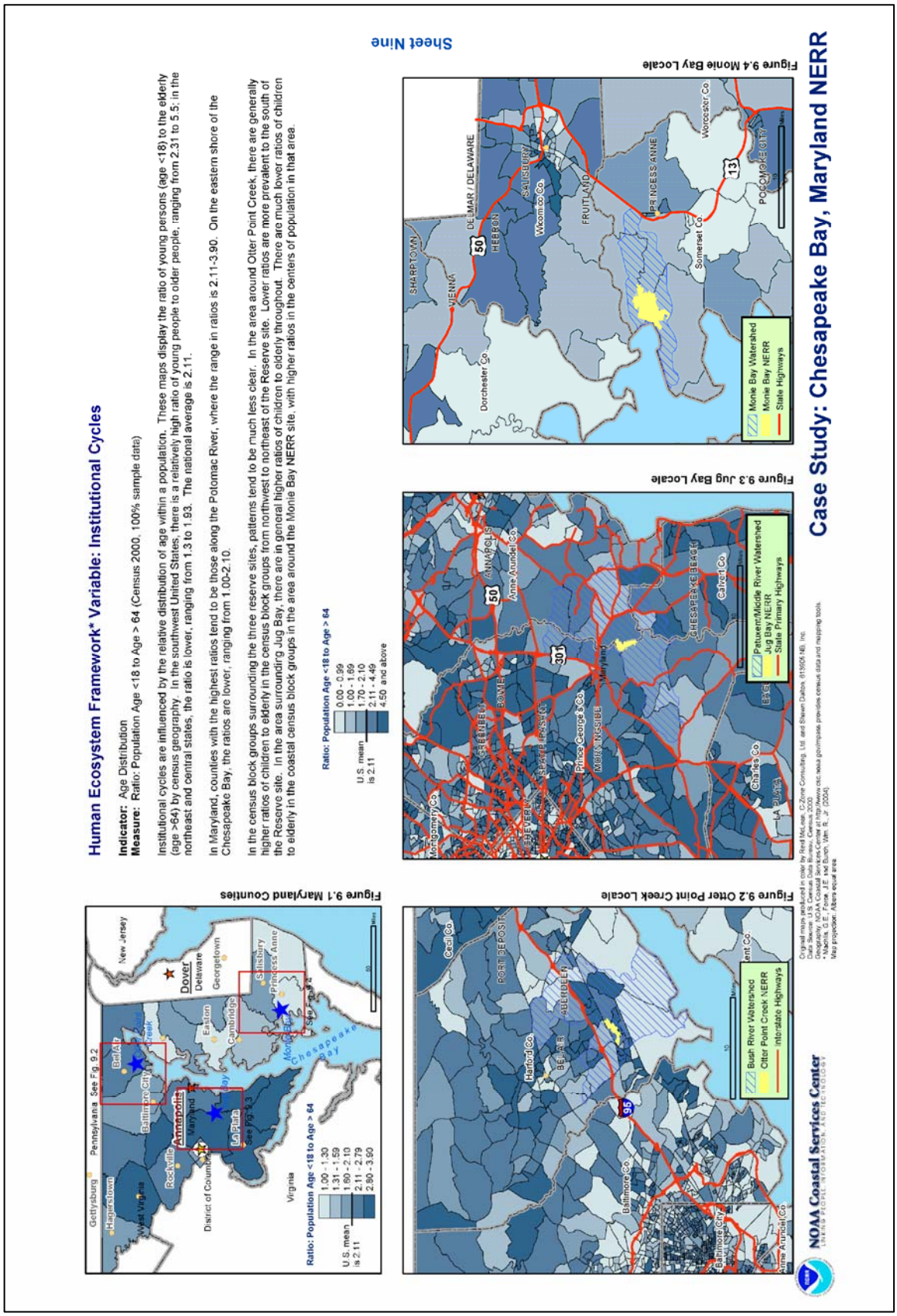
Map 7: Power


Sheet Seven
Human Ecosystem Framework* Variable: Power
Indicator / Measure: Percent of Households with Income above $100,000 (Census 2000, 100% sample data)
Power can be defined as the ability to influence the allocation and distribution of resources, and is often associated with one's financial status. In these maps, power is displayed as a function of income, with those households earning $100,000/year or more considered to be more influential than those of lower income. At the national level, power is concentrated on our coasts, in particular the northeast. The national average is 10.9% of households in this annual income range.
In Maryland, the concentration of households by county with this income level displays a wider range (4.3%-32.4%) than the national data (5.0%-21.5%), with a pattern of higher concentration of power in and around the centers of population in the counties along the western and northeastern shores of the Chesapeake Bay.
The locales around the three Chesapeake Bay, Maryland NERR sites display a range of concentrations of power: there are high concentrations of household income above $100,000 throughout the locale of the Jug Bay site, as well as to the northwest of the Otter Point Creek (OPC) site. Immediately adjacent to and southwest of OPC, however, there are lower concentrations of power (although in mary cases still higher than the national average of 10.9%). The census block groups immediately surrounding Monie Bay have still lower concentrations of power, with higher levels in nearby Salisbury.
Percent of Households with Income above $100,000
0.0 - 5.3
5.4 - 10.6
10.9 - 17.9
18.0 - 29.4
29.5 - 100.0
U.S. mean is 10.9%
Figure 7.1 Maryland Counties
Figure 7.2 Otter Point Creek Locale
Figure 7.3 Jug Bay Locale
Figure 7.4 Monie Bay Locale
Case Study: Chesapeake Bay, Maryland NERR
NOAA Coastal Services Center

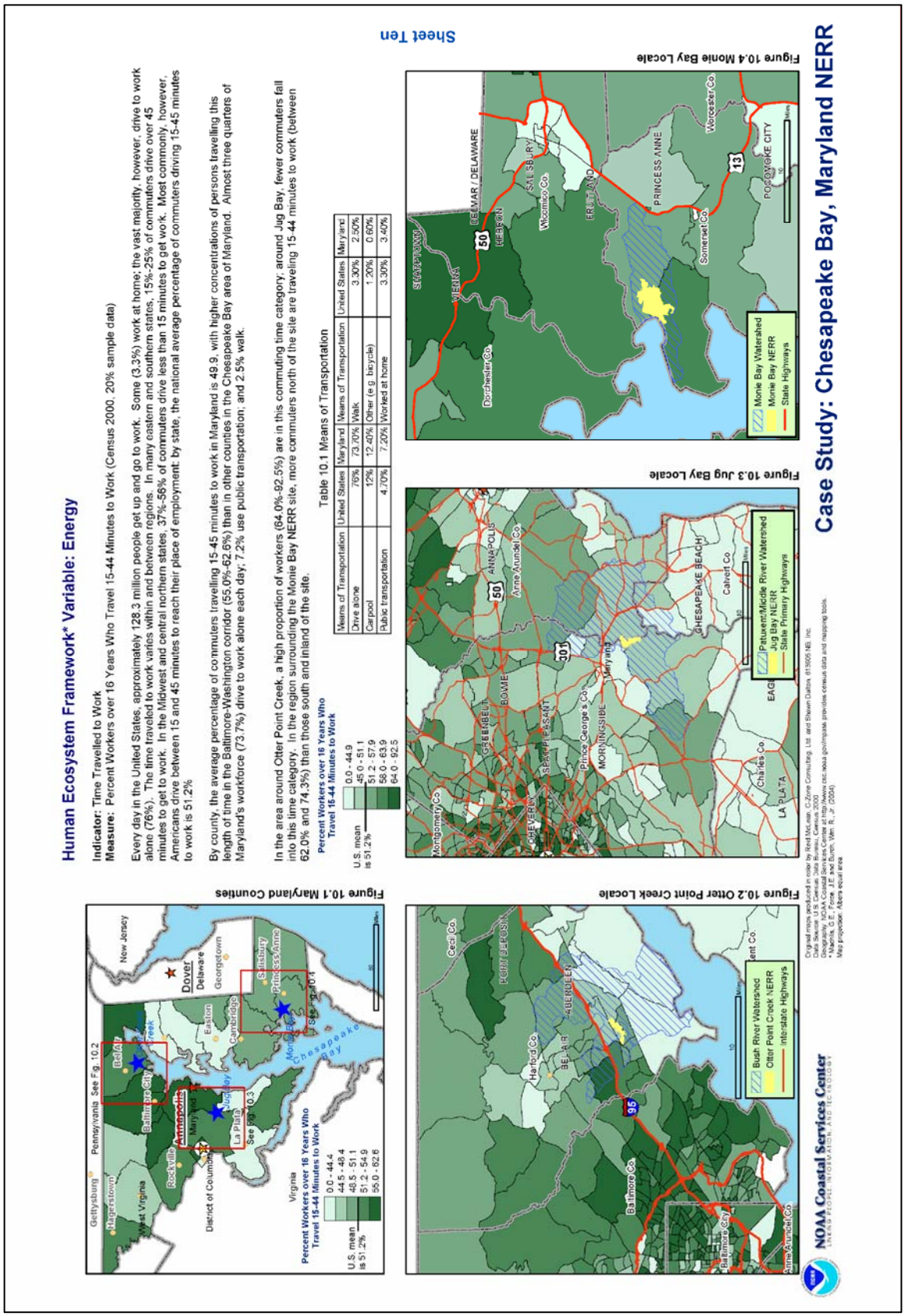
Map 8: Wealth


Sheet Eight
Human Ecosystem Framework* Variable: Wealth
Indicator: Poverty Rate
Measure: Percent of Persons Living below Poverty Line (Census 2000, 100% sample data)
Nearly 36 million people in the United States are living below the poverty line, defined as an annual income of $18,660 or less for a family of four. In most of the southern states, 14.3%-19.3% of the population are living below the official poverty line. In Maryland, there is a wide range of poverty levels, by county, ranging from 0.0%-80.0%. Higher poverty levels are detectable at the county level on the eastern and southwestern shores of the Chesapeake Bay.
In the locales surrounding the two western NERR sites, Otter Point Creek (OPC) and Jug Bay, high concentrations of poverty are found in Baltimore and Washington DC. There is a pattern of relatively high concentrations of poverty south of I95 in the vicinity of OPC, including coastal areas between Baltimore and OPC. No similar pattern is detectable at Jug Bay. In the census block groups along the eastern shore of the Chesapeake Bay in Maryland, there are high rates of poverty along the coast (17% and up), as well as in centers of population.
Percent of Persons Living below Poverty Line
0.0 - 3.0
3.1 - 6.4
6.5 - 11.6
11.7 - 16.9
17.0 - 80.0
U.S. mean is 11.7%
Figure 8.1 Maryland Counties
Figure 8.2 Otter Point Creek Locale
Figure 8.3 Jug Bay Locale
Figure 8.4 Monie Bay Locale
Case Study: Chesapeake Bay, Maryland NERR
NOAA Coastal Services Center

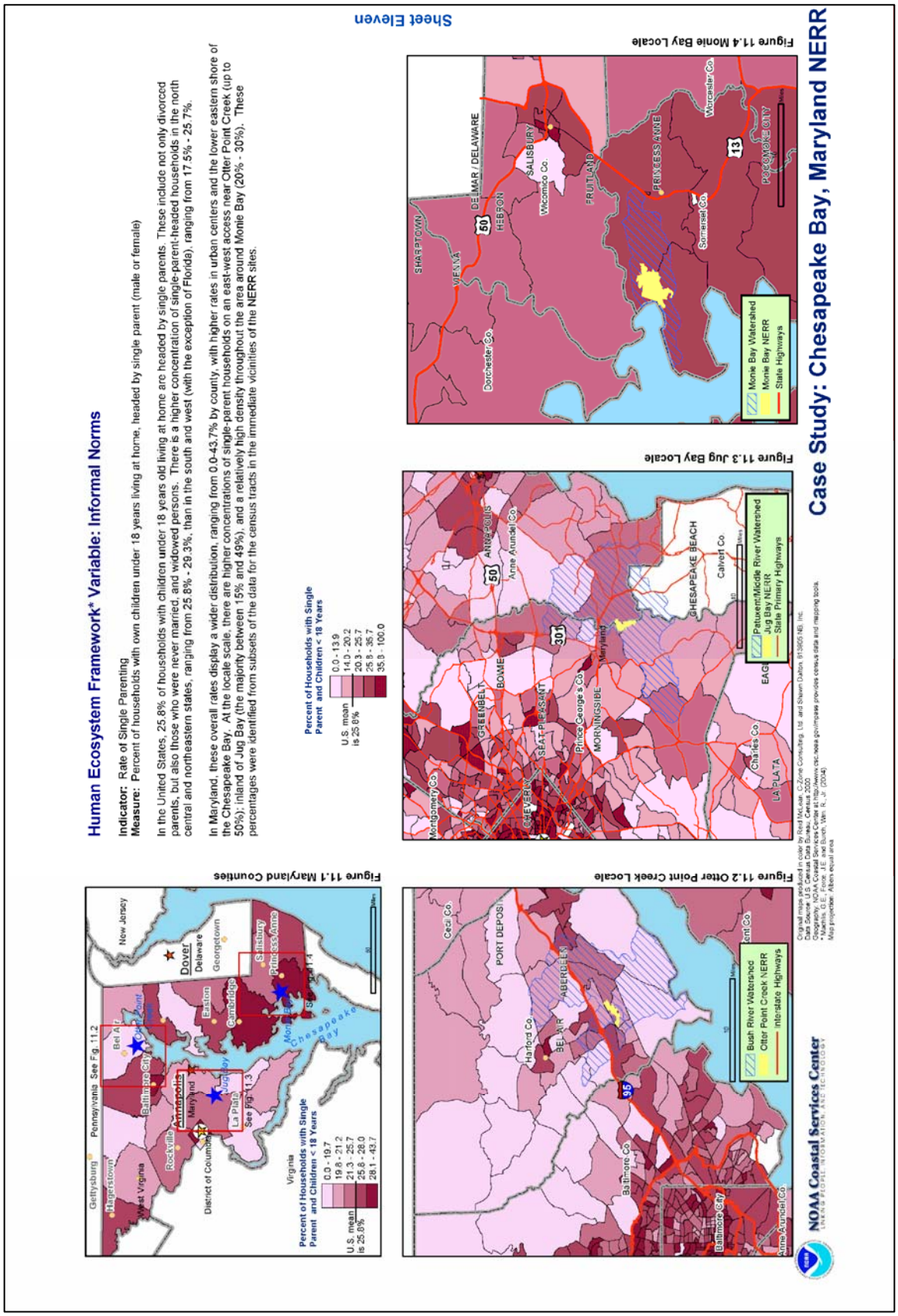
Map 9: Institutional Cycles



Map 10: Energy



Map 11: Informal Norms



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