Social Indicators for the Washington Coast Integrated Ecosystem Assessment

A Report to Washington Department of Natural Resources in fulfillment of Interagency Agreement No. IAA 14-204. Washington Sea Grant WSG-TR 15-07. 159pp.

Contributing authors: Poe, Melissa R.; Watkinson, Melissa K.; Trosin, Bridget; Decker, Kevin

TABLE OF CONTENTS

TABLE OF FIGURES

Executive Summary

This report documents the development and assessment of social indicators of human wellbeing for the four counties of Washington State's Pacific Coast: Clallam, Jefferson, Grays Harbor, and Pacific counties. The social indicators assessment is part of the Washington integrated ecosystem assessment to support the science needs for Washington marine spatial planning.

In socio-ecological systems, social, ecological, and economic indicator assessments can be used to: (a) monitor, anticipate, and mitigate conditions; (b) provide baselines for ecosystem planning and recovery; and (c) identify strategies for adaptation planning and to improve ecological integrity and human wellbeing.

This report summarizes the results of Washington Sea Grant's (WSG) effort to develop a framework of human wellbeing, and to identify and assess social indicators. WSG evaluated ten domains of human wellbeing: basic needs; access to social services; health; education; social connectedness; governance: planning and management; safety; environmental conditions; economic security; and population demographics. We collected, organized, and evaluated secondary data for 59 indicators mapped to the domains of wellbeing. Data was gathered from various public sources. Each indicator was assessed for spatial and temporal comparisons, using GIS and graphed calculations for each coastal county. We conducted trend analyses for changes across the coast, and produced in-depth quantitative assessments for each individual county in the case study for the time period 2000 to 2013. Finally, we conducted and reported on a series of workshops to refine the social indicator model based on local values, using input from community members and stakeholders.

Because of the dynamic nature of the socioeconomic, institutional, and environmental systems in which humans live, their wellbeing can be thriving, maintaining, or declining. Social indicators are tools used to assess and track changes in these system conditions. As a

result, indicators enable the public and decision-makers to measure and monitor changes and outcomes towards meeting goals.

Marine changes (oceanographic, ecological, policy, social and economic) can affect conditions in wellbeing. Indicators make it possible to monitor the effects of changes and conduct regional comparisons as needed. The quantitative, publically-available data used for social indicators in this report make it possible to repeat this assessment of wellbeing in future years, using this study as a baseline.

Chapter 1. Introduction

The purpose of this report is to document the development and assessment of a suite of social indicators for ecosystem-based management to support Washington marine spatial planning (MSP).

The 2010 Washington Marine Waters Planning and Management Act (RCW 43.372) provides the legal mandate and broad guidelines for the state of Washington to manage marine resources in a coordinated effort across government entities, with strong public engagement, and based on best available science. A comprehensive marine management plan requires an ecosystem assessment that analyzes the health and status of Washington marine waters including key *social*, economic, and ecological characteristics and incorporates the best available scientific information through key ecosystem indicators. To meet this charge, Washington Sea Grant (WSG) developed and assessed social indicators of human wellbeing for Washington Pacific Coast counties, presented in this report. The social indicators for Washington coast integrated ecosystem assessment complement and expand the ecosystem indicators identified by NOAA's Northwest Fisheries Science Center in 2013 (Ref: Andrews et al. 2013), which recognized the importance of, but did not include, social indicators.

Human wellbeing

Human wellbeing is "a state of being with others and the environment, which arises where human needs are met, where individuals and communities can act meaningfully to pursue their goals, and where individuals and communities can enjoy a satisfactory quality of life" (Breslow et al. 2014). Wellbeing reflects the socioeconomic conditions of a population. Social, institutional, and environmental systems are dynamic. As a result, human populations (including subpopulations with shared socio-demographic patterns) can be thriving, maintaining, or declining. Indicators are used to assess and track changes in conditions.

Figure 1: Washington Sea Grant Social Indicators Framework

WSG identified 59 social indicators for ten domains of human wellbeing: basic needs; access to social services; health; education; social connectedness; governance: planning and management; safety; environmental conditions; economic security; and population demographics (Figure 1). These indicators of human wellbeing were assessed in four counties of the Washington Coast: Clallam, Jefferson, Grays Harbor, and Pacific County. County-level indicators are compared with Washington State averages for the time period 2000 to 2013, or most recent available data.

Background: *Why indicators*?

Indicators are commonly used tools for measuring a system. Indicators help communicate and identify goals and objectives for ecosystem-based management (EBM) and enable the public and decision-makers to measure and monitor changes and outcomes towards meeting EBM goals. Indicators have been widely used in public planning and medical practice and other professional fields to communicate complex system information in ways that are relatively simple to understand. For example, commonly used and well-understood

indicators of individual human health are blood pressure and body temperature. These simple indicators are used to measure more complicated features of heart function and immune response to infection. Commonly used economic indicators, for another example, include gross domestic production (GDP) and employment rates. In socio-ecological systems, social, ecological, and economic indicator assessments can be used to: (a) monitor, anticipate, and mitigate conditions; (b) provide baselines for ecosystem planning and recovery; and (c) focus attention on areas sensitive to environmental changes and management actions (Levin et al. 2013; Levin et al. 2009).

Social indicators provide information about non-economic human conditions of the ecosystem used in integrated ecosystem assessments (IEA) (see chapter 2 for more information). Social indicators do not supplant other important social science necessary for marine spatial planning (MSP), for example, mapping existing marine uses or identifying social values of marine resources and places (Ban et al. 2013; McLain et al 2013; Poe et al, 2014).

Marine changes (e.g., new uses such as marine renewable energy and development for marine shipping and industries, or climate changes such as rising sea temperatures and increasing storm severity) can affect the status and trends of social conditions for coastal communities. In this light, social indicators provide important information (i.e., "baselines") to help monitor and anticipate the effects of changes to human wellbeing in coastal communities. Social indicators also provide information to help identify factors of socioeconomic vulnerability (e.g., communities that lack access to social services, perform poorly in select health and safety indicators, among other measures) to guide mitigation and adaptation planning (Cutter et al. 2000, 2003). Social indicators can also show disproportionate impacts of marine changes to specific communities (e.g., for impacts to fishing communities, see Colburn and Jepson 2012, Jepson 2007, and Tuler et al 2008; for climate change impacts on indigenous communities, see Donatuto et al 2014 and Morlein and Carothers 2012; and for planning impacts on indigenous communities, see Singleton 2009).

Integrated ecosystem assessments

Integrated ecosystem assessments often follow an iterative and step-wise process that begins by identifying the socio-ecological context, followed by developing indicators, then assessing risks and status of indicators, evaluating management scenarios for potential threats and tradeoffs, and implementing adaptive management (Figure 2, used with permission of Levin et al. 2009, accessed in Samhouri et al. 2014). Several efforts exist to develop indicators for IEAs, laying the groundwork for broad considerations of selecting good, transparent, and acceptable ecosystem measures. Some basic principles of indicators are that they be: theoretically-sound, linkable to management goals and reference points, operationally-simple and easily understood, spatially and temporally comparable, transparent, and drawn from existing rigorous quantitative data collected at regular intervals (Kershner et al 2011). We apply these principles in this study.

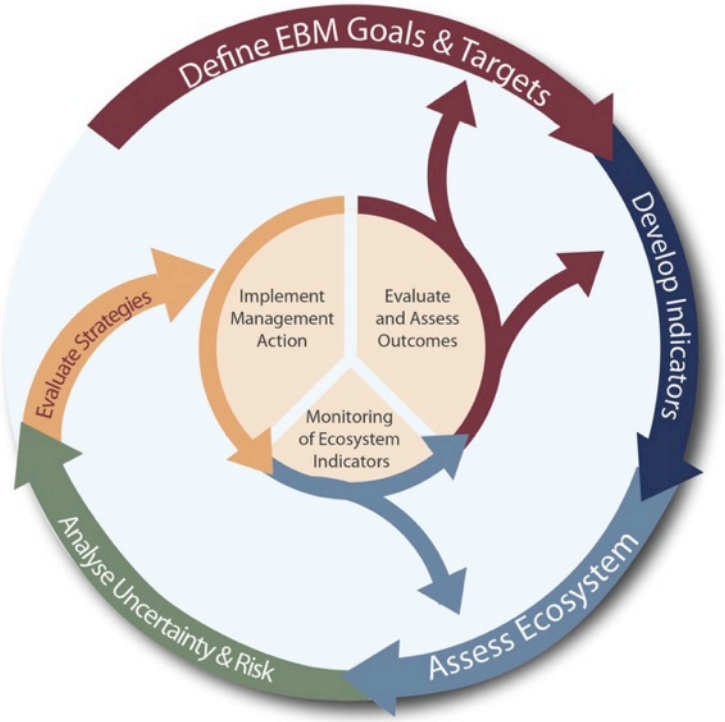


Figure 2: NOAA IEA iterative process

While important progress has been made to define and assess ecological indicators, social indicator development for IEAs have been lagging (Samhouri et al 2014). While this is true for EBM in general, many fields of social science over the years have developed rigorous indicators of human wellbeing that can be used to inform EBM and included as indicators for IEA. There is no shortage of social indicators in general, and a literature review supported by Washington Sea Grant identified in partnership with NOAA's Northwest Fisheries Science Center identified over 3,000 potential indicators for human wellbeing (Breslow et al. 2014), some of which were developed to evaluate human wellbeing in Puget Sound (Biedenweg et al. 2014). However, where the former had not completed its indicator selection to yield an operationally simple number of top indicators for the Washington Coast IEA (work in progress), the later contained many indicators for which no data exists (including subjective measures) and which were tailored specifically for watershed-scale restoration monitoring in Puget Sound contexts. Other existing social indicators for marine management include NOAA's Fishing Community Social Vulnerability studies, with upcoming assessments for the West Coast (being led by Karma Norman, see Breslow et al. 2014 for introduction to the approach). While the approach used in NOAA's community vulnerability indicators is instructive, it focuses exclusively on fisheries-dependent communities and a smaller selection of indicators of vulnerability, and not on general conditions of wellbeing for all coastal populations, which is our focus here.

To address the broader coastal population, including fishing sectors as well as other residents of coastal counties, we turned to a quantitative regional social indicators study for EBM recently developed by National Center for Coastal and Ocean Science (NCCOS) (Dillard et al 2013). The NCCOS framework was applied in the Gulf of Mexico region of the United States (U.S.). We model our Washington social indicators for IEA on the NCCOS approach, described below. The Washington social indicator assessment is unique and complementary to other regional efforts, which use different methodologies and are operationalized at different scales and social contexts.

This report is organized into chapters. Following this introduction, in chapter 2 we describe the methodology and framework used to develop and assess ten domains of human wellbeing. In chapter 3, we assess each indicator and provide brief trend analyses for changes across the coast over the study period. In chapter 4, we describe engagements with local communities to inform the selection and assessment of social indicators based on a series of local values workshops held in 2013, and social indicator workshops held in 2015 with each of the three Pacific Coast Marine Resource Committee. In chapter 5, we provide a summary of the main findings of this assessment and close with potential next steps. Additional details about data sources and comprehensive assessed data for each county are provided in an extended set of appendices.

In the following chapter, we describe how we parameterized, collected, and operationalized measurements for each indicator for the 10 social indicator domains in our study.

Chapter 2: Social indicator methodology

Washington Sea Grant identified social indicators for ten domains of human wellbeing: basic needs, access to social services, health, education, social connectedness, governance, safety, environmental conditions, economic security, and population demographics. We assessed 59 indicators of human wellbeing in four counties of the Washington Coast: Clallam, Jefferson, Grays Harbor, and Pacific County. The purpose of this methodology section is to describe the indicators, how they are measured, and the data used for each domain.

Our selection of domains and indicators is largely based on a previous study of wellbeing by an expert social science working group convened by the National Oceanic and Atmospheric Administration's (NOAA) National Center for Coastal Ocean Science (NCCOS). That study is called *Monitoring Well-being and Changing Environmental Conditions in Coastal Communities: Development of an Assessment Method,* led by Dillard and colleagues (2013). The NCCOS study developed a human wellbeing assessment methodology to examine socioeconomic changes in communities linked to coastal and marine ecosystems. The purpose of the NCCOS project was to conceptualize and develop an approach to monitor coastal communities in relation to ecosystem and management changes that could be tracked comparatively across coastal regions in the U.S. and its Territories. The NCCOS methodology was applied to a longitudinal case study in the Gulf of Mexico region to create a baseline for human wellbeing in coastal environments. The particular call to action in the inaugural Gulf of Mexico case study was to: (a) develop a method for measuring the status of coastal communities in relation to environmental conditions; and (b) establish a baseline to assess the impacts to communities affected by marine changes, in this case: the Deepwater Horizon oil spill and disaster.

The Washington social indicators assessment (present study) is the second known application of the NCCOS approach. The assessed indicators in the Washington study achieve the first goal (a), and position decision-makers and analysts with baseline information in the event of any future impact to coastal communities (b). Washington Sea

Grant authors consulted with the lead NCCOS author, Dr. Maria Dillard during the Washington coast social indicators assessment process. More detailed information about the NCCOS approach can be reviewed in the technical report: http://aquaticcommons.org/14677/.

The elements of our Washington social indicators model are organized in three hierarchical data steps: 1) *domains* of wellbeing, 2) *indicators* for each domain, and 3) *measures* for each indicator (Figure 3). [1]

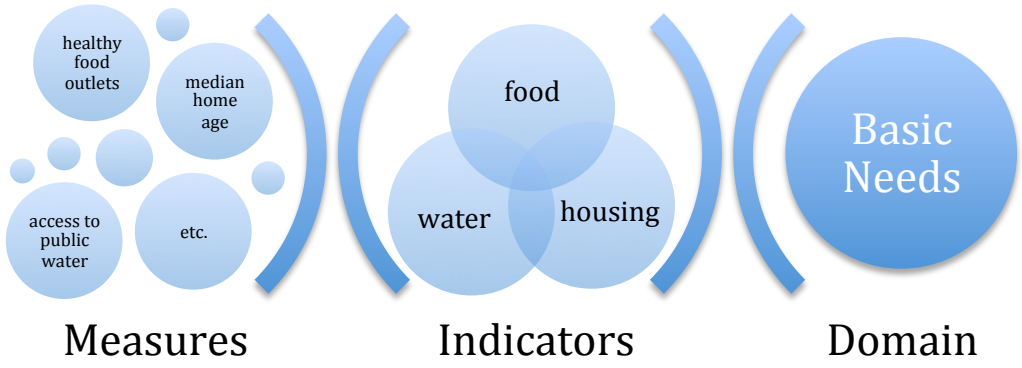


Figure 3: Order of elements in Washington Sea Grant social indicator framework

A *domain* refers one of many categories of human wellbeing. In our model, we identify 10 domains, however, there are other potential categories that also related to human wellbeing, but which are not directly measured here. (e.g. cultural and spiritual values, sense of place, identity). This omission is largely owing to the quantitative and secondary nature of the data required for spatial and longitudinal analyses. We note possible cultural and place-based proxies when applicable. We also describe local values identified in workshops in chapter 4 and link them back to indicators. *Indicators* are the selected

[1] What WSG calls "indicators" are called "components" in the NCCOS model, and "domains" in the WSG model are called "indicators" in NCCOS. In our view, the composite or aggregate groupings of information (what NCCOS calls indicators) are actually indices made up of more discrete proxies for social phenomena.

elements that make up a domain, relevant to the coastal EBM context, and compatible with data criteria. Finally, *measures* are the exact phenomena that are evaluated for a representative indicator (e.g. "median home age" is one measure for the indicator "housing").

The Washington Sea Grant model uses true individual indicator values for select socioeconomic conditions, whereas the NCCOS model uses composites (or indices), which aggregate multiple measures into one unit to help reduce the volume and complexity of data. The need for composites was justified in the Gulf Study in part because it was a regional assessment across multiple states and included dozens of local jurisdictions (parishes or counties). The Washington case study is limited in scope to one state and only 4 jurisdictions (counties), and thus, composites are not needed. While composites can be useful in synthesizing larger volumes of data, they may obscure patterns in the measures for indicators. As well, there remain unresolved challenges in defining adequate weights for each measure when joined in a composite (for example, in the basic needs domain, is *access to food* the same contribution to wellbeing as *age of housing unit*?) Instead, WSG presents each indicator for a stand-alone assessment, which helps for improved understanding of real socioeconomic changes. Some of the NCCOS indicators (e.g. hurricane events) are not applicable to Washington Coast context, and vice-versa. We note new indicators developed for WSG below.

The selection of indicators is based on a theoretically meaningful relationship between what is being measured and an aspect of wellbeing. In the NCCOS model, indicators were initially selected through a Delphi method with experts in various fields of wellbeing. Extended rationale for selection of these specific indictors can be found in Dillard et al. (2013). Here, we provide basic descriptions of each indicator in the WSG model. In cases where we depart from the NCCOS study to reflect unique attributes of the Washington Coast, we provide additional justification.

Quantitative Data

The Washington social indicator assessment uses only existing (secondary) quantitative data that is publicly available to evaluate human wellbeing. In addition to assessing quantitative socioeconomic data (results in chapter 3), we also elicited input from the Washington Coast Marine Advisory Committee (WCMAC) and from coastal residents. The lead researcher on the WSG social indicators study provided a preliminary step-wise approach to developing social indicators to the WCMAC in July 2014. At that meeting, WCMAC members expressed interest in a practical social indicator assessment that focused less on conceptual model development, but provided instead information about social change that could be used as a baseline to track human wellbeing. A decision was made at that point to build from the existing NCCOS model and modify it whenever appropriate to reflect the local Washington context.

Local values and input for Washington coastal counties were considered in two important ways described in greater detail in chapter 4. First, we analyzed documents from a series of workshops on coastal values for marine spatial planning to identity potential indicators to use in our model that are sensitive to local concerns and values. Second, we presented preliminary social indicator assessments (from this study) to each of the Washington coastal Marine Resource Committees (MRC) for feedback, identification of data gaps, and potential explanations of assessed changes. When possible, we made changes to our social indicator model based on the MRC feedback. Some changes were not possible to make owing to lack of data availability or inadequate time and resources to collect and analyze new datasets within the project performance period. We provide summaries and notes from the MRC meetings in Chapter 4 and Appendix F.

A key strength to using secondary quantitative data is that the data already exists (e.g., collected by other agencies such as the U.S. Census Bureau or Washington State Department of Health) and when available, can be more affordable and less time consuming than collecting new data. Another strength is that many of these secondary datasets are collected at regular intervals and across multiple locations, allowing for

longitudinal and spatial analyses. Consistently available and methodologically compatible quantitative data allow for comparative investigations. For example, the use of secondary data collected regularly at many locations allows us to compare the Washington coastal counties in this study with one another and in relation to county averages for the entire state of Washington. It also allows us to conduct trend analyses across the selected time period, 2000-2010 with updates to 2013 when available. Another benefit of using existing quantitative data is that it makes it easier to assess these same social indicators in future years using this study as a baseline. A final strength to note is that widely collected secondary data enable regional comparisons, for example, between Washington and the U.S. Gulf Coast where these indicators were first tested (Dillard et al 2013).

An important shortcoming of quantitative secondary data is that they are often only available at certain resolutions –such as the county-level, state-level, or national-level, and some fine-scale resolutions about community socioeconomic change and vulnerability can be masked by the aggregation of data at coarser scales. For example, in our case study, communities in west and east Jefferson County might perform starkly different from one another in social indicator scores. Scales such as the census tract (i.e., neighborhood) and zip code level can help analyze socioeconomic variations within a single county, where some areas may be more vulnerable or affluent than others. However, comprehensive indicator suites at these smaller spatial resolutions are rarely consistently available. Some of the indicators we assess in this study can be examined at the community level (see Appendix A.)

There exist other methodological approaches to social indicator assessments and these include generating new quantitative and qualitative data through the use of surveys, focus groups, interviews, and other data elicitation and social science techniques (see Boyd and Charles 2009 for community-based indicator development for local fisheries sustainability; Johnson et al., 2015 on qualitative indicators for social resilience in fishing communities; and Buttolph et al., 2006 for an example of multiple method approach to socioeconomic monitoring of Olympic Peninsula communities.) Many social indicators of wellbeing not

included in this report are useful in measuring the subjective wellbeing of individuals and communities that contribute to quality of life (Smith and Clay 2010). Subjective indicators (how community members perceive their own wellbeing and conditions) are important tools for evaluating wellbeing linked to local experiences, but these typically require new data collection and may be difficult to use comparatively across time and location.

Measuring Social Indicators

As mentioned in the introduction, we identified social indicators for ten domains of human wellbeing: *basic needs; access to social services; health; education; social connectedness; governance: planning and management; safety; environmental conditions; economic security;* and *population demographics* (see Figure 1, page 6). We report here the 59 indicators for each domain of wellbeing, the measures associated with each indicator, and the calculations used to derive the measure. For example, the indicator "education attainment" is measured by the proportion of total population over 25 years of age with at least a high school diploma or equivalent. We describe how the data for the indicator was retrieved, including data sources (e.g., U.S. Census Bureau). When applicable, we describe our steps to operationalize comparative data. We also note whether the direction of change for a particular indicator is considered positive or negative for wellbeing. For example, a positive indicators is one for which an increase in the value signifies improvement in human wellbeing. Whereas negative indictors are those for which an increase in the value signifies a decline in human wellbeing. Some indicators are described as neutral, such that the linkage between changes (increase or decline) and wellbeing is neutral or not clear. For example, an increase in the median age of housing units in an area can signify either an increase or a decline in wellbeing, or it may have no bearing at all, depending on the observer. A fully compiled list of indicators and data descriptions, including information about the spatial scales (census tract, county, or state level) and the years for which data is available, is provided in Appendix A.

Basic Needs Domain

The first domain in our social indicators approach is Basic Needs. We start with this domain of human wellbeing as it includes the foundational requirements of life. Quite simply, this domain examines the basic needs of *water, food,* and *shelter* (Figure 4). We use nine indicators for basic needs.

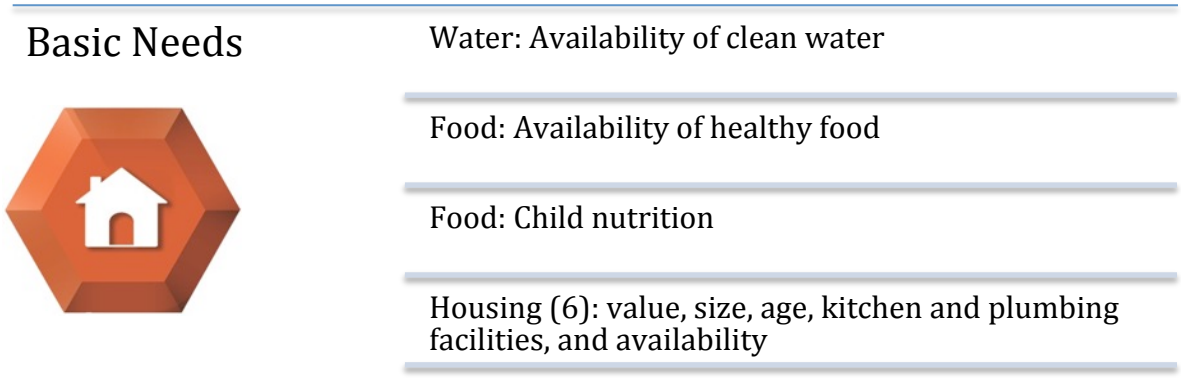


Figure 4: Basic Needs Domain

We use the indicator "*availability of clean water*" for water security, which is measured as the proportion of total population served by public water supply using data from the United States Geological Survey (USGS) National Water Information System. This indicator is calculated as population served by public water supply divided by total population in the county. An increase in the numeric value from one time point to another indicates a positive change for wellbeing; a decrease indicates a negative change. In addition to access to water, a benefit of public water supply is water quality. In many rural counties, people also access water by private and community wells, drawing water from the ground typically without public infrastructure. Data for well water is inconsistently available and not included here. Thus, we do not know how much of the population without access to public water supply, have access to other sources of water for their daily needs. The indicator we use here is currently the best existing measure for availability of clean water, but could be improved with new data on other sources of water, including information on the quality of those sources.

Our first indicator for food, a*vailability of healthy food,* is measured by the number of healthy food outlets per 1000 people. This indicator is a positive indicator, meaning that increases in value translate into improvements in wellbeing. The data for this indicator is derived from the US Census County Business Patterns (hereafter, Census Business Patterns) for Retail Trade (grocery stores and convenience stores). Grocery and convenience stores provide options for food to families, particularly for purchase of produce, dairy, meats, breads and other foods. This indicator was measured using the following calculation: (number of healthy food outlets/total population) multiplied by 1000. Social indicator workshop participants commented that many coastal families procure food through fishing, hunting and gathering wild foods; however, an adequate indicator to measure wild food access for our geographic coverage and timeframe was not found. Other indicators evaluated in our social indicators model are associated with availability and access to wild and locally-procured foods, including: area of public land, beach closures, and industry distribution sector for natural resources.

A second indicator for food is *child nutrition*. Child nutrition is measured as the proportion of enrolled students eligible for free or reduced lunch in the National School Lunch Program (NSLP). This focus is important for many reasons, including because of the disproportionate rates of poverty for children (see Population Demographics domain) and importance of food for human development. We calculate the measure by the number of students eligible for NSLP divided by total schools enrollment. This is a negative indicator of wellbeing, such that increases in eligibility indicates greater need and increased childhood poverty. The data was accessed through the Washington Superintendent of Public Instruction, and is based on federal income guidelines. This is a unique indicator in the Washington Sea Grant model (distinct from NCCOS framework). Child nutrition was added based on feedback provided by a member of the Washington Coast Marine Advisory Committee (WCMAC) in response to a preliminary social indicators model presented by WSG in 2014.

Housing (shelter) is measured by five indicators: housing value, size/rooms in average household, median age of housing unit, capacity of housing facilities (plumbing and kitchens), and availability of units. The information for each of these indicators is derived from US Census. *Housing value* is a measurement of the median dollar value of housing units. *Housing size* is measured as the average rooms per person in average household. *Housing age* is measured as the median years of age of housing units, which is the median year a structure was built at the time point. Capacity of *housing facilities* is the proportion of total housing units without complete plumbing or kitchens. *Housing availability* is the number of housing units available per household, calculated by the total housing units/occupied housing units.

Access to Social Services Domain

The Access to Social Services domain is comprised of five key indicators: human services, nutritional assistance, transportation, medical facilities, and medical care (Figure 5).

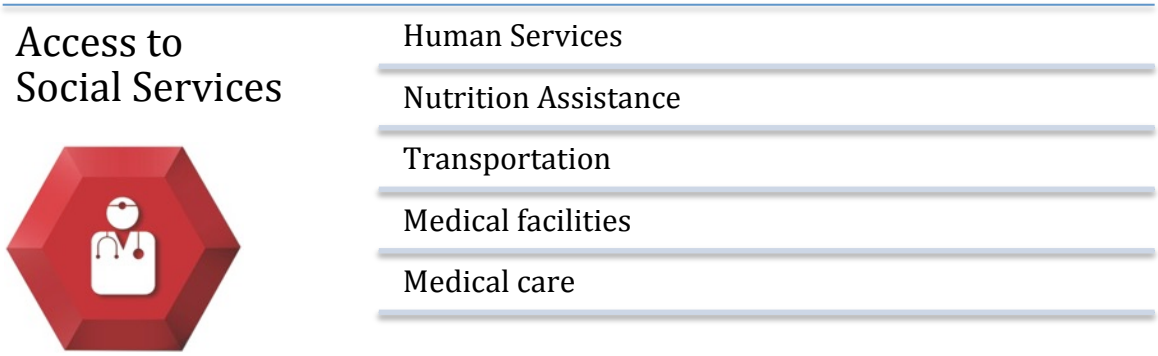


Figure 5: Access to Social Services Domain

Human Services is measured as the number of social assistance establishments per 1000 people. The data for this indicator come from the US Census Business Patterns for Health Care and Social Assistance (social assistance establishments). This indictor is different from the NCCOS model as we used County Business Patterns on "Social Assistance Establishments" that includes child and youth services; services for elderly and disabled

persons; individual and family services; community food services; community housing services; emergency and relief services; vocational rehabilitation services; and child care services. The NCCOS model used charitable organization statistics, which were difficult to access for Washington. The measurement is calculated as (social assistance establishments/total population) multiplied by 1000. This is a positive indicator: as the number increases, human wellbeing is positively affected.

Nutrition Assistance is measured as the proportion of those in poverty participating in the supplemental nutrition assistance program (SNAP) and is derived from the US Census - Small Area Income and Poverty Estimates. SNAP eligibility is based on federal income guidelines, for example, in 2010; a family of four with annual household income at or below $40,793 would be eligible. The measurement is calculated as the number of SNAP recipients/population in poverty. This is positive indicator such that increases in values indicate that more people who need food support are getting it.

Transportation is measured as proportion of households without a vehicle. Vehicles are important for mobility and for populations to be able to reach services and acquire basic needs. The measurement is calculated as the number of households without a vehicle/total number of households.) The data for this indicator come from US Census. This indicator is negative or inverse, such that increases in households without vehicles is negative on wellbeing.

Medical Facilities is measured as the number of hospital beds per 1000 people. Data for this indicator come from the Department of Health and Human Services and is calculated as (Hospital beds/Total population) multiplied by 1000. This is a positive indicator.

Similarly, *Medical Care* is measured as the number of physicians per 1000 people. It is calculated as (Total MD's/Total population) multiplied by 1000, using data from Department of Health and Human Services. It is also a positive indicator for wellbeing, meaning that as values go up, wellbeing is positively affected. Both of these indicators

together can help determine if a population is able to access adequate medical services. Lack of access to medical services can create a burden for wellbeing.

Health Domain

The Health domain is comprised of nine (9) indicators: fertility, life expectancy, mortality (due to cardiovascular, respiratory, cancer, and drug and alcohol related death), behavioral health, and recreational opportunities (facilities, access to public lands) (Figure 6). There are many ways to measure health, and here we focus on a subset of indicators to track key variables in physical and behavioral health.

Health	
	Fertility/Birth rate
	Life expectancy
	Mortality due to: cardiovascular, cancer, respiratory
	Behavioral health: exessive drinking, drugs/alcohol mortality
	Recreational opportunity: facilities, access to public lands

Figure 6: Health Domain

Two basic measures of health are fertility/birth rates and life expectancy. *Fertility* is measured as the number of births per 1000 people ([total births/total population] multiplied by 1000). Data comes from the WA Department of Health. *Life expectancy* is measured as the average lifespan in years for both males and females. Data come from University of Washington Institute for Health Metric and Evaluation. These are both considered positive indicators of health and wellbeing.

A key way to measure trends in population health is to assess the causes of death. We examine three physical health related mortality indicators: cardiovascular, respiratory, cancer. We also examine *drug and alcohol related deaths*, examined as an indicator of

behavioral health in response to questions raised during community MRC workshops about rates of substance use. Occupationally-related deaths –specifically within the fishing sector considered one of the most dangerous occupations– were requested however no adequate data were identified for analysis to include by county or state; some data is available by region (CDC NIOSH)[2].

Cardiovascular mortality is a leading cause of death in the US and is measured as proportion of deaths caused by major cardiovascular diseases per 1000 people. A second leading cause of death is *cancer*, measured as proportion of deaths caused by all cancers per 1000 people. A growing cause of death stems from *respiratory illness* (e.g. asthma, emphysema, bronchitis, etc.). Data for these indicators come from the Center for Disease Control, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER) and are calculated as (mortality due to chronic disease/total population) multiplied by 1000. These indicators are negative values for wellbeing.

Behavioral health is monitored for national and state-level community health metrics, but not many variables are available at the county-level. We include two indicators in the WSG Social Indicators model that were not evaluated by NCCOS in the Gulf Study: *excessive alcohol consumption* and *mortality caused by drug and alcohol consumption*. These two indicators were added in response to input provided at Marine Resource Committee social indicators workshops. For example, at the Pacific County and Grays Harbor MRCs, we learned about local concerns regarding mental health and substance use for residents in these counties.

Excessive alcohol consumption is measured as the percent of adults that report excessive drinking, either chronic high alcohol consumption or binge drinking. Data for this indicator

[2] Occupational risk factors vary by sector and region. For example, the CDC reports that 83 fishing fatalities occurred between 2000-2009 across the entire West Coast, of these 26 were in the crab fishery one the most dangerous sectors. These fatalities were strongly correlated with vessel disaster (crossing a bar, sinking, capsizing, fire), of which 78% were contributed to severe weather events. The second leading cause of fishing fatality during the period was falls overboard, where not a single victim was wearing a PDF (CDC NIOSH; http://www.cdc.gov/niosh/docs/2011-104/pdfs/wc_cfid_summary_ev.pdf).

come from the Center for Disease Control, Behavioral Risk Factor Surveillance System (CDC BRFSS) and provides self-reported data from respondents age 18+ who drank more than two drinks per day on average (for men) or more than one drink per day on average (for women) or who drank 5 or more drinks during a single occasion (for men) or 4 or more drinks (for women) during a single occasion. *Mortality caused by drug and alcohol consumption* is measured as the proportion of deaths caused by alcohol or drug consumption per 1000 people. Data come from CDC WONDER and is calculated the same as the other mortality indicators. Both behavioral health indicators are negative.

Health is also evaluated by the opportunities to engage in physical exercise, or recreational opportunity. Two indicators are identified for recreational opportunities. The first is consistent with the NCCOS framework, which measures *recreational facilities* per 1000 people. The data for this indicator comes from the US Census Business Patterns - Arts, Entertainment, and Recreation (other amusement & recreation industries), and includes: golf courses and country clubs; marinas; fitness and recreational sports centers; bowling centers; all other recreational industries.

Recognizing the importance of informal and family-based outdoor activities in Washington State –such as hiking, fishing, and walking at the beach, digging razor clams–we identified *access to public lands* as a second indicator for recreation opportunities for the WSG social indicators. We calculate access to public lands as the proportion of county area that is covered by public lands (sq. mi). Two data sources provided the ArcGIS data to calculate this value: ArcGIS USA Federal Lands and Washington State Recreation and Conservation. Access to public lands is also an indicator for consideration under the Governance domain. Recreational opportunity indicators are positive for wellbeing.

Education Domain

The Education domain is comprised of three indicators: education expenditures, attainment, and enrollment (Figure 7).

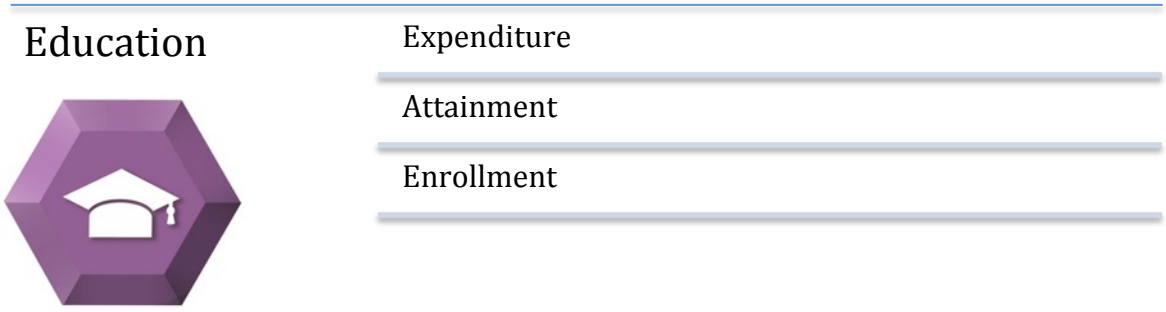


Figure 7: Education Domain

Education expenditure is measured as average education expenditure per student enrolled in public school (K-12). The data for this measure come from US Census National Center for Educational Statistics (Elementary/Secondary Information System) and is calculated by total expenditures in public schools/total students in public schools. It is a positive indicator.

Educational attainment is measured as the proportion of total population over 25 years of age with at least a high school diploma or equivalent. Data for this indicator come from US Census. It is also a positive indicator.

The final indicator for education is *enrollment*, measured as the proportion of total school age (5-17) population enrolled in public school (K-12). The data for this measure come from US Census National Center for Educational Statistics (Elementary/Secondary Information System) and is calculated by total students enrolled/total ages 5-17. It is a positive indicator.

Social Connectedness Domain

The Social Connectedness domain is comprised of five indicators: access to communication, participation in democracy, social gathering places, arts and culture, and tenure in community (Figure 8). Social capital, cohesion and connectedness are linked to greater community resilience in the face of impacts (Dillard et al 2013). These indicators are selected to measure the combined elements of a strong civil society and social connectedness. We omit a sixth potential indicator of social connectedness that was used in the NCCOS model –charitable giving– owing to inability to retrieve data.

Figure 8: Social Connectedness Domain

Access to communication is measured as the proportion of households without telephone service (including cellular service), and is a negative indicator as it impedes the ability to maintain social networks and interactions, as well as receive crucial information during events or crises. The data for this indicator come from US Census.

Participation in democracy is measured as the proportion of registered voters who participated in national/presidential elections. The data for this analysis come from Office of the Secretary of State Elections and Voting. Voter turnout is evidence of participation in democratic processes. Engagement in public decision-making was identified in the 2013 Coastal Values workshops as one important characteristic of Washington coast. National/Presidential election participation is not the only or best measure of this type of

engagement, but it is one of the best available data for this analysis. It is a positive indicator.

Social gathering places is measured as the number of religious organizations per 1000 people. While certainly there are other types of gathering places in coastal counties, churches and religions organizations provide important venues for people to gather, and are associated with high levels of civic engagement (see Dillard et al 2013). The data for this indicator come from the County Business Patterns - Other Services - Religious Organizations. The measure is calculated as (religious organizations/total population) multiplied by 1000. This is a positive indicator.

Arts and culture is measured as the number of arts and humanities organizations per 1000 people. These organizations enhance communication across socially diverse segments of populations and contribute to stronger communities (Dillard et al 2013). The data for Arts and culture organizations come from the US Census Business Patterns - arts, entertainment, recreation, and museums (performing arts, spectator sports, & related industries and museums, historical sites, nature parks and other similar institutions.) It can be considered complementary to the recreation opportunity health indicator. This indicator is calculated as (arts and humanities organizations/total population) multiplied by 1000. It is a positive indicator.

Tenure in community is measured as the median years householder has lived in unit. Length of residence in a community is associated with social cohesion and attachment. This indicator is measured using data from the US Census. The measurement is calculated as total households/2 (middle); (add tenure time spans, find middle year; then add households to determine the median year of grouped variable). It is a positive indicator, such that more years in community/place improves social connectedness and wellbeing.

Governance Domain: Planning and Management Domain

The Governance domain is comprised of three indicators: county planning, county management and emergency planning (Figure 9). A fourth indicator can also be considered applicable to this domain, included in the health/recreation opportunity domain: public lands.

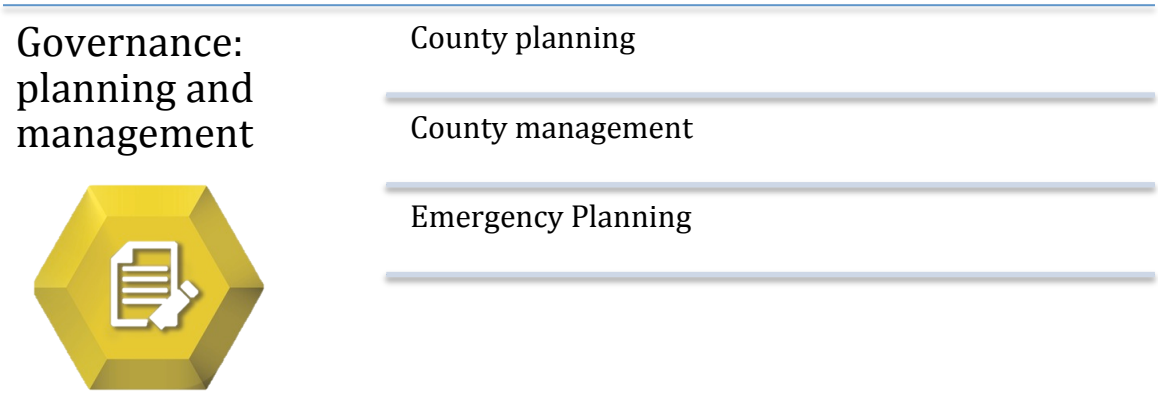


Figure 9: Governance Domain

County planning is measured by the number of years since a county-wide comprehensive plan was adopted. Comprehensive plans indicate proactive planning and provide guidance for how a county will develop in the best interests of its constituents and residents. While the presence of a plan is positive, this indicator is considered negative, meaning that if the number of years since a plan was adopted increases, the county government may miss opportunities to update planning for current conditions. The data for this indicator was collected from each county via their county government website.

County management is measured as FEMA's Community Rating System county score, a rating based that is awarded by FEMA to counties and results in lower flood insurance rates based on hazard mitigation. The score recognizes community floodplain management activities that exceed minimum standards, and is implemented by the FEMA National Flood Insurance Program Community Ranking System. Scores are on a scale of 1 (best/high) to 10 (low), which are awarded to communities for completing specific preparedness tasks

that reduce exposure and vulnerability, increase safety, and minimize loss. The indicator is negative, or inverse, whereby lower scores indicate better outcomes.

Emergency planning is the third indicator in the governance domain. This is an indicator added by the WSG Social Indicators model. It measures the number of Community Emergency Response Team (CERT) programs per 1000 people in a county. CERT programs are citizen-initiated projects. Programs include emergency response planning for emergency and disaster situations. The data come from FEMA Citizen Corps and is a positive indicator.

Safety Domain

The Safety domain is comprised of four indicators: two measuring environmental hazards (severe storms and floods) and two measuring personal safety (property and violent crime) (Figure 10).

Figure 10: Safety Domain

Exposure/Vulnerability to Severe Storms is measured as the number of FEMA funded public assistance projects for declared natural hazard storm events per 1000 people. Data comes from FEMA Public Assistance for two five-year periods (2000-2005; and 2006-2010). This indicator was changed from the NCCOS study (as environmental exposure variables were different in the two regions.) To reach this measure, we calculated the (number of projects per county for each 5 years period/total population) multiplied by 1000. This indicator is

negative because an increase in the number of projects indicates more exposure to hazard events, and thus less safety from severe storms.

Exposure/Vulnerability to Floods is measured as proportion of population (or population density) in the Special Flood Hazard Area (SFHA zone). Data was accessed using the ArcGIS SFHA exposure analysis map base. This indicator is negative. Indicator is negative.

Exposure/Vulnerability to Property Crime is measured as property crime rate (known incidents) per 1000 people. *Exposure/Vulnerability to Violent Crime* is measured as violent crime rate (known incidents) per 1000 people. The data for both of these measures come from the FBI Uniform Crime Report, and is calculated as (total crime incidents/total population) multiplied by 1000. Both of these indicators are negative.

Environmental Conditions Domain

The Environmental conditions domain is comprised of four indicators: air quality, beach water quality, beach closures, and impervious cover (Figure 11).

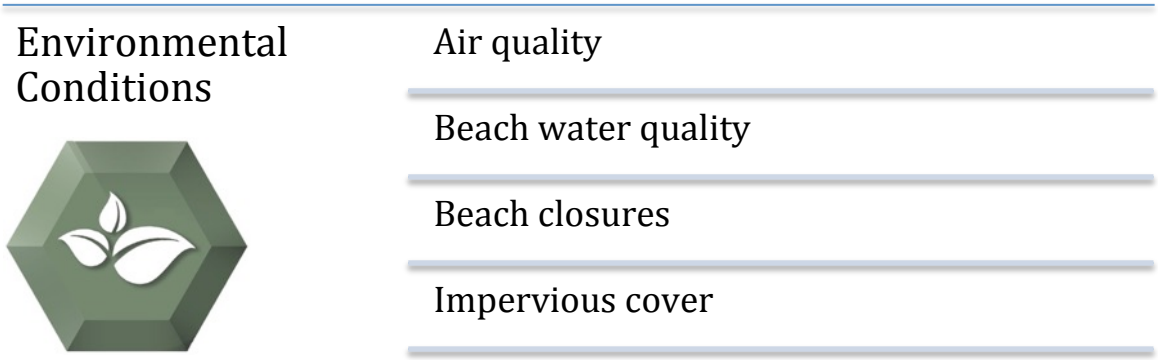


Figure 11: Environmental Conditions

Air quality is measured using a median Air Quality Index (AQI) score (1-200) where a score of 1=best and 200=worst. The data for this indicator come from the EPA Air Quality Index.

This indicator was not used in the NCCOS study where data on particulate matter and ozone were used instead. In the Washington case, we use Air Quality, however, there were no data available for Pacific County. This indicator's values are inversed and it is therefore negative; as the score increases, wellbeing decreases.

Beach water quality is a measurement of Median Water Quality Grade of wet/rainy days. Data come from the Heal the Bay Beach Report Card, a comprehensive analysis of coastline water quality compiled from weekly county health departments' beach water quality samples for three types of indicator bacteria. Heal the Bay compiles the complex shoreline data, analyzes it and assigns an easy-to-understand letter grade. This indicator is uniquely added for Washington recognizing the importance swimming at coastal beaches. Presence of bacteria doesn't automatically close a beach to swimming. We normalized letter grades to values: A=10, B=8, C=6, D=4, F=2. This is a positive indicator: "A" or "10" is best.

Beach closure is measured as the number of reported recreational harvest public beach closures per mile of shoreline. Beach closure data comes from Washington Department of Health, and spatial coastal county data from the Washington Department of Ecology Coastal Atlas. This indicator is uniquely added for Washington recognizing the importance of shellfish harvesting at many coastal beaches. Shellfish harvesting is important for residents of coastal counties, as well as other Washington counties. An estimated 300,000 people harvest shellfish recreationally from Washington beaches (including Puget Sound).[3] The Department of Health closes a recreational shellfish harvest beach when levels of biological toxins from bacteria and viruses, such vibrio and other organisms exceed health limits, and can lead to paralytic (PSP), diarretic (DSP), or amnesiac shellfish poisoning (ASP). Beach closures impact community wellbeing in various ways, not limited to economic impacts to recreational shellfish-oriented business, but also to recreational and subsistence users who harvest for food and traditions. At time of reporting, for example, ocean beaches were closed to harvesting of all shellfish species (including commercially-important crab and razor clam operations) owing to early and widespread levels of the harmful bio-toxin called

[3] http://www.doh.wa.gov/Portals/1/Documents/5500/EH-SF2012.pdf

Domoic Acid. We calculated this indicator by adding up the number of recreational harvest beach closures/miles of shoreline for the time periods in the study, measured using ArcGIS. The indicator is negative. We also created a table of the total number of full and partial closures.

Impervious cover is a common indicator used to assess environmental conditions and is measured as the percentage of total land cover that is developed (square miles). Data for this indicator come from the NOAA Coastal Change Analysis Program. The C-Cap defines an impervious cover as composed of any man-made material that impedes or prevents the natural infiltration of water into the soil mantle (e.g., building roofs, patios, sidewalks, concrete or asphalt streets, parking lots, and gravel roads.) Impervious surfaces reduce the amount of water available to recharge wells and springs; and during storms, impervious surfaces can accumulate harmful pollutants (e.g., oil and fertilizer) that flow into surrounding waters and farther downstream. The indicator is negative.

Economic Security Domain

The Economic Security domain is comprised of ten indicators: income, poverty rates, income inequality, unemployment, employment diversity and industry distribution, gross domestic product, and government expenditures and revenues (Figure 12).

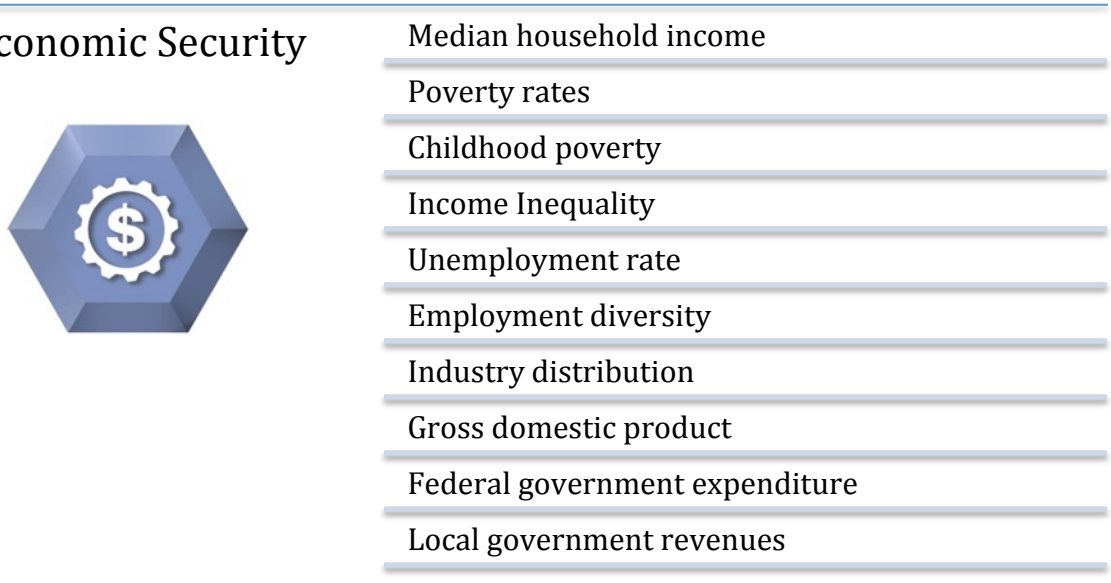


Figure 12: Economic Security Domain

Median household income is measured as the median income earned annually by households using data from the US Census. This is a positive indicator.

Poverty rate is a county poverty estimate of households below the federal poverty rate. Data for this indicator come from the US Census Bureau. WSG added this indicator, distinct from the NCCOS model. This is a negative indicator.

Childhood poverty is measured as the percent of people under 18 years of age in poverty using data from the US Census. This is a negative indicator.

Income Inequality is measured using the Gini coefficient. Numbers closer to 1 indicate the greatest inequality, and 0 indicates that wealth (measured as income) is equal between everyone. The Gini coefficient is the ratio of the area between a line of equality (45 degree line) and the Lorenz curve divided by the total area under the line of equality. The Lorenz curve is a graphical representation of wealth distribution. Data for this indicator come from the US Census Bureau and was added in the WSG model. This is a negative indicator, such that higher income inequality is negative for human wellbeing.

Unemployment rate is measured as the percent of the civilian labor force that is unemployed. Data for this measure come from Bureau of Labor Statistics, Local Area Unemployment Statistics. This is a negative indicator.

Employment diversity indicator measures economic diversity of employment (using the Ogive index, which is a simple measure of the distribution of employment across industry sectors). The more equally a region's economic activity is distributed among its sectors, the greater the diversity. An Ogive index of zero means perfect diversity. A more unequal distribution of sectorial activity will result in a higher value of the Ogive index. Data for this indicator come from the National Ocean Economics Program. This is a positive indicator. It can be viewed in combination with Industry distribution to analyze which sectors contribute most employment in each county.

Industry distribution is a measure of the distribution of jobs across sectors in the county. This allows assessment of which industries play the biggest role in a county, and how these change over time. This indicator is particularly useful for identifying sectors that counties are most engaged in, and which might be most sensitive to changes. Some sectors may be more sensitive to environmental and management changes that others. WSG added this indicator to the wellbeing model. Data for this indicator come from the Bureau of Labor Statistics, retrieved through the National Ocean Economics Program. The calculation for this indicator is created by dividing the number of jobs in each sector by the total number of jobs.

Gross domestic product (GDP) measures the monetary value of all finished goods and services produced for all industries (year 2000 and 2010 value) in the county. Data for this indicator come from the National Ocean Economics Program. This is a positive indicator.

Federal government expenditure is a measure of federal government expenditure per 1000 people. Data for this indicator come from US Census - Censtats, USA Counties Data, Federal Government. This data was gathered from the Consolidated Federal Funds Reports on Federal expenditures and obligations for grants, salaries and wages, procurements, direct payments, direct loans, guaranteed loans, and insurance obtained from Federal Government agencies. The underlying data are no longer available due to the termination of the Federal Financial Statistics program. Data is only available through 2010. This is a positive indicator.

Local government revenues is a measure of local government revenues per 1000 people. Data for this indicator come from WA Office of Financial Management. This is a positive indicator.

Population Demographics Domain

We selected seven basic demographic indicators useful for analyzing changes in social conditions in a county: population, age, gender, race/ethnicity, language, disability, and

veteran status (Figure 13). The entire demographics domain was added for the Washington social indicators project; while demographic analyses are common to socioeconomic monitoring, the NCCOS model did not have a domain or set of indicators for this content.

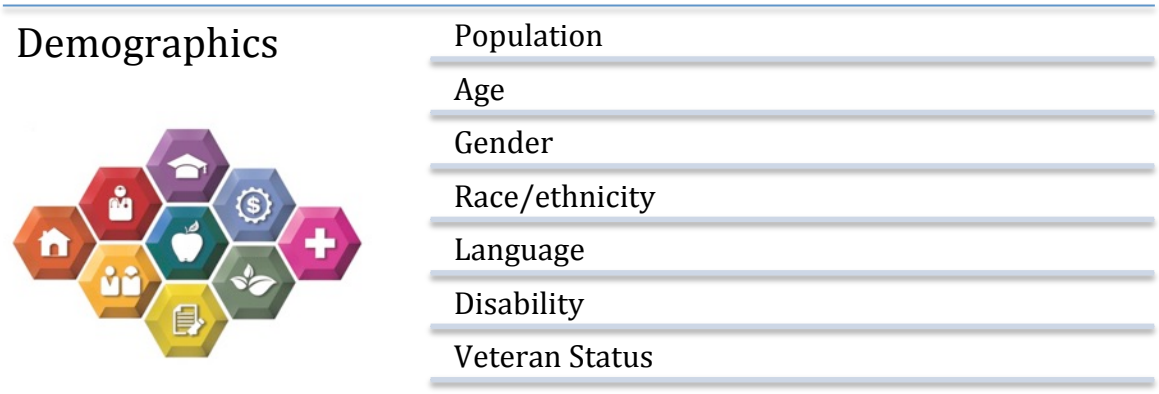


Figure 13: Demographics Domain

The indicators for basic demographic descriptors are standard measures. These are all data that come from US Census Bureaus and American Community Survey estimates. We provide total population numbers, distribution of population by age, race, gender, and language spoken. We also describe the percent of the population with disability and veteran status. We do not do any calculations on these descriptive data. All descriptive demographic details are included with in-depth county tabulated details in appendices B, C, D, and E. In the coast-wide conditions comparison, we assess two indicators: population change and age distribution.

Population change is a measure of the percentage change (increase or decrease) of population in a county. We provide actual population numbers and chart changes over the time period.

Age distribution (or age composition) is a measure of the distribution of age groups in each county. Distributions across age classes and changes of over time can indicate whether or not working age individuals are staying in the community, and whether or not seniors

might be staying in or leaving the county. Age composition is also influenced by fertility rates and migration patterns in a county.

In summary, we identified and assessed indicators for 10 domains of wellbeing. There are 59 indicators that we evaluated for each of the four coastal counties (Clallam, Jefferson, Grays Harbor, and Pacific) from 2000-2013.

BASIC NEEDS
Clean water
Healthy food (2 indicators)
Housing (6 indicators)

ACCESS TO SOCIAL SERVICES
Human Services
Nutrition Assistance
Transportation
Medical facilities
Medical care

HEALTH
Fertility/Birth rate
Life expectancy
Mortality (3 indicators)
Behavioral health (2 indicators)
Recreational opportunity (2 indicators)

EDUCATION
Expenditure
Attainment
Enrollment

SOCIAL CONNECTEDNESS
Participation in democracy
Access to communication
Social gathering places
Arts and culture
Tenure in community

GOVERNANCE: Management & Planning
County planning
County management
Emergency Planning

SAFETY
Exposure/vulnerability to severe storms
Exposure/vulnerability to floods
Exposure/vulnerability to property crime
Exposure/vulnerability to violent crime

ENVIRONMENTAL CONDITIONS
Air quality
Beach water quality
Beach closures
Impervious cover

ECONOMIC SECURITY
Median household income
Poverty rates
Childhood poverty
Income Inequality
Unemployment rate
Employment diversity
Industry distribution
Gross domestic product
Federal government expenditure
Local government revenues

DEMOGRAPHICS
Population
Age
Gender
Race/ethnicity
Language
Disability
Veteran Status

Chapter 3. Results: coast-wide conditions compared by domain

In this section, we assess the social indicators for the four Washington coastal counties in our case study. We analyze socioeconomic changes from 2000-2013, or the most recent year for which data is available. We provide comparative graphs and GIS maps for spatial and longitudinal county comparisons of each indicator in our 10 domains of human wellbeing. We provide initial trend analysis of coastal county social conditions. Full-tabulated datasets are provided for each county and indicator in Appendices B, C, D, and E.

These assessed indicators are useful for tracking changes in socio-economic conditions by county, across time, and relative to other coastal counties and averages for the state of Washington. Indicators assessed here provide a baseline for the socioeconomic conditions in each coastal county since 2000. These baselines can be used in integrated ecosystem assessments in subsequent years. Some indicators can be early warning signs and point towards vulnerabilities in communities (e.g. child poverty and increased storm events in all counties, as well as poor air quality in Jefferson and Grays Harbor counties, among other coast-wide declines in wellbeing). Other indicators can show where public programs (e.g. investments in education) are showing positive wellbeing results (e.g. education attainment). These assessed indicators can also be used to help identify and prioritize programs for addressing social conditions. Additional analyses, such as correlations between indicators, more refined spatial scales (e.g. census tract and zip code), and specific socio-demographic analyses (e.g. proportional changes effecting specific populations, compared by race, age, income, community location, etc.), can provide more information about the relationships between indicators and observed changes.

Below, we present coast-wide conditions for each domain. Comments and feedback by local communities on these indicators was provided in a series of workshops held in each county in Spring 2015, described in Chapter 4.

Basic Needs

Water

The availability of clean water did not changed significantly during the study period for any of the four coastal counties and this is consistent with the relative stability of clean water access for Washington counties on overage, where approximately 85% of the state population is served by public water supply (Figure 14). We note, however, that two counties (Clallam and Grays Harbor) experienced slight declines during the study period, and these two counties along with Jefferson County have a slightly lower percentage of population with public water supply than Pacific County, which is on par with the Washington average (Figure 15). In other words, 85 out of every 100 homes in Pacific County are supplied with clean public water, whereas 75-79 homes in the other three coastal counties have access to public water. Workshop participants noted that changes in rural migration, and thus more population using well water, might explain declines in access to public water supply.

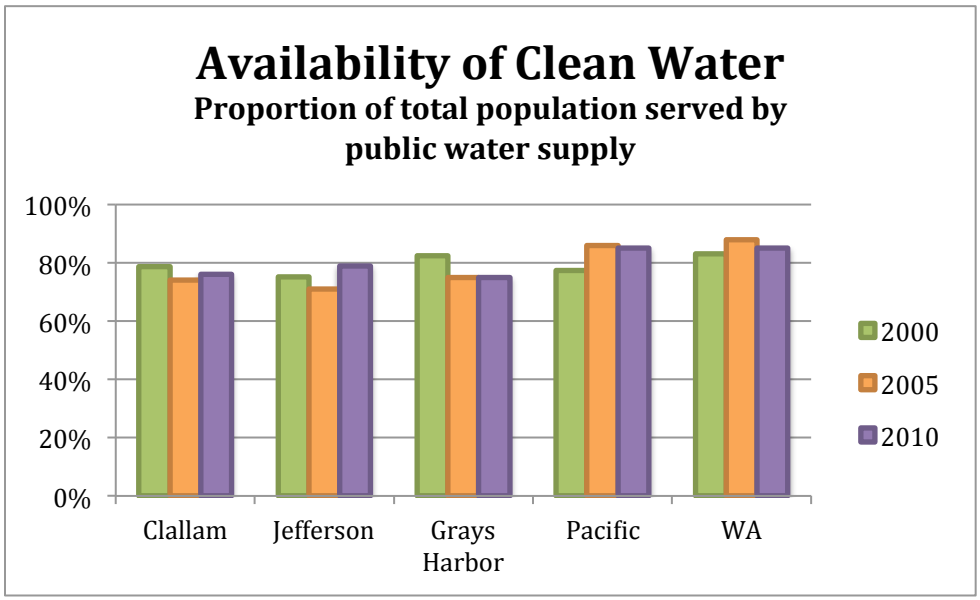


Figure 14: Availability of Public Water Supply

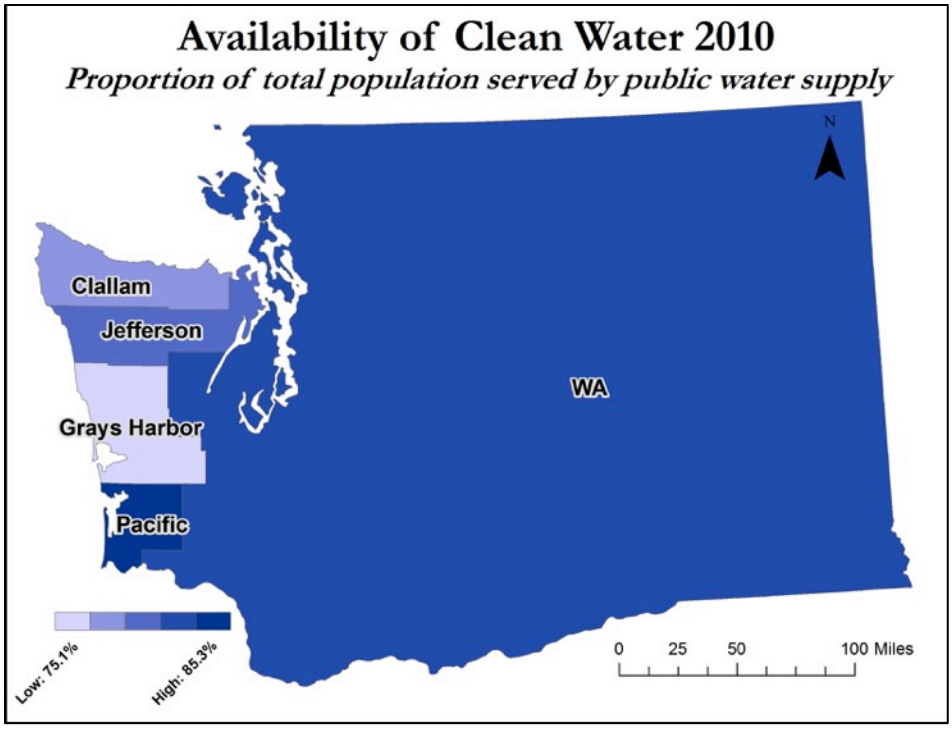


Figure 15: Geographic comparison of availability clean water

Food

The availability of healthy food outlets varies across the Washington coast (from 10 outlets in Jefferson to 48 in Grays Harbor), but is better than the average for Washington State (Fig. 16). Pacific and Grays Harbor counties, in particular, have better access to healthy food than the other counties (Fig. 17). Nonetheless, all counties, with the exception of Grays Harbor experienced declines during the study period. This indicates the likelihood of closures or downsizing of market places (including "corner stores" and mini-marts) that sold healthy fresh food such as produce, dairy, breads and meats. Indicator workshop participants discussed the importance of subsistence foods (e.g. fish, game, produce procured by families outside of markets) to coastal counties that would not be included in these data, but which are healthy foods available to people and common practices of many coastal WA residents.

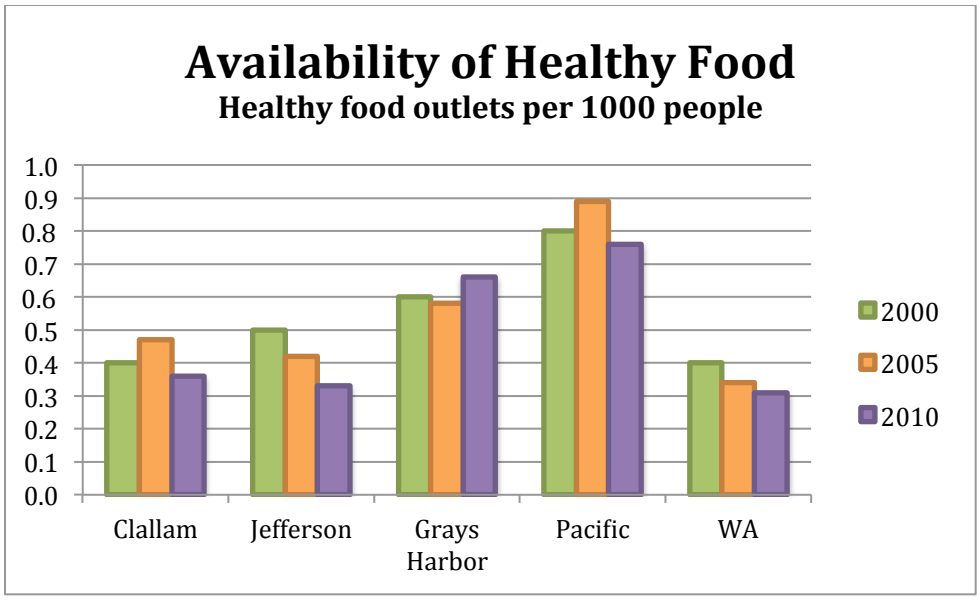


Figure 16: Availability of healthy food

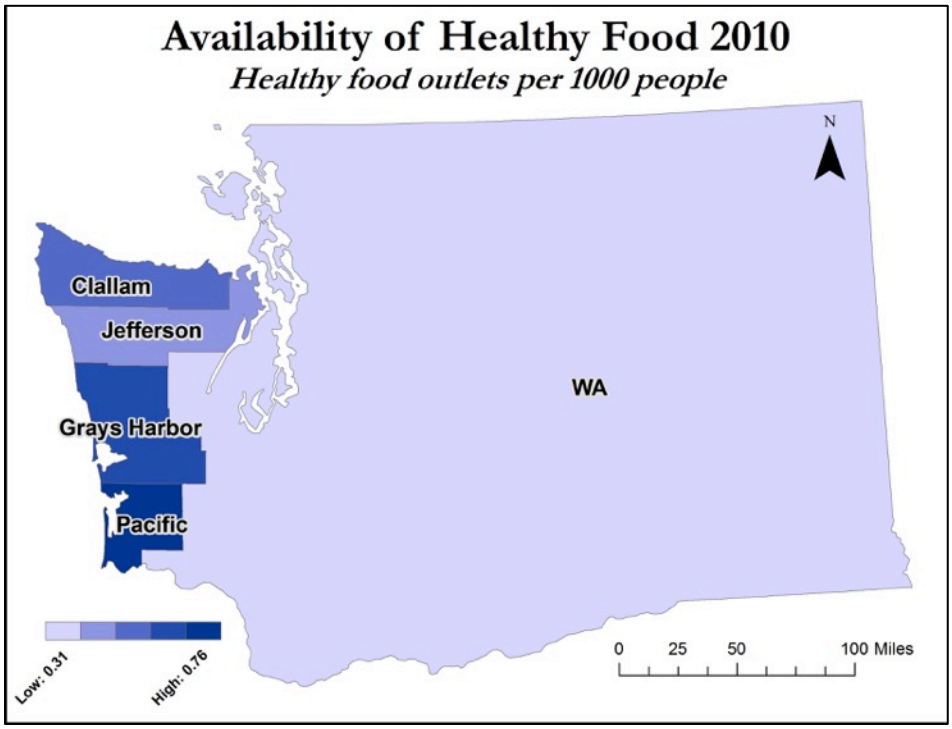


Figure 17: Geographic comparison of availability of healthy food

A second indicator that we use for food security is "Child nutrition," which looks explicitly at food security for children. We examine here the proportion of enrolled students who are eligible for lunch programs (Fig. 18). Overall, coastal counties in Washington have more

students *eligible* for free and reduced lunch programs than the state as a whole (Washington average in 2010 was 38% of students enrolled) (Fig. 19). The need for nutritional support grew in all counties during the study period, with the greatest increases in Grays Harbor County (from 48% to 57%), which along with Pacific County (58% eligible for food assistance), is also the coastal county with the greatest child poverty (see Economic Security domain), and corresponding participation in Supplemental Nutrition Assistance Program (SNAP) (see Access to Social Services domain).

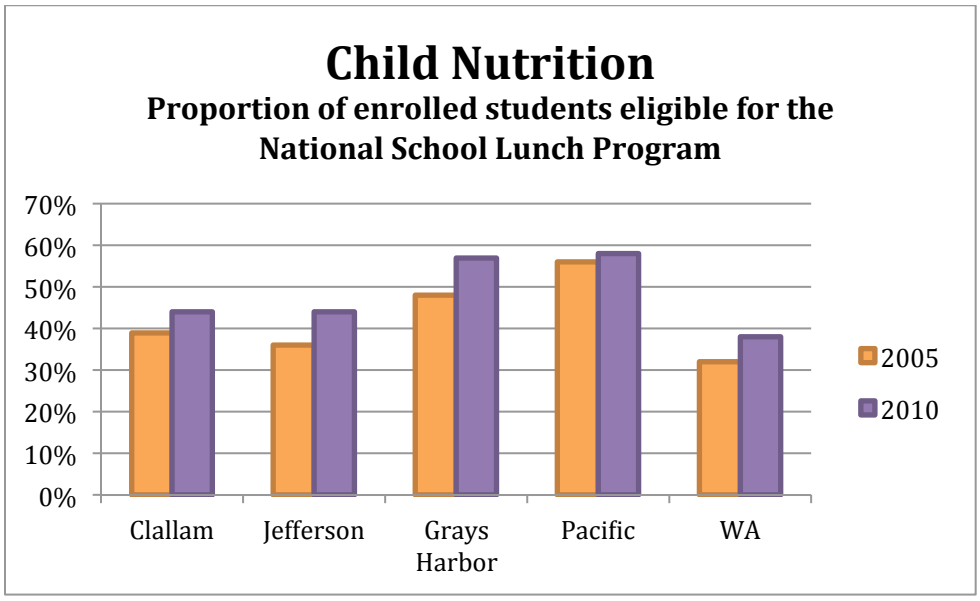


Figure 18: Students eligible for School Lunch Program

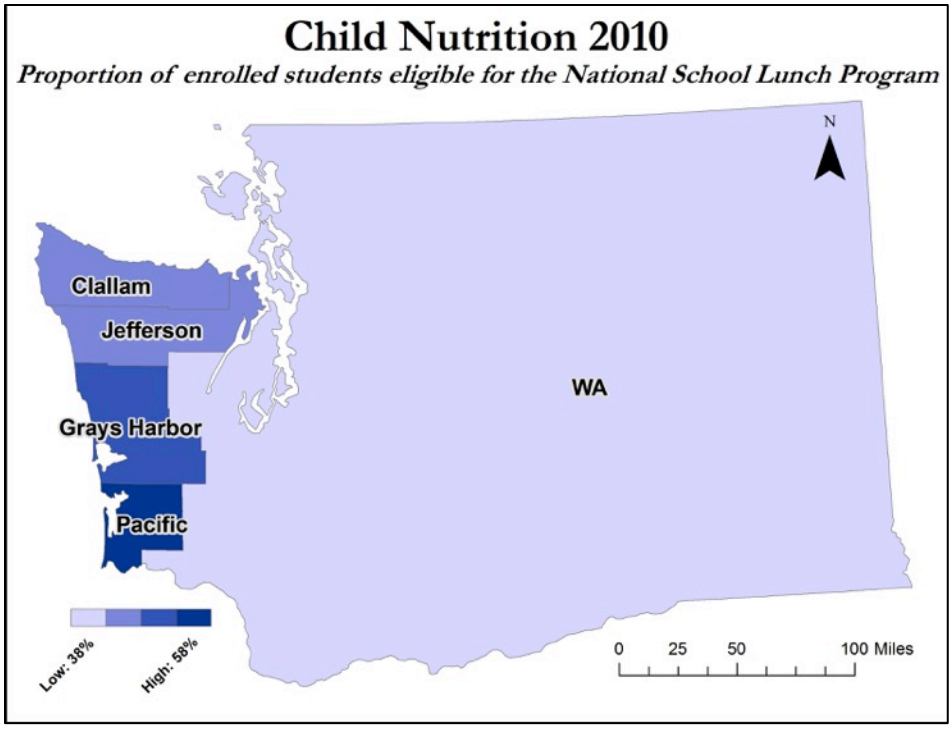


Figure 19: Geographic comparison of Child Nutrition, 2010

Housing

Housing is measured here with six indictors that depict changes in market values, capacity, and facilities.

The median dollar value of housing units varies across coastal counties, and with the exception of Jefferson County, housing values are lower than the average for Washington Fig 20, Fig. 21). In all cases, home values increased between the time periods. We include here the most recent data available (2013). Average housing prices in Washington in 2013 were $262,100. On the lower end among our case study counties, housing values in Grays Harbor and Pacific average around $160,000. In Jefferson County, the average values are above $280,000.

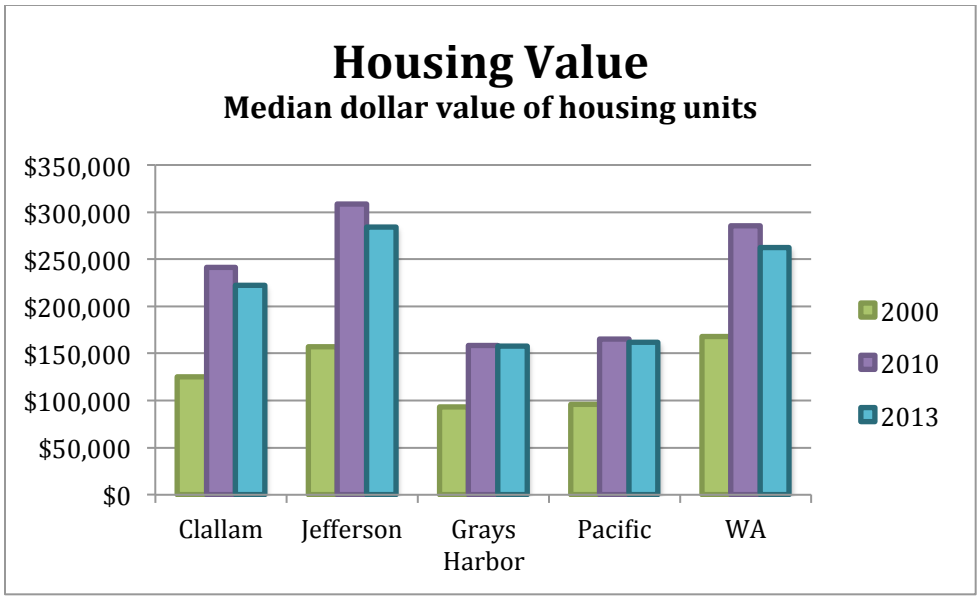


Figure 20: Housing value

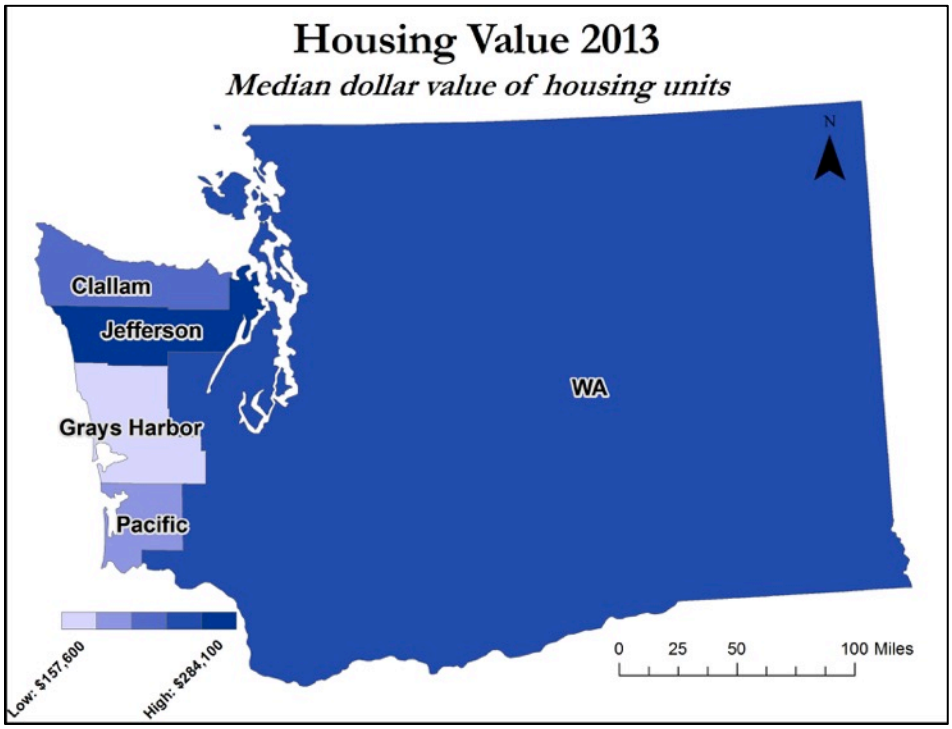


Figure 21: Housing value, 2013

Housing capacity is measured in two ways: the number of housing units available per household and the number of rooms per person in the average household. Housing availability values above one indicate that there are more than enough houses to meet the

needs of the population (Fig. 22). In all counties, the housing availability is greater than the state average, which is also adequate for meeting housing needs (Fig. 23). Greater availability of housing might indicate the presence of "second homes" units in coastal counties, where people maintain their primary residence in another county. Our other measure, housing size, indicates the average number of rooms per person in the average household. Coastal county figures are on par or better than the state average, with the exception of Grays Harbor which not only has fewer rooms than the average, it also was the only county that declined during the study period (Fig. 24, Fig. 25).

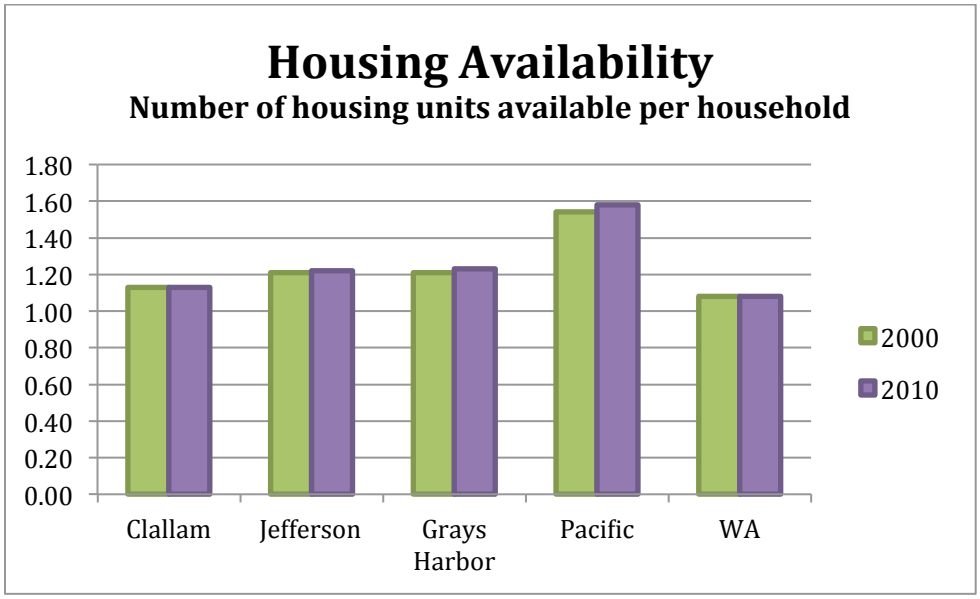


Figure 22: Housing availability

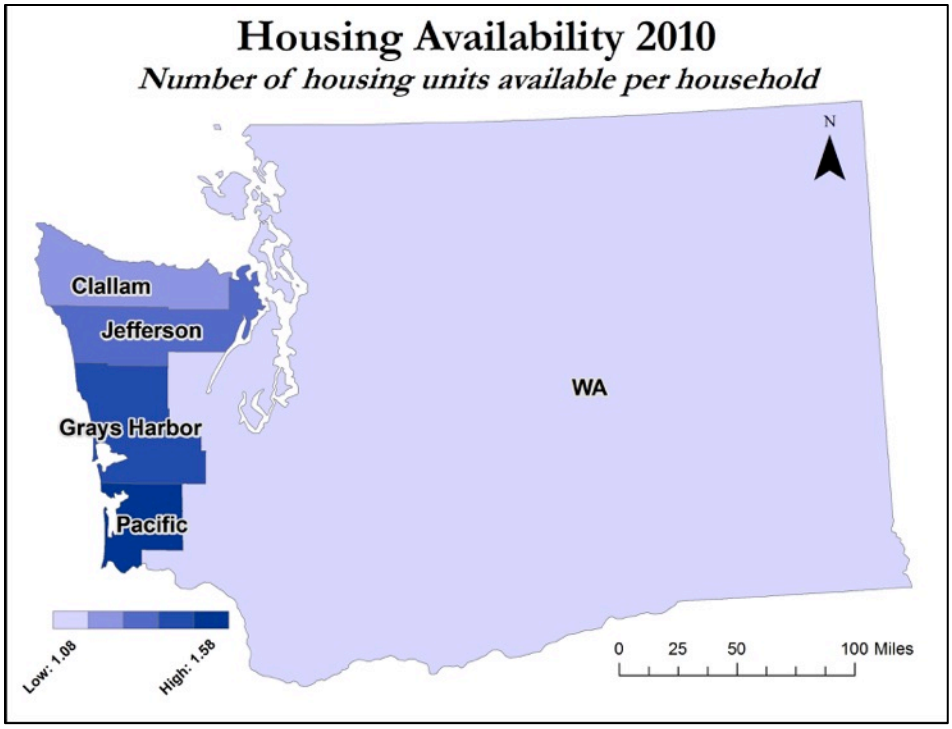


Figure 23: Geographic comparison of housing availability, 2013

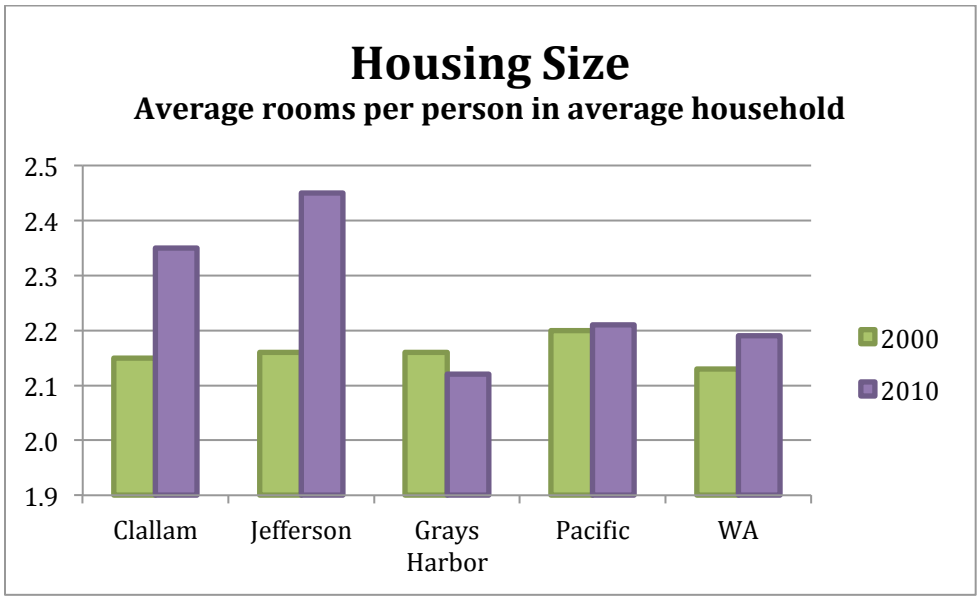


Figure 24: Housing size

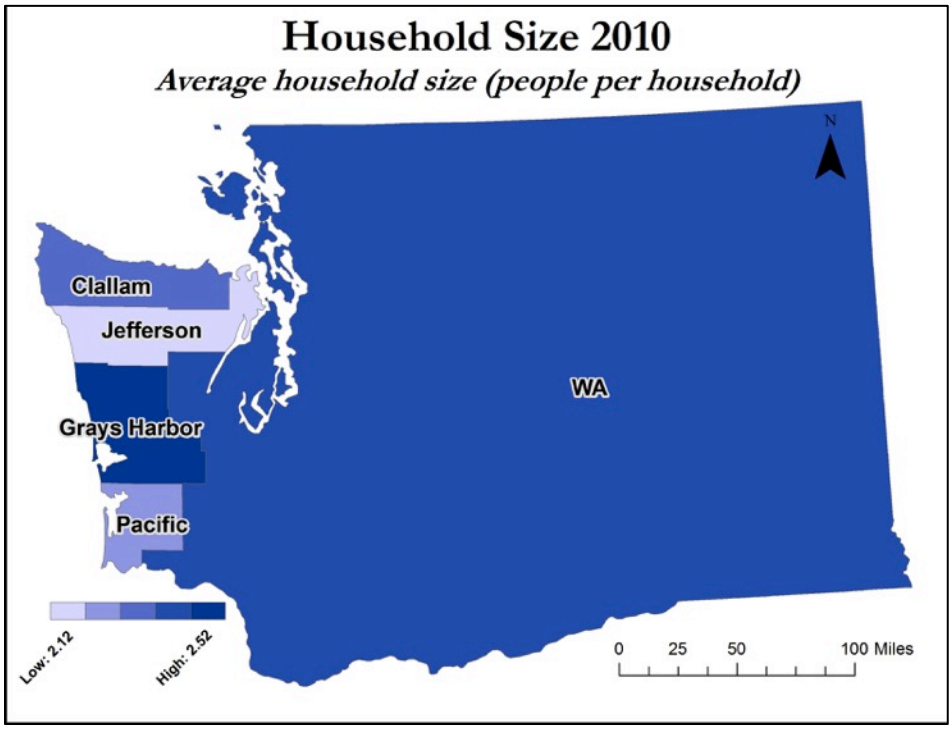


Figure 25: Geographic comparison of household size, 2010

Housing facilities are measured in three ways: age of housing (Fig. 26), percentage with complete kitchens, and complete plumbing. When housing age is lower on average, it indicates more recent home construction in that county. Jefferson County has lower housing ages than state or other coastal county averages (Fig. 27). Lower rates of change in age between the time periods, (e.g. Grays Harbor) indicates that more houses were built between 2000-2010 than elsewhere in the case study locations, as average house age did not increase in step with the passing of years.

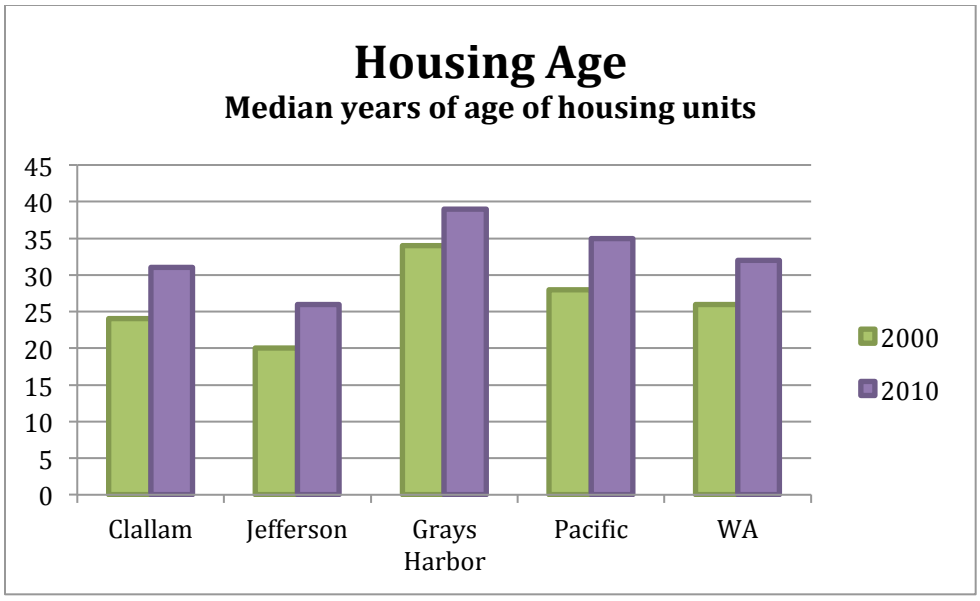


Figure 26: Housing age

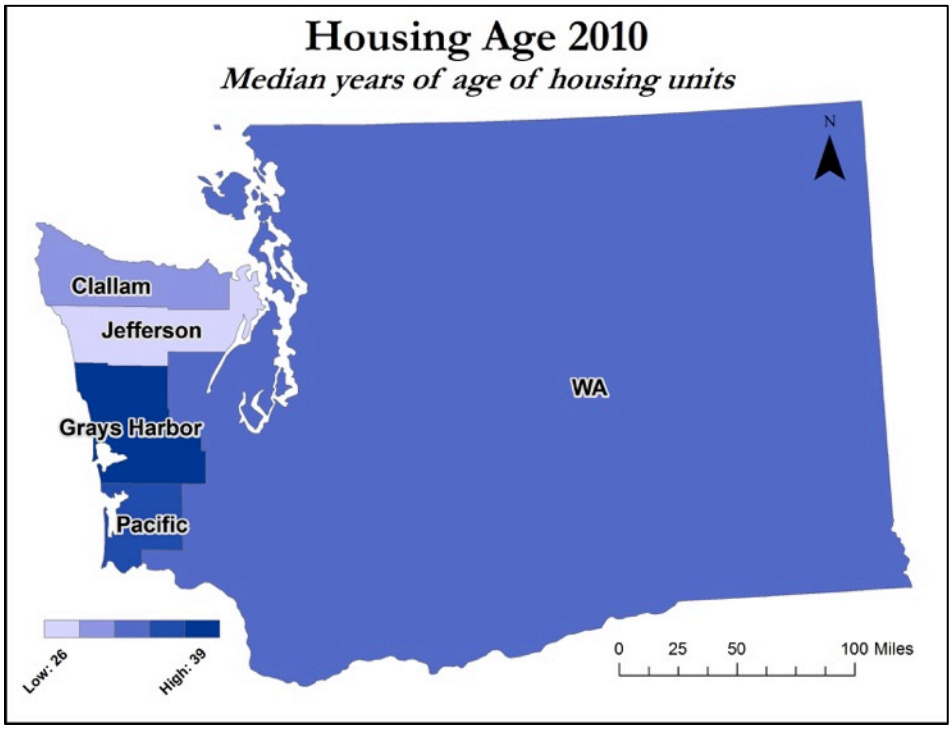


Figure 27: Geographic comparison of housing age, 2010

Housing facilities without kitchen and plumbing facilities are another way to measure the basic needs of shelter and housing (Figs. 28, 29). Both of these indicators are negative measures, such that increases in values indicate negative changes in wellbeing. Over 98%

of housing units in coastal counties have full kitchen facilities, with similar completeness rates for plumbing facilities. Fewer than 2% of houses in coastal counties and the state are without full kitchens and plumbing ((Figs. 30, 31).

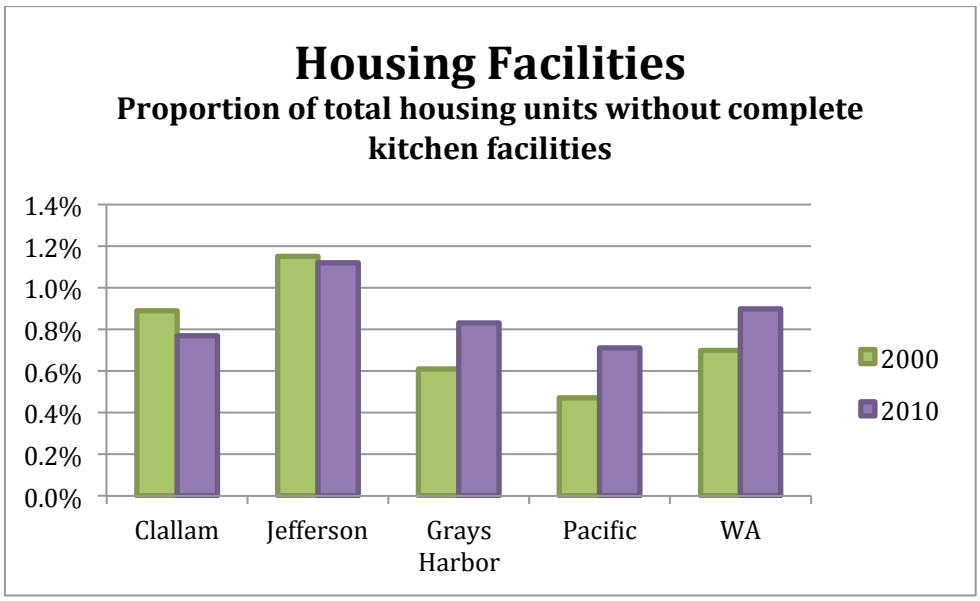


Figure 28: Housing facilities, without complete kitchen

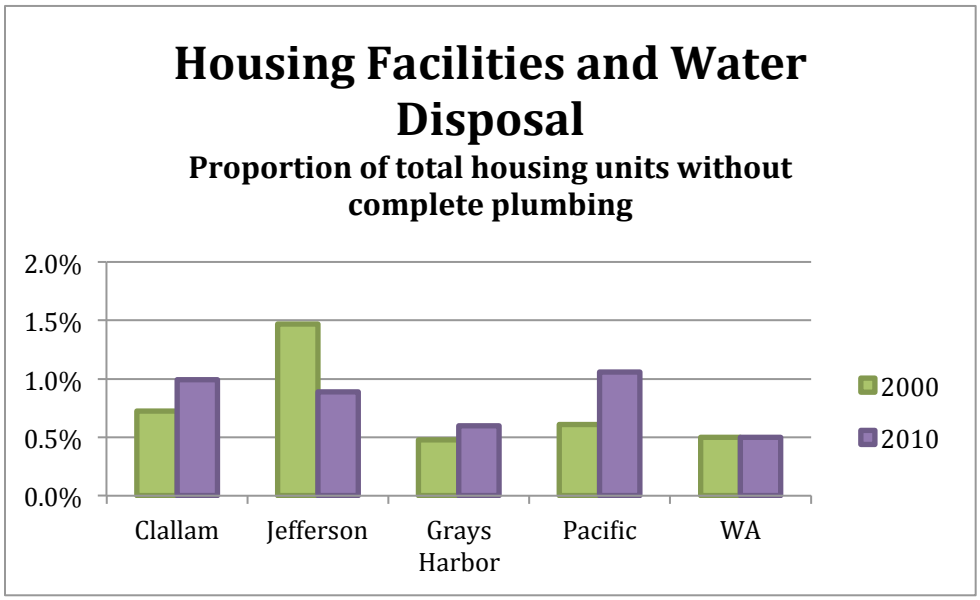


Figure 29: Housing facility, without complete plumbing

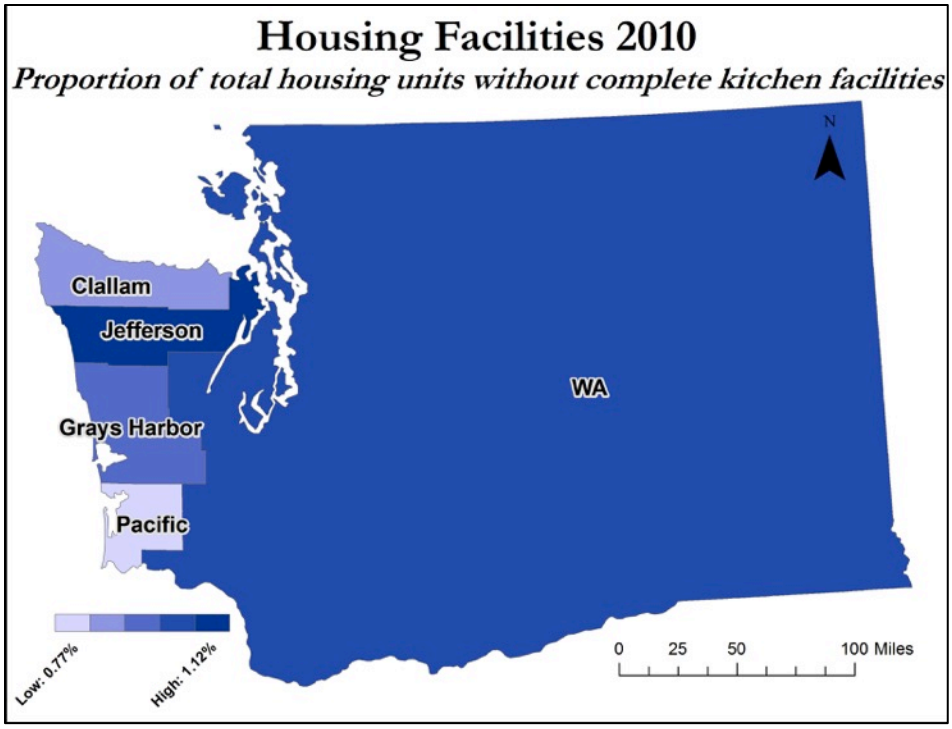


Figure 30: Geographic comparison of housing without complete kitchens

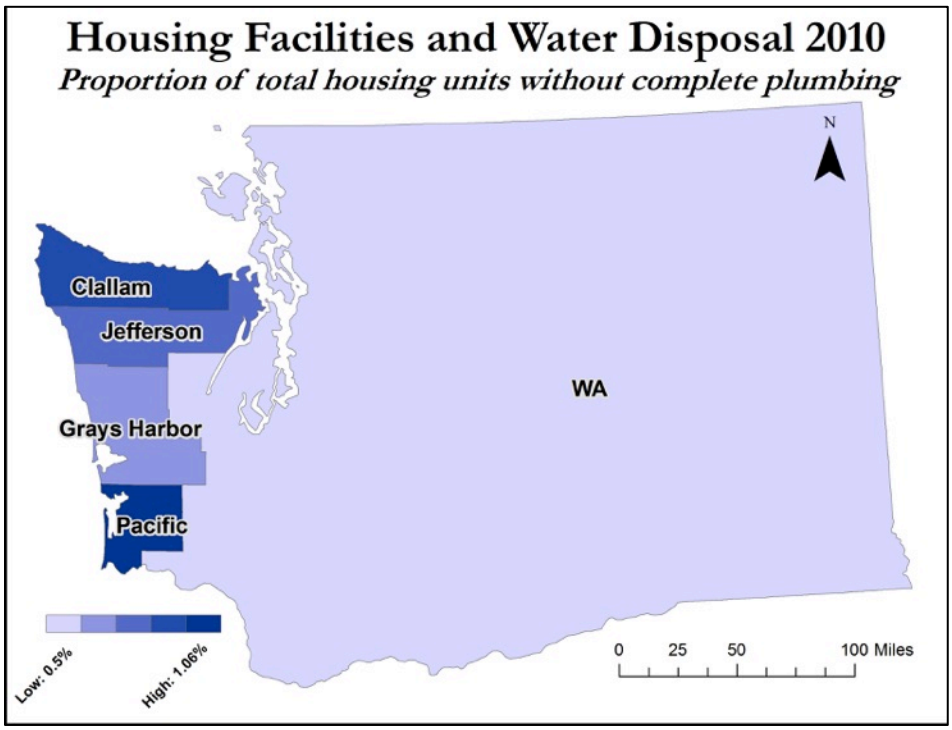


Figure 31: Geographic comparison of housing without complete plumbing

Access to Social Services

The Access to Social Services domain is comprised of five key indicators: human services, nutritional assistance, transportation, medical facilities, and medical care.

Human Services

Human services indicator is measured by the number of social assistance establishments per 1000 people. All counties experienced declines in per capital social assistance establishments with the exception of Pacific County, which saw a 51% increase (the addition of 6 organizations) between 2000-2010 (Fig. 32). Jefferson and Grays Harbor declined by 24% and 18%, respectively. With the minor exception of Grays Harbor County, the coastal counties have more social assistance per capita than Washington on average (Fig. 33).

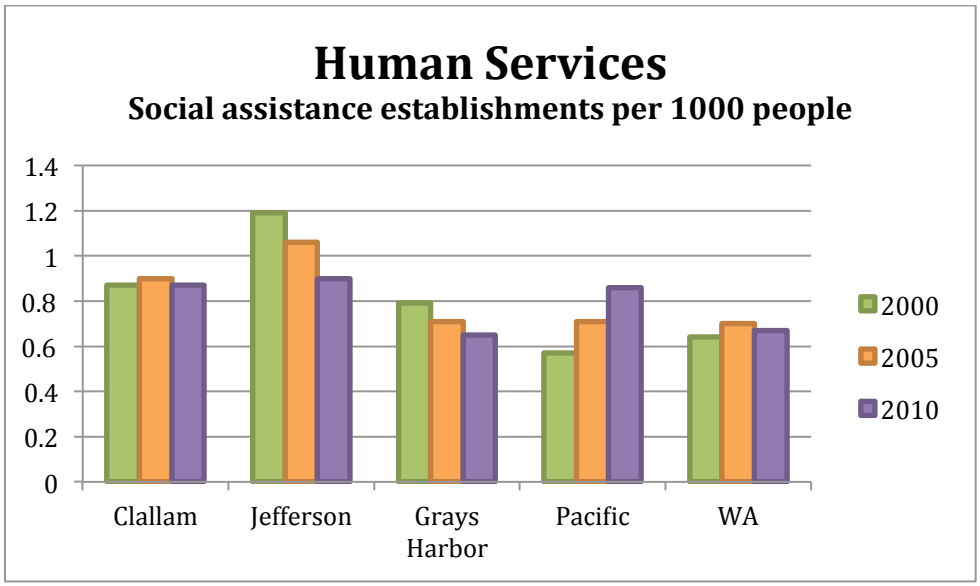


Figure 32: Human services

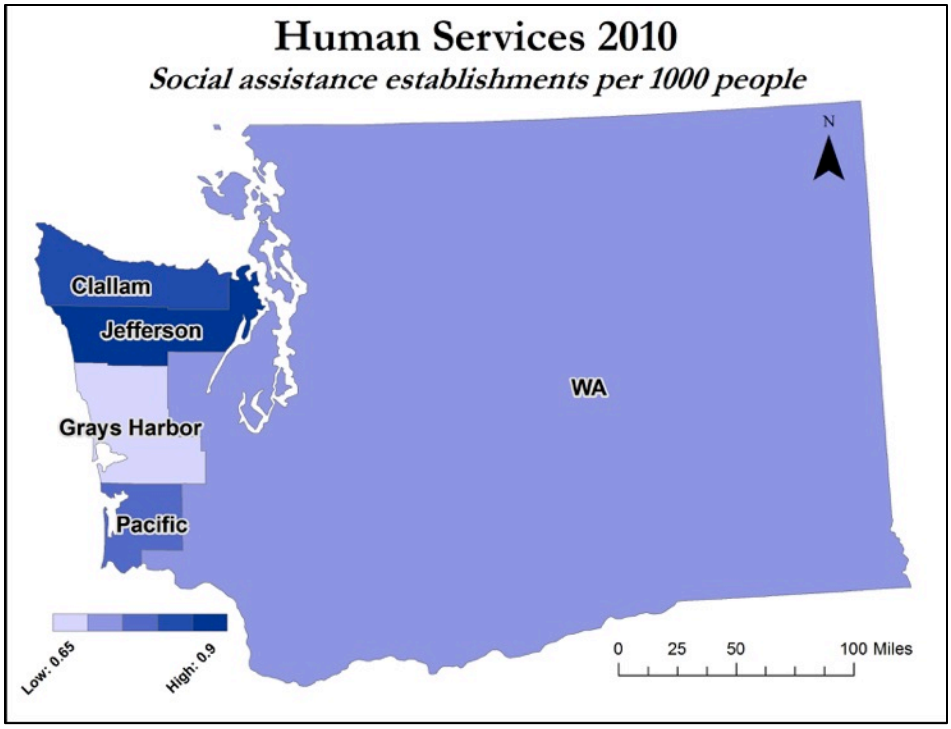


Figure 33: Geographic comparison of human services, 2010

A second indicator of access to social services is nutritional assistance. Nutritional assistance is measured as the proportion of people in poverty participating in the Supplemental Nutrition Assistance Program. This is positive indicator such that increases in values indicate that more people who need support are getting it. All coastal counties witnessed increases in SNAP participation, nearly up to 100% in the case of Jefferson, and more than 100% in the other counties (Fig. 34, 35). This indicator does not tell us whether or not more families are experiencing food insecurity, an may be an outcome of improved outreach. The food indicators discussed in the previous section, however, indicate that more families are indeed lacking adequate access to food and may be experiencing greater food need. Some values go above 100% as eligibility rates vary within a year, such that a family can qualify for SNAP and not fall below the poverty line based on annual income.

More information on participation rates and changes over the decade can be found at USDA Trends report.[4]

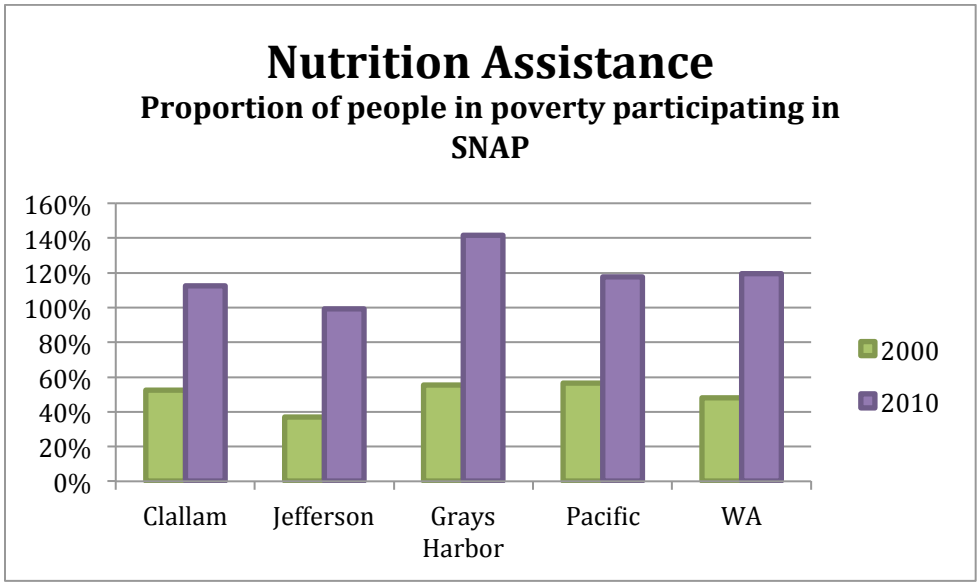


Figure 34: Nutritional assistance

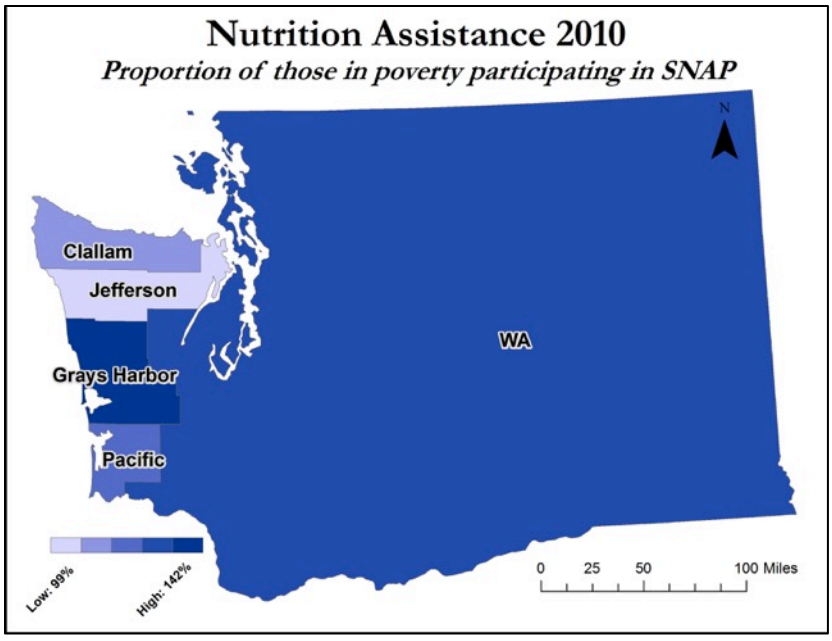


Figure 35: Geographic comparison of SNAP participation

[4] http://www.mathematica-mpr.com/~/media/publications/PDFs/nutrition/trends2002-09.pdf

Transportation

The proportion of households without a vehicle declined slightly in all counties, with the greatest decline seen in Grays Harbor, from 9.5% of the population to 6.7%. These trends indicate that more coastal households have a vehicle, and thus increased access to transportation. Jefferson County has the greatest access to transportation, but Grays Harbor experienced the greatest rate of improvement during the time period (Fig. 36, 37).

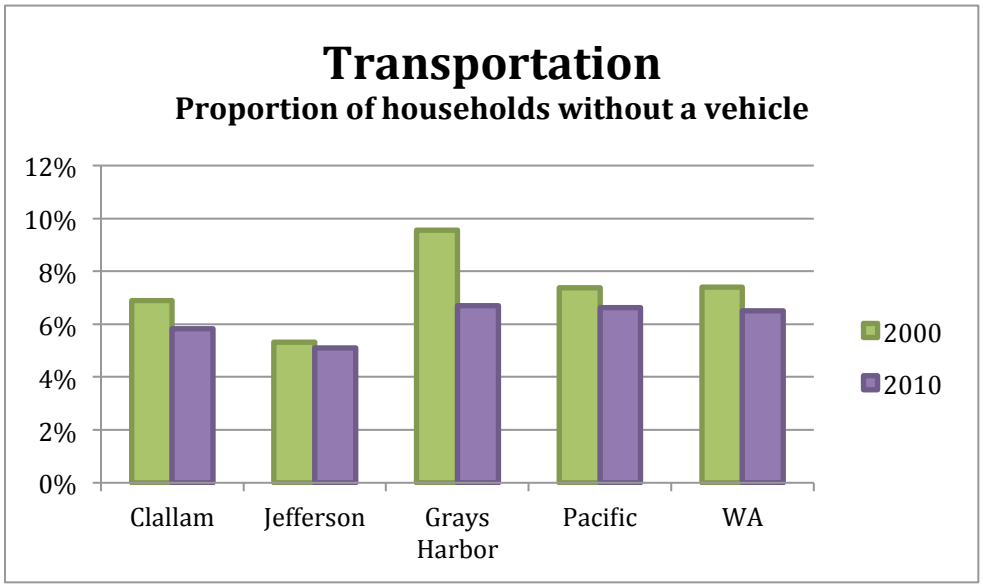


Figure 36: Transportation

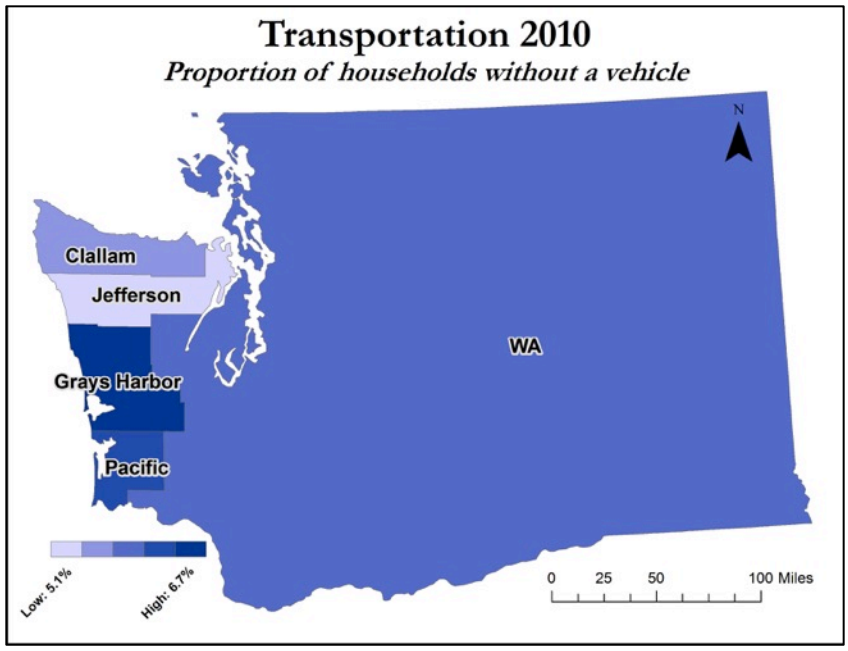


Figure 37: Geographic comparison of households without a vehicle, 2010

The final indicator we evaluate for the Access to Social Services domain is access to medical facilities and care. The number of hospital beds per capita in Grays Harbor and Pacific counties increased by 51% and 39%, respectively (Fig. 38, 39). In 2010, there were 206 hospital beds in Grays Harbor, and 41 in Pacific County. Slight declines per capita occurred in Clallam County (loss of 9 beds) and Jefferson County (where facilities remained the same, but population increased).

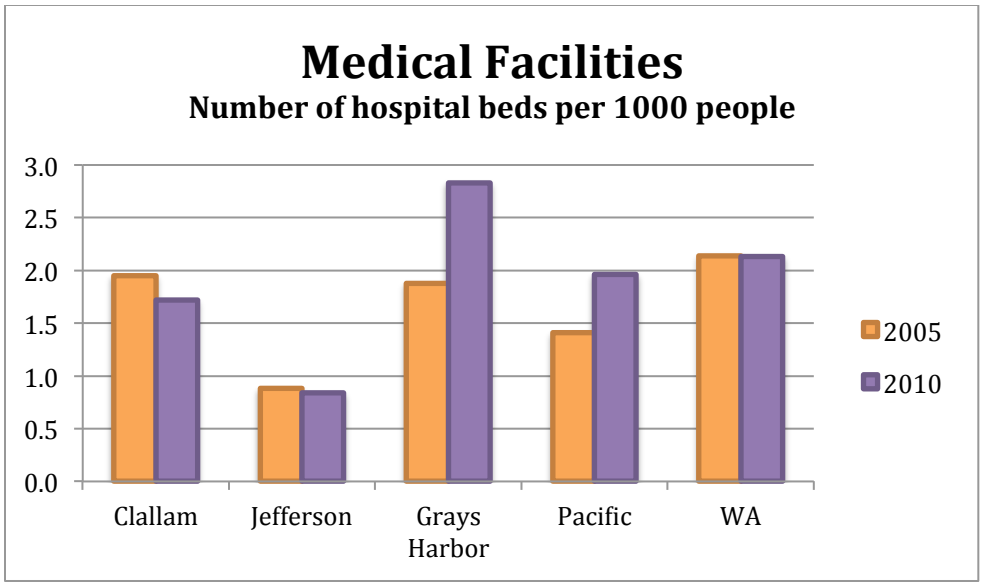


Figure 38: Medical facilities

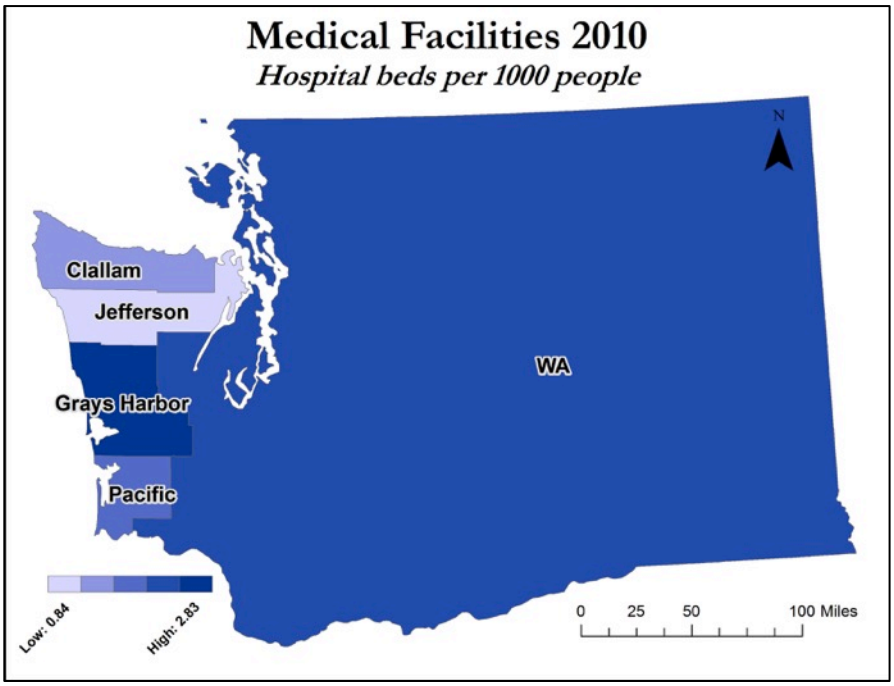


Figure 39: Geographic comparison of hospital beds per 1000, 2010

As second indicator for access to medical care is measured by the number of physicians per 1000 people. Similar to trends in medical facilities, there were slight decreases per 1000 people for Clallam (4 fewer physicians) and Jefferson counties (the same number of

physicians (87) serving a growing population) (Fig. 40, 41). There were increases of between 4-6 physicians in Grays Harbor and Pacific counties. For all Washington coastal counties the health (and education) sectors are the largest segment of employment (see Economic Security domain).

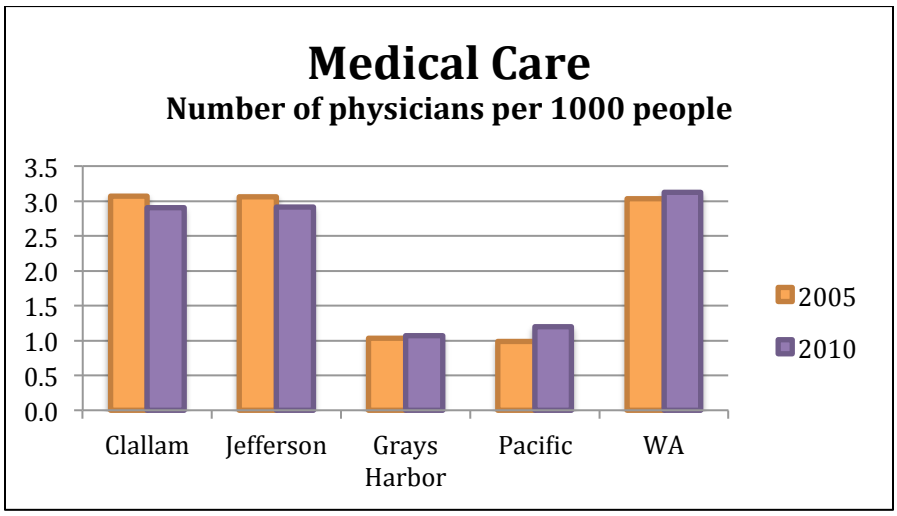


Figure 40: Medical care

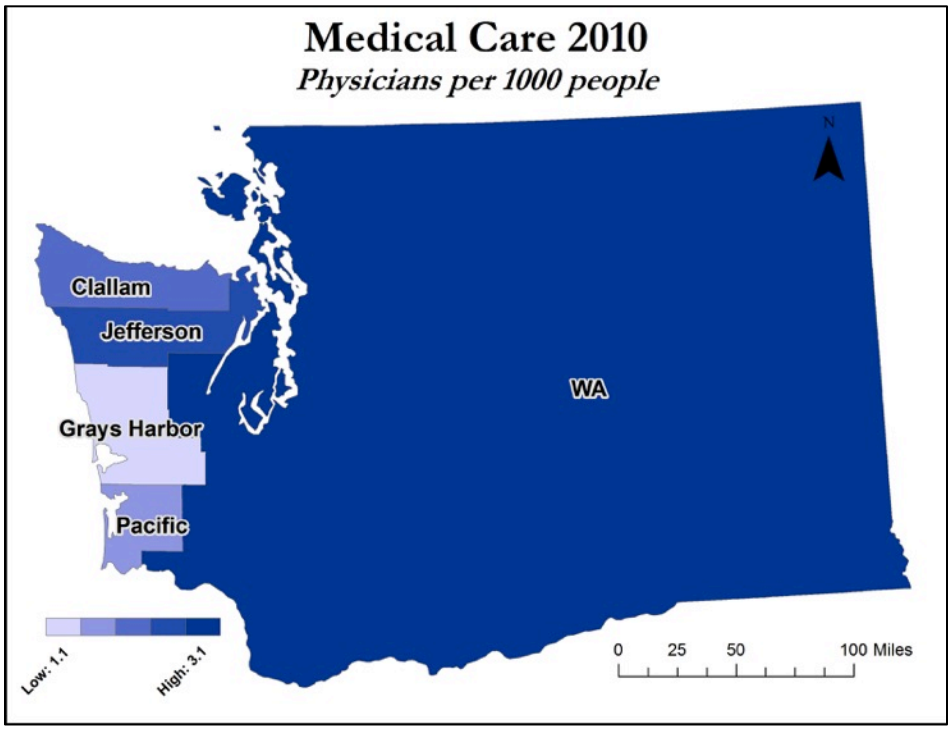


Figure 41: Geographic comparison of physicians per 1000 (in 2010)

Health

The Health domain is comprised of five main indicators: fertility, life expectancy, mortality (due to cardiovascular, respiratory, cancer, and drug and alcohol related death), behavioral health, and recreational opportunities (facilities, access to public lands).

Fertility

Fertility rates are lower on the coast than the state average (Fig. 42). The rates of fertility ranged from 6.7% in Jefferson County to 11.6% in Grays Harbor in 2010 (Fig. 43). These are down from fertility rates in 2005, with the exception of Clallam where fertility rates did not fluctuated much over the decade.

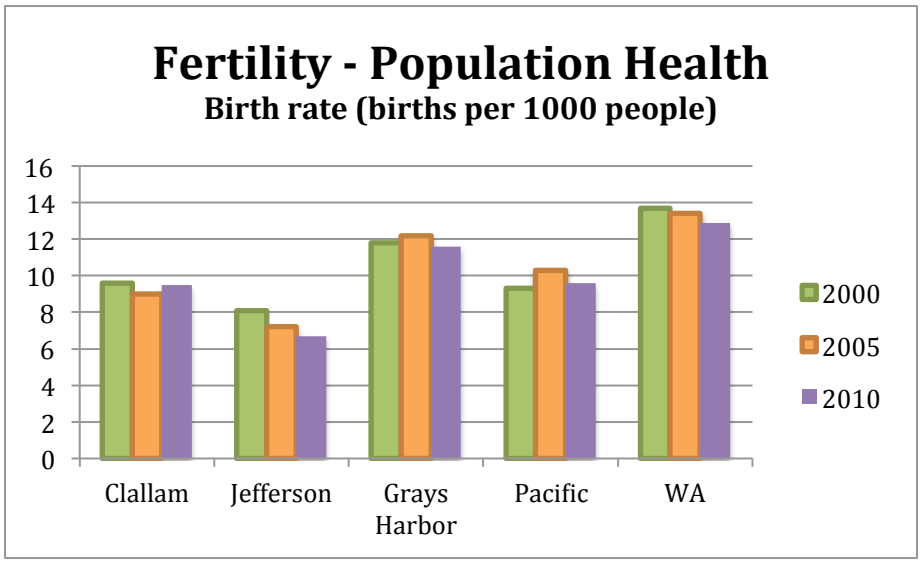


Figure 42: Fertility

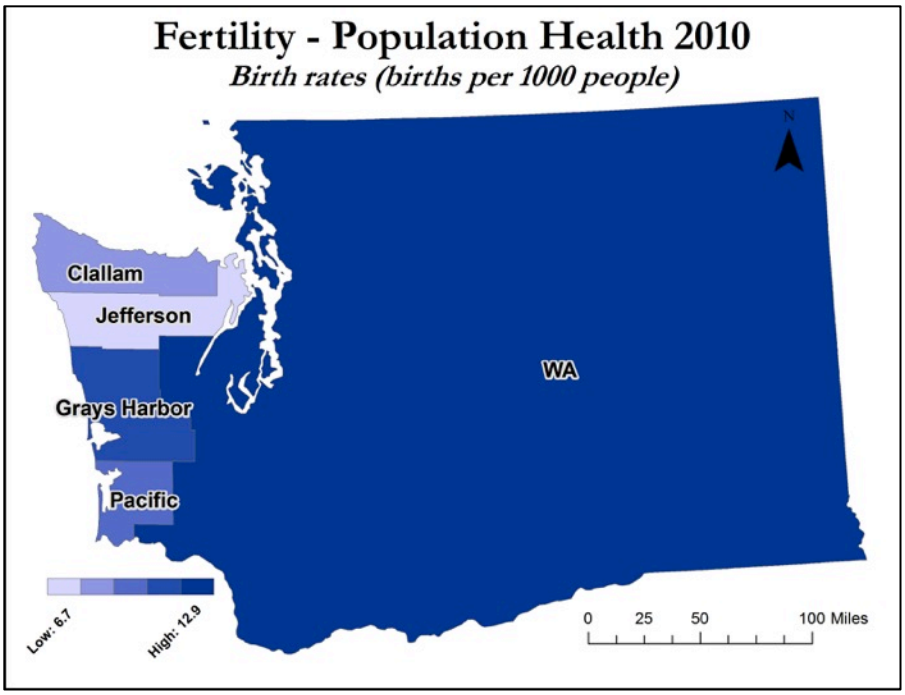


Figure 43: Geographic comparison of birth rates per 1000 (in 2010)

Life expectancy

Life expectancy increased for both men and women from 2000 to 2010 in all coastal counties (Fig. 44, 45). Jefferson County has the highest life expectancy, even higher than the state average, at 78 years for men and 83.4 years for women.

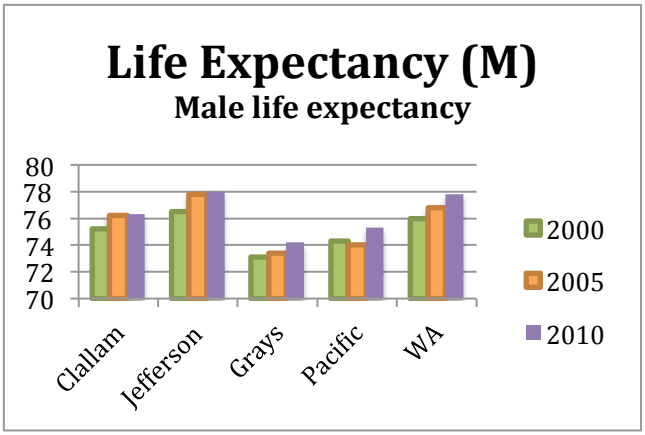


Figure 44: life expectancy (males)

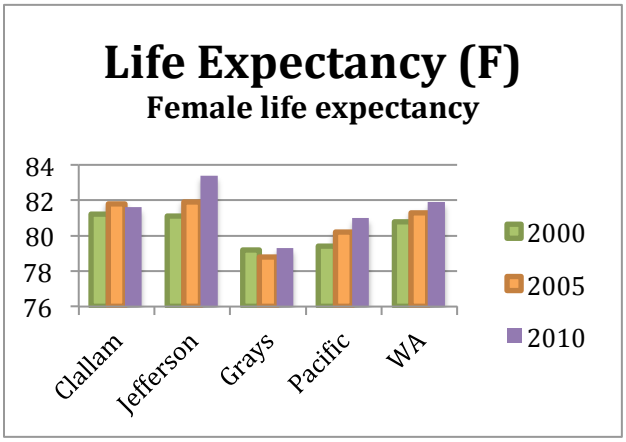


Figure 45: life expectancy (females)

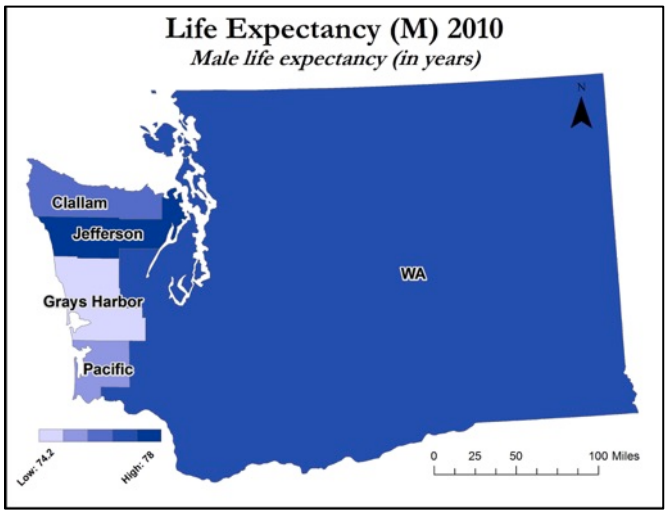


Figure 46: Life expectancy (F) map

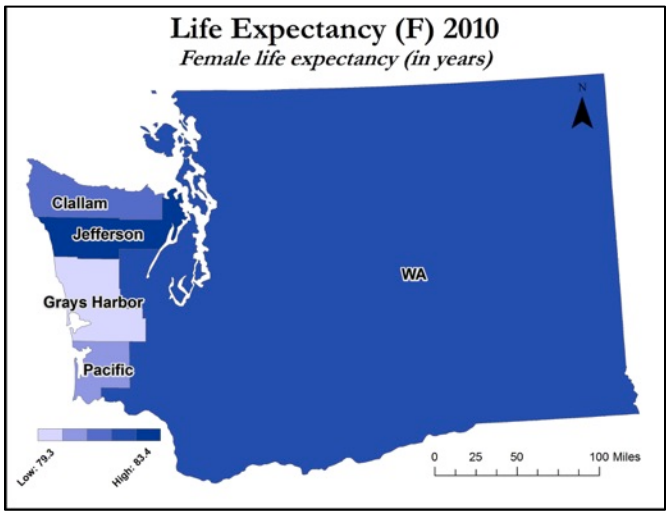


Figure 47: Life expectancy (M) map

Mortality

We evaluate three major causes of death: cardiovascular disease, cancer, and lower respiratory disease.

The proportion of deaths caused by major *cardiovascular disease*, declined in all coastal counties (accounting for between 92-274 total deaths across the counties). These declining rates reflect similar positive trends in cardiovascular health for Washington at large (Fig. 48, 49). The greatest improvements in cardiovascular health were experienced in Grays Harbor and Pacific County, where mortality rates declined 33% and 26% respectively.

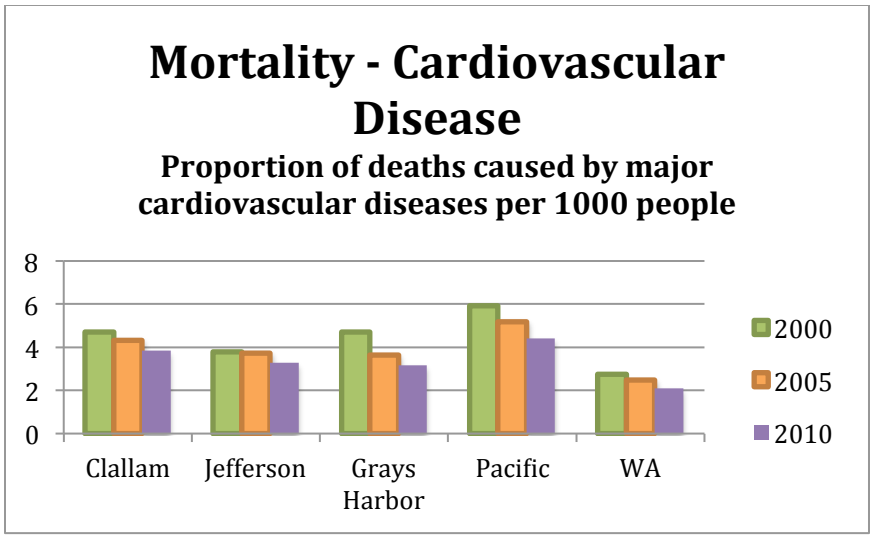


Figure 48: Cardiovascular disease-related mortality

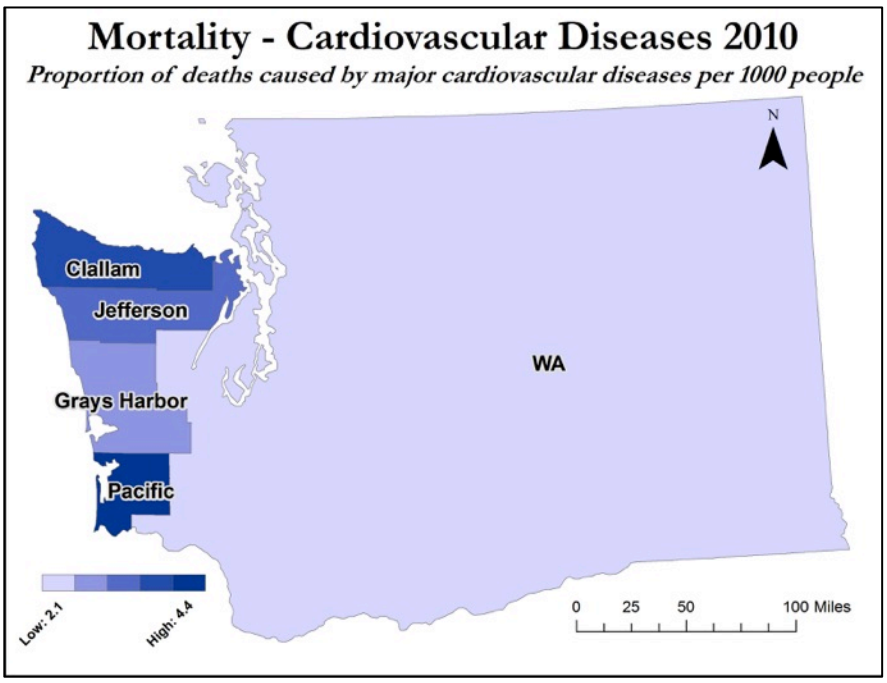


Figure 49: Cardiovascular deaths mapped, 2010

However, the proportion of deaths caused by *cancer* increased in all coastal counties, and this contrasts with changes to average rates in Washington State, where the average is roughly half that of the coastal counties (Fig. 50, 51). Cancer-related mortality rates were greatest in Pacific County (accounting for 83 total deaths in 2010), followed by Clallam

County (250 total deaths). Clallam County cancer mortality rates increase the most by 26 percentage points.

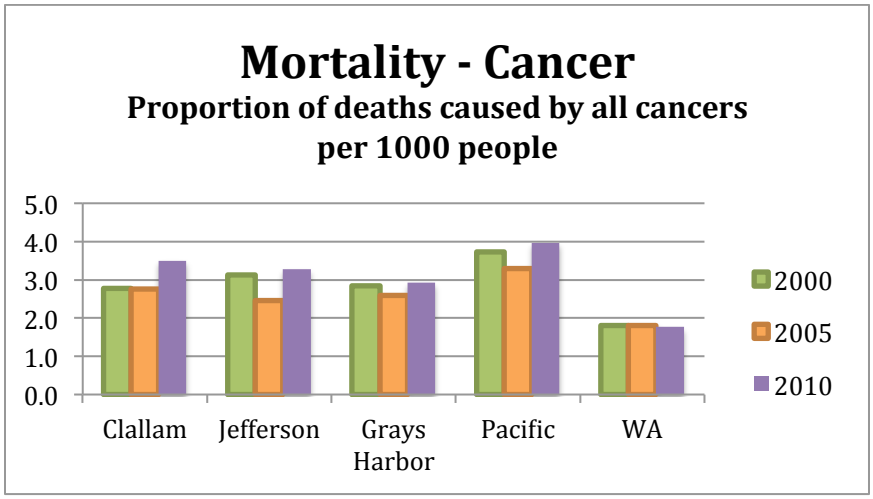


Figure 50: Cancer-related mortality

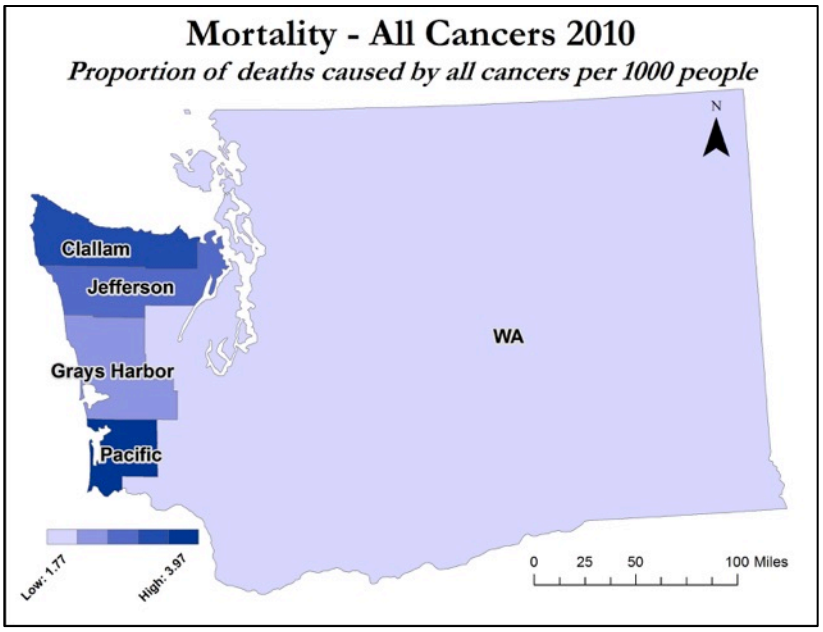


Figure 51: Geographic comparison of cancer-related deaths, 2010

The proportion of deaths caused by *lower respiratory disease* declined in Clallam, Jefferson and Grays Harbor counties, but increased in Pacific County (Fig. 52, 53). With the exception of Clallam, which is at the same level, all coastal counties have higher death rates from

respiratory diseases than the state averages. Lower respiratory diseases accounted for between 17 to 29 total deaths across the coast coastal counties in 2010.

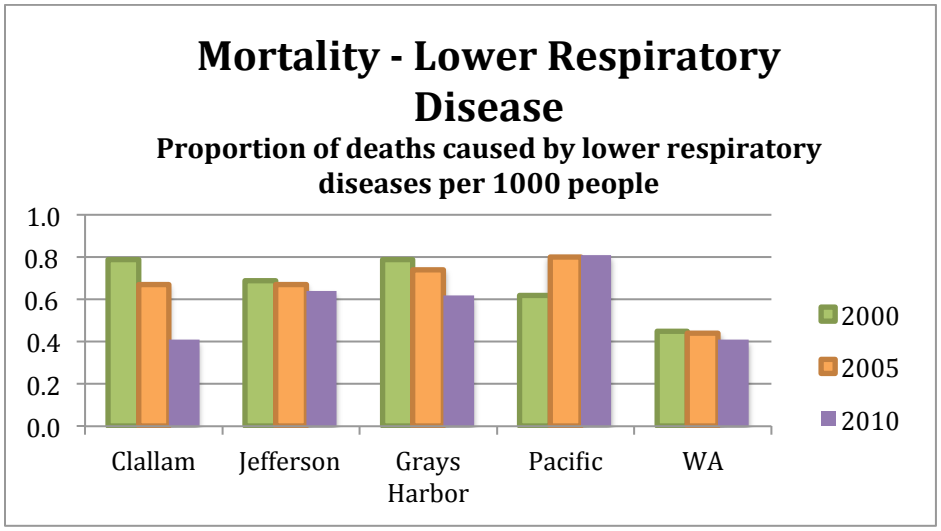


Figure 52: Mortality caused by lower respiratory disease

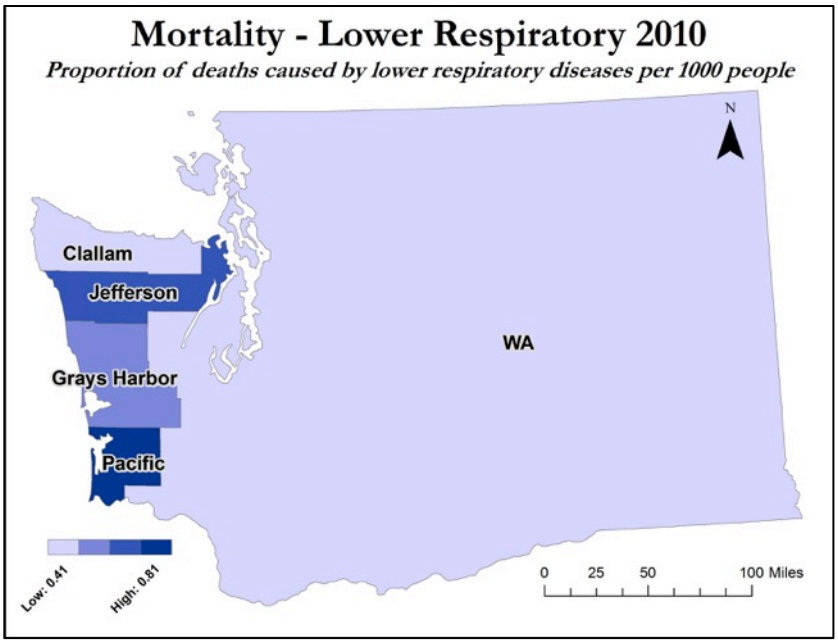


Figure 53: Geographic comparison of mortality caused by lower respiratory disease, 2010

Behavioral health

We evaluate two indicators for behavioral health. In the first behavioral health indicator (Fig. 54, 55), there were increases in *chronic or binge alcohol consumption* in Clallam, Jefferson, and Grays Harbor counties. Pacific County consumption declined between 2005 and 2010.

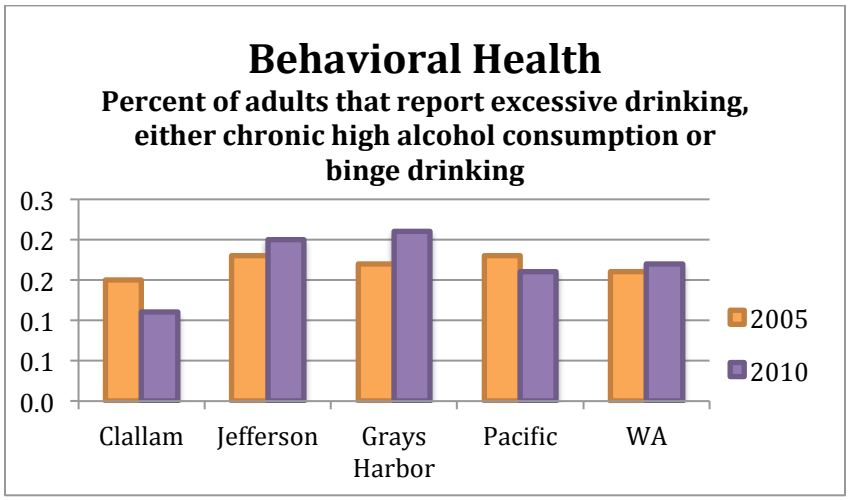


Figure 54: Behavioral health: excessive drinking

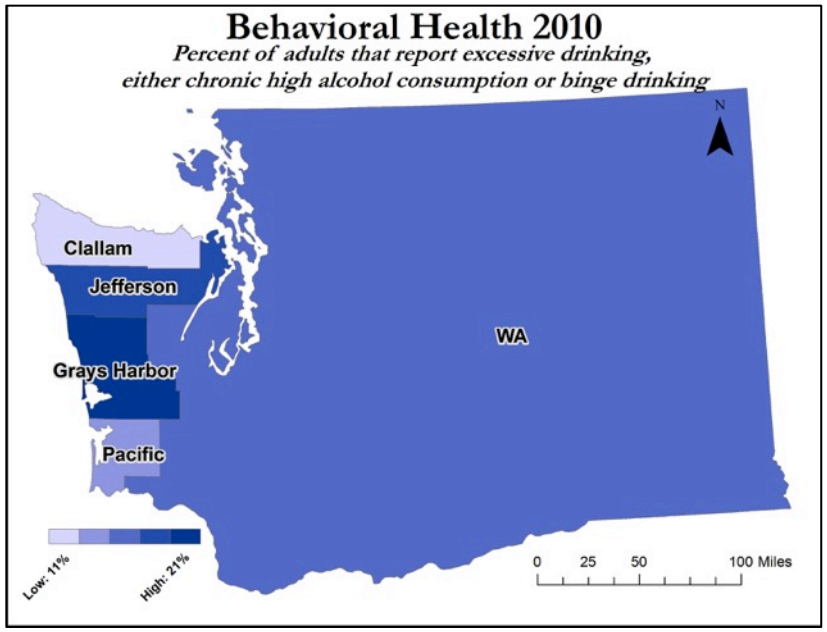


Figure 55: Geographic comparison of excessive alcohol consumption, 2010

While a decline might suggest a positive change for mental health measured as substance abuse, Pacific County's percentage of deaths caused by drug and alcohol consumption

increased substantially by over 130% and is by far the county with the highest mortality rates in this category (Fig. 56, 57). Total drug and alcohol related deaths ranged between 12-34 in the respective coastal counties.

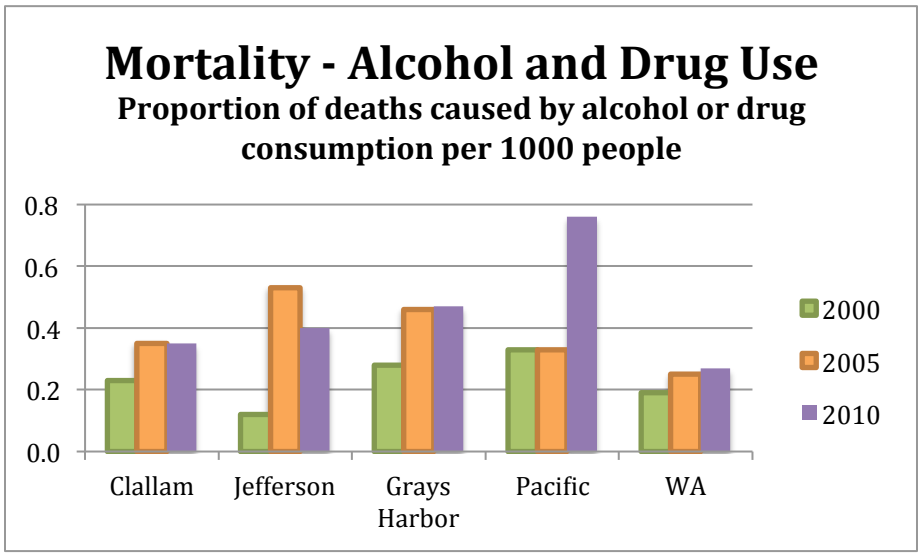


Figure 56: Mortality due to alcohol and drug use

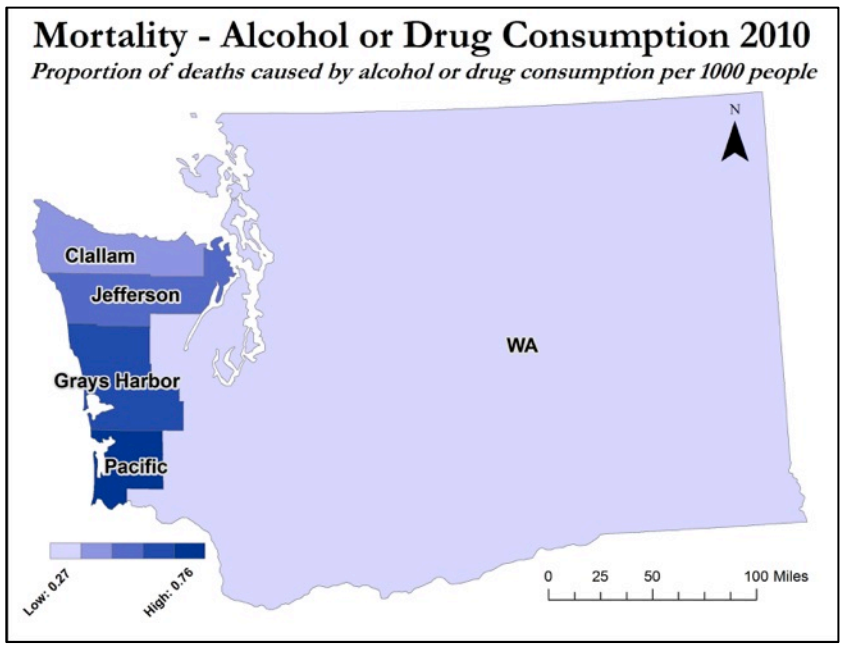


Figure 57: Geographic comparison of alcohol and drug related deaths, 2010

Healthy lifestyle opportunities

Opportunities to engage in healthful activities are measured using two indicators: recreational opportunity through facilities (marinas, golf, fitness, sports, and amusement centers), and opportunities for outdoor activities measured in access to public lands. We added the second indicator (not present in the NCCOS framework) based on the observation that many residents of WA coastal counties enjoy recreational activities outdoors (e.g. hunting, swimming, hiking, fishing, surfing, boating, etc.) Both of these indicators are proxies for opportunities to engage in exercise and healthful activities.

The number of recreational facilities per 1000 people (Fig. 58, 59) is higher in coastal counties than the state average. Jefferson County has the greatest number (14 facilities total), however the facilities per person declined from 2000. The 19% decline in Jefferson is a partial factor of 15% population growth in the county during the same period. However, Clallam County, which also increased in population by 11%, saw increases in the number of recreation facilities (from 17 to 22 facilities).

Figure 58: Recreational facilities per 1000

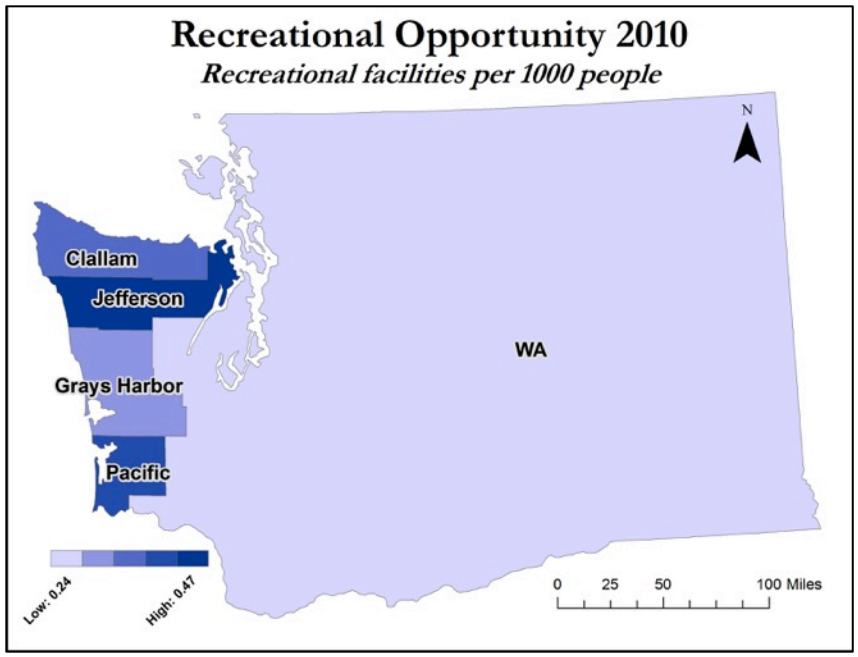


Figure 59: Geographic comparison of recreational facilities, 2010

Access to public lands (federal, state and county parks and lands) varies across the coastal counties. This indicator can be used to assess opportunities for recreation, as well as many other wellbeing indicators, including access to natural resources and wild food, governance, and rural ways of life. The proportion of county area categorized as "public lands" is not highly variable across decades. Here we assess the public lands in 2015 (Fig. 60, 61, 62)). The greatest percentage of public lands is found in Jefferson County (64% of the county area is public), followed by Clallam County (55% of the county area is public). In Grays Harbor and Pacific counties, 21% and 9% are public lands, respectively.

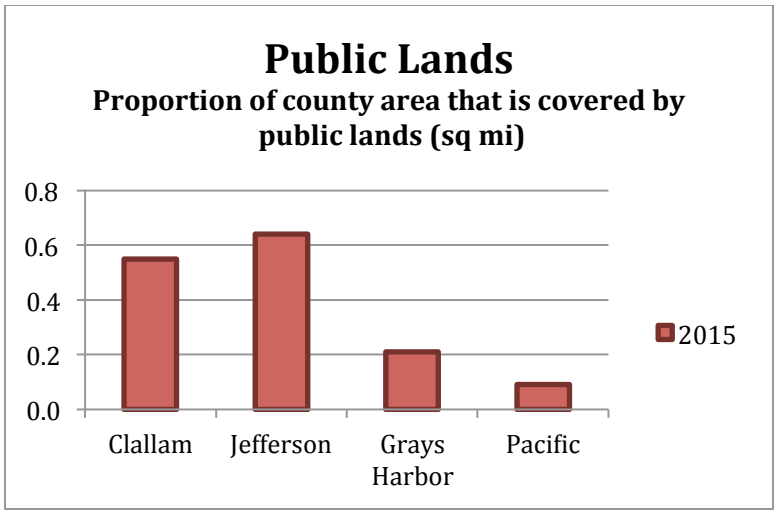


Figure 60: Percent area covered by public lands

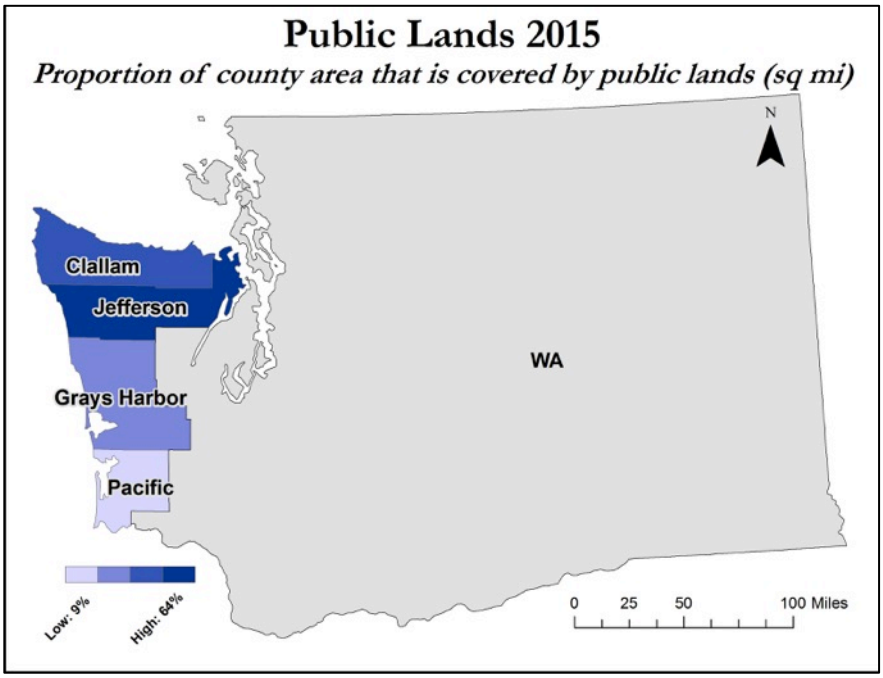


Figure 61: Geographic comparison of proportion of public lands per area (WA interior counties not included)

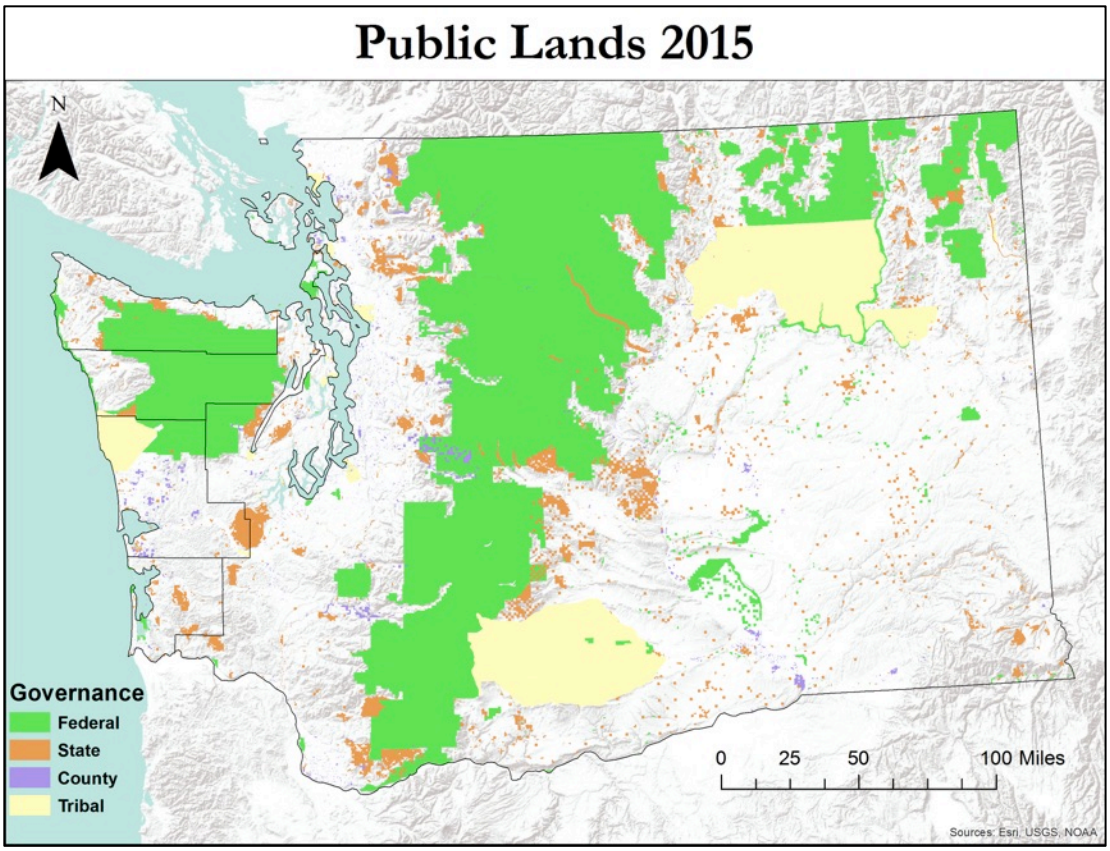


Figure 62: Public lands distribution by type, Washington

Education

The Education domain is comprised of three indicators: education expenditures, attainment, and enrollment.

Education expenditures

All four counties saw increases in the expenditures per student enrolled in public schools, indicating positive public investments in education and wellbeing outcomes (Fig. 63, 64). The greatest investments per student were made in Pacific County following by Grays Harbor, at just over $13,000 and nearly $12,000 per student per year respectively. Both of these counties saw the greatest percentage increase from 2000 to 2010.

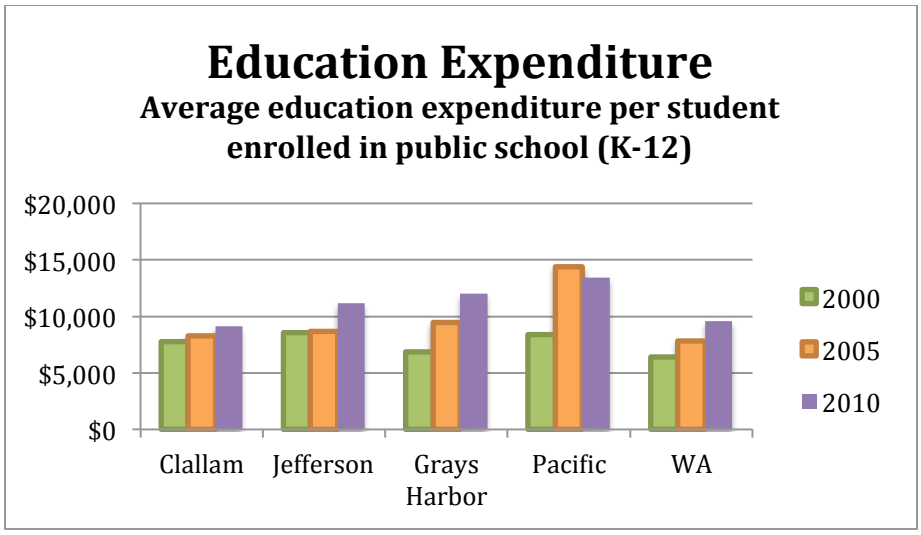


Figure 63: Education expenditure

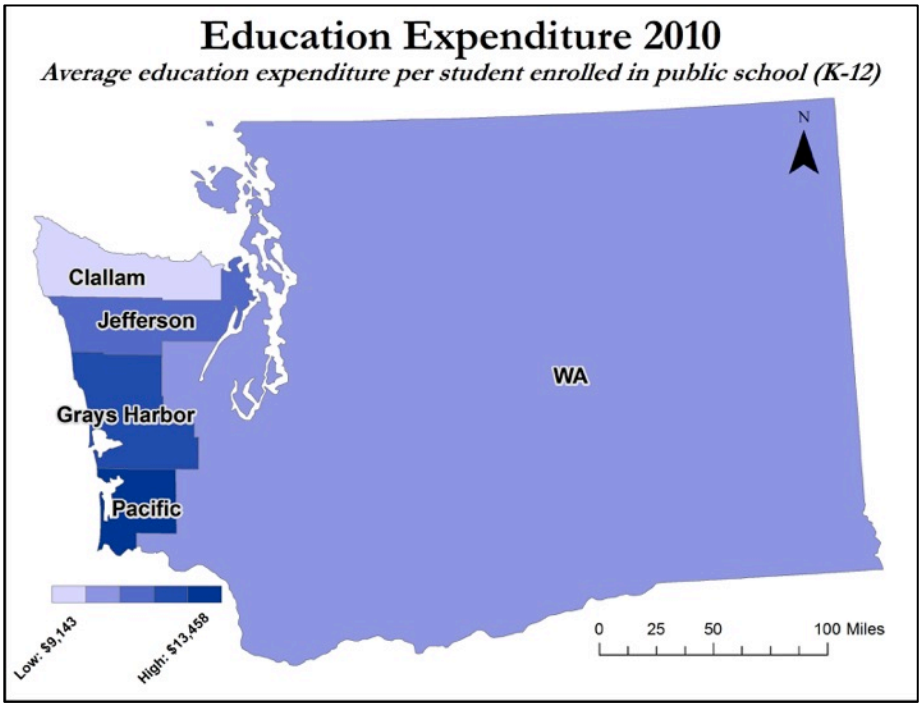


Figure 64: Geographic comparison of education expenditures, 2010

Education attainment

Following trends in improvements in expenditures, all four counties also saw improvements in the rates of attainment (Fig 65, 66). Both Clallam and Jefferson counties

have higher measures than Washington State or other coastal counties in proportion of population over 25 years of age with a high school diploma or above. The greatest increase took place in Pacific County, with went from 79% to 86% of the population.

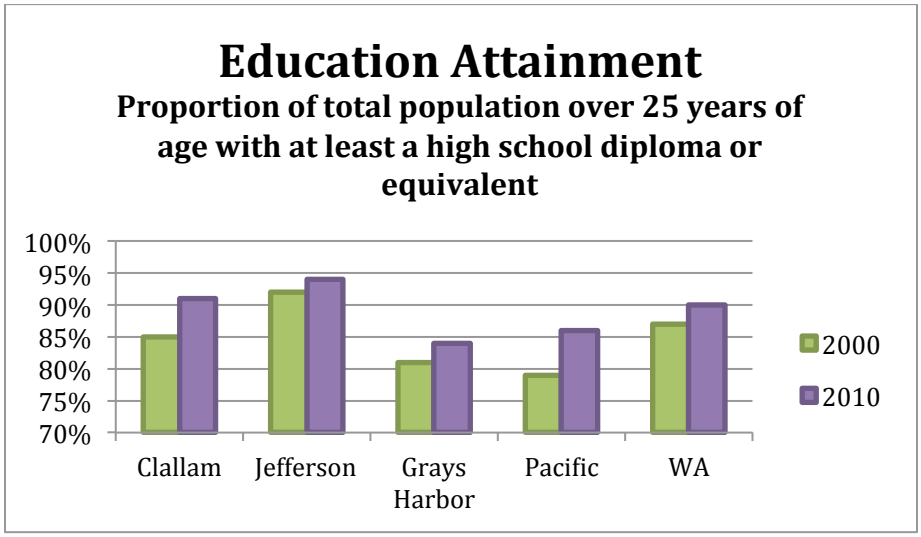


Figure 65: Education attainment

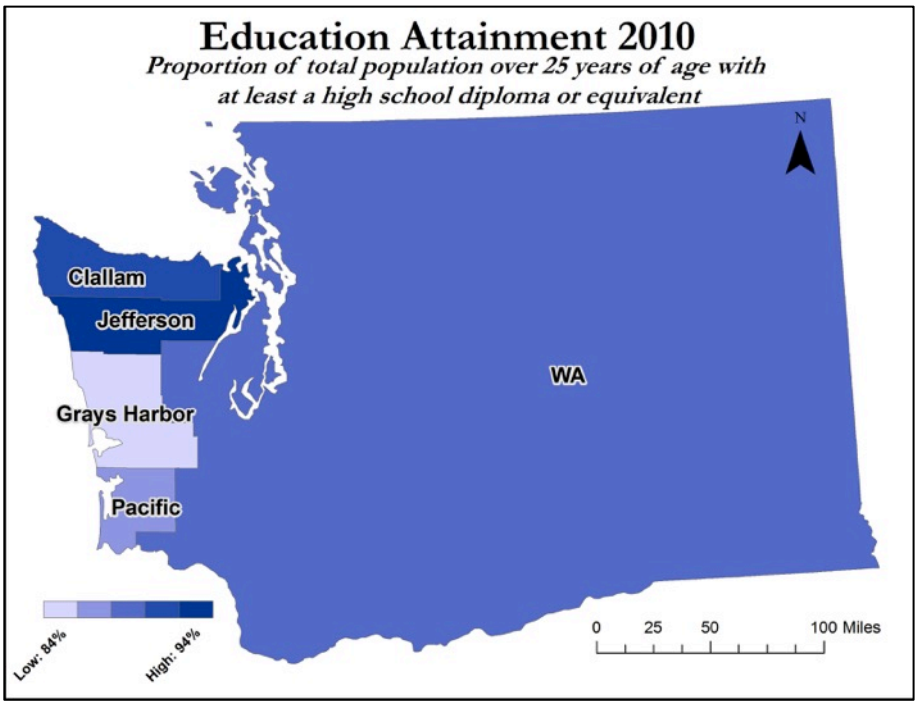


Figure 66: Geographic comparison of adults with high school diploma or higher, 2010

Education enrollment

Measures for the education enrollment indicator are more of a mixed picture. Clallam County saw the greatest improvements (25% increase) followed by Pacific County (8% increase) (Fig. 67, 68). Both Jefferson and Grays Harbor declined slightly; this is in contrast to the attainment trends analyzed above. All counties but Jefferson have enrollment rates higher than the state average. MRC workshop participants noted that many families choose home school options in the coastal counties. Percentage rates exceed 100 in cases where enrolled students are older than age 17, as well some enrolled students within the age range might live in one county (population) and be enrolled in a school located in another.

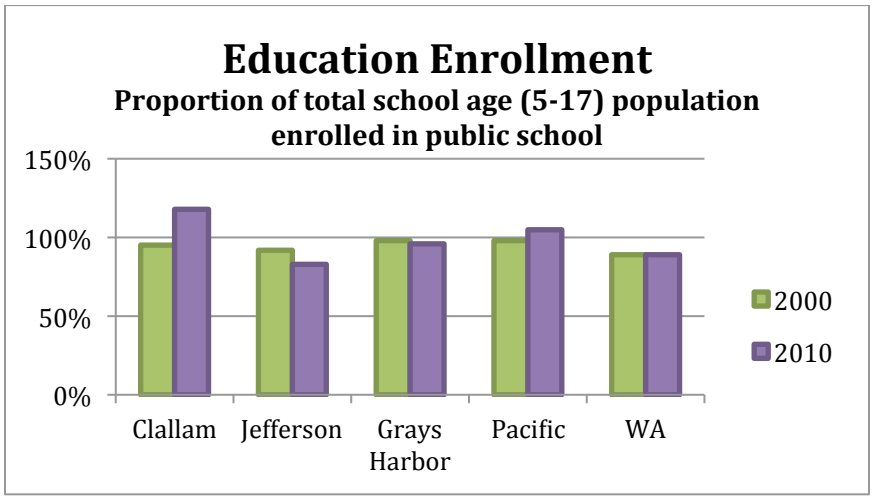


Figure 67: Education enrollment

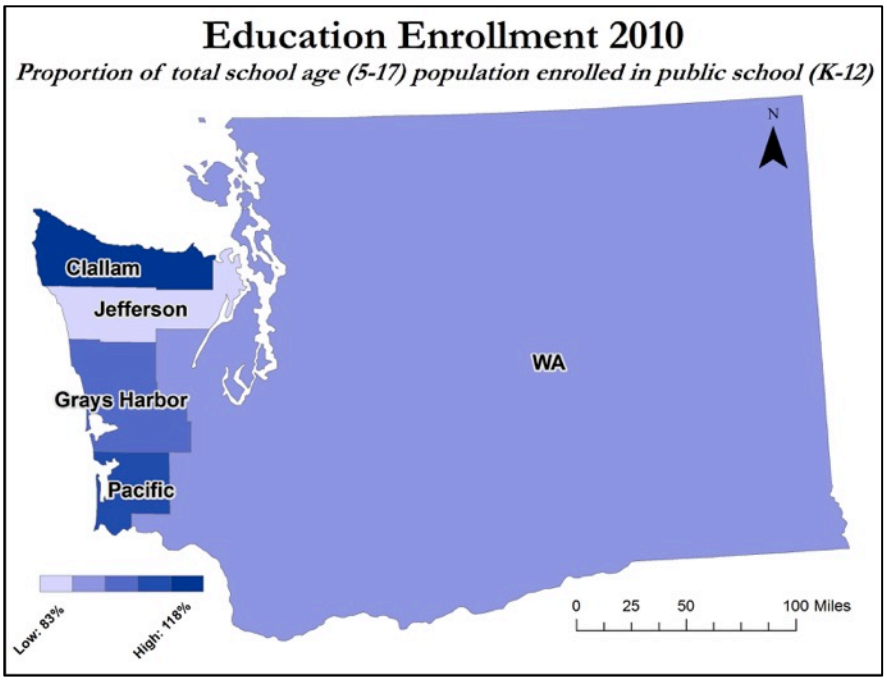


Figure 68: Map of adults with at least a high school diploma, 2010

Social Connectedness

The Social Connectedness domain is comprised of five indicators: access to communication, participation in democracy, social gathering places, arts and culture, and tenure in community

Access to communication varies slightly across the four coastal counties; still over 97% of the households have phone service, which is slightly better than the state average (Fig. 69, 70). Clallam County had the highest proportion of households with phone service (2.5%).

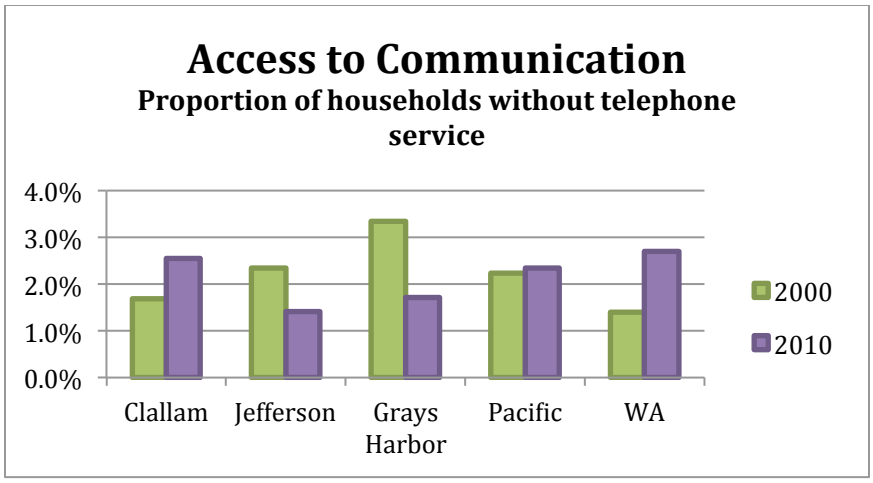


Figure 69: Access to communication

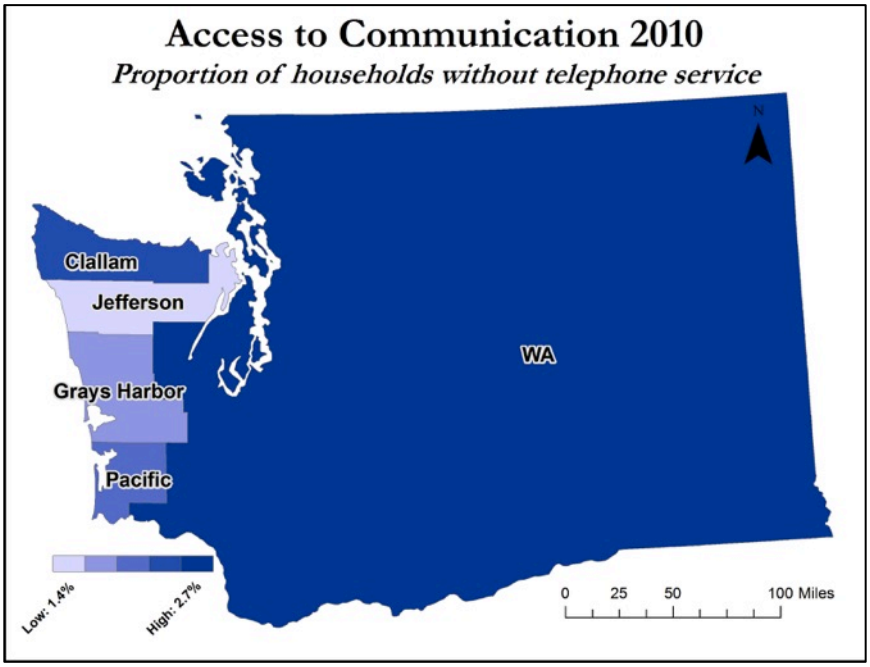


Figure 70: Geographic comparison of access to communication, 2010

Participation in democracy

Participation in the national elections was on par with the state averages, where 80% or higher voted (Fig. 71, 72). These participation rates represent increases in all counties since 2000.

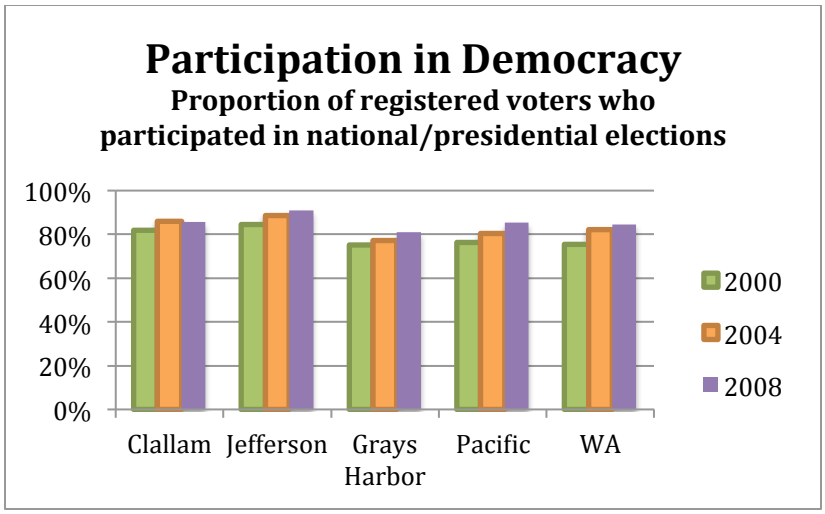


Figure 71: Participation in national/presidential elections

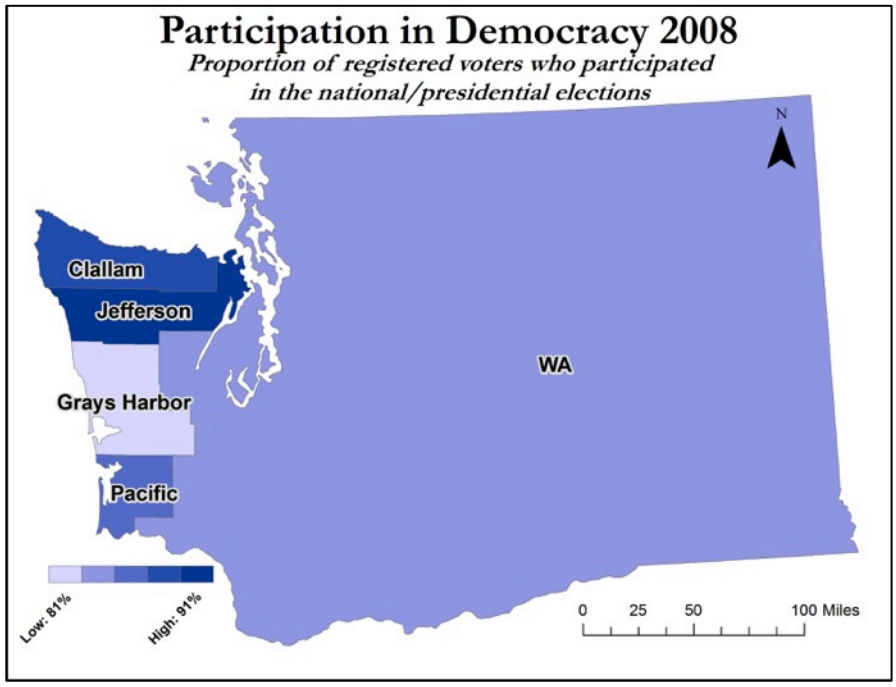


Figure 72: Geographic comparison of participation in elections, 2008

Social gathering places

While higher than state averages on the whole, the number of religious and spiritual organizations per 1000 people declined for all coastal counties, except Pacific (Fig. 73, 74).

These declines in per capita mostly reflect population growth, with little corresponding change in the total number of organizations in each county. Grays Harbor had the most religious organizations in 2010 (51), and Jefferson County had the least (19 total).

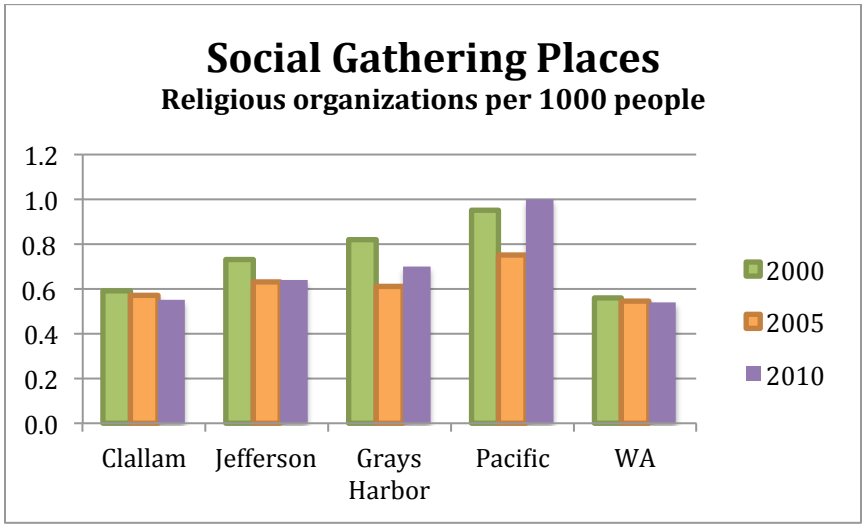


Figure 73: Social gathering places per 1000 people.

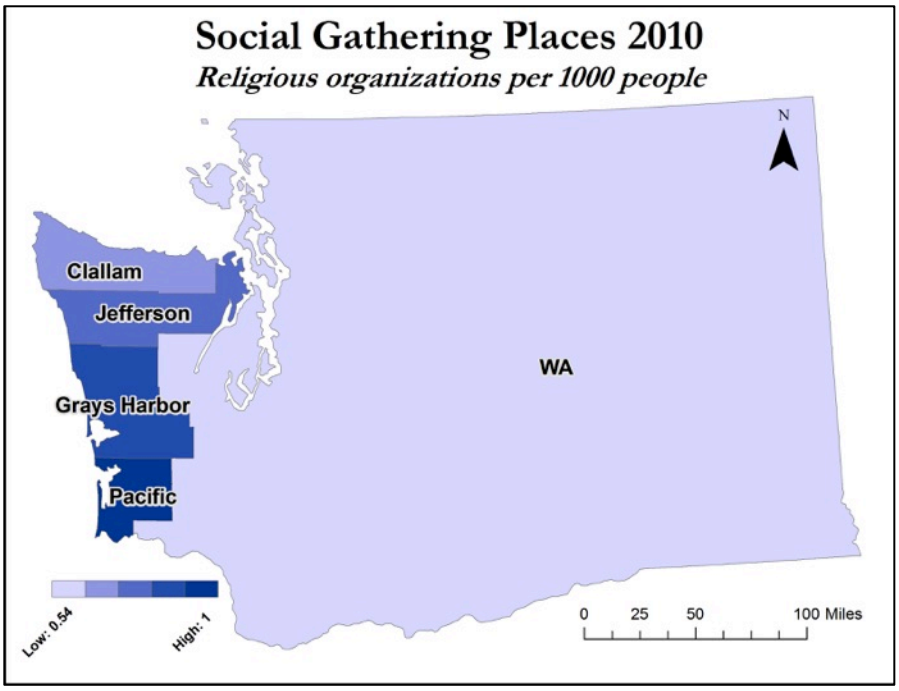


Figure 74: Geographic comparison of religious organizations per 1000 (in 2010)

Arts and culture

Apart from Grays Harbor County, the number of arts and humanities organizations in coastal counties is more numerous per capita than the state average (Fig. 75, 76). In Clallam and Jefferson this indicator improved since 2000, with an addition of 6 and 3 organizations, respectively.

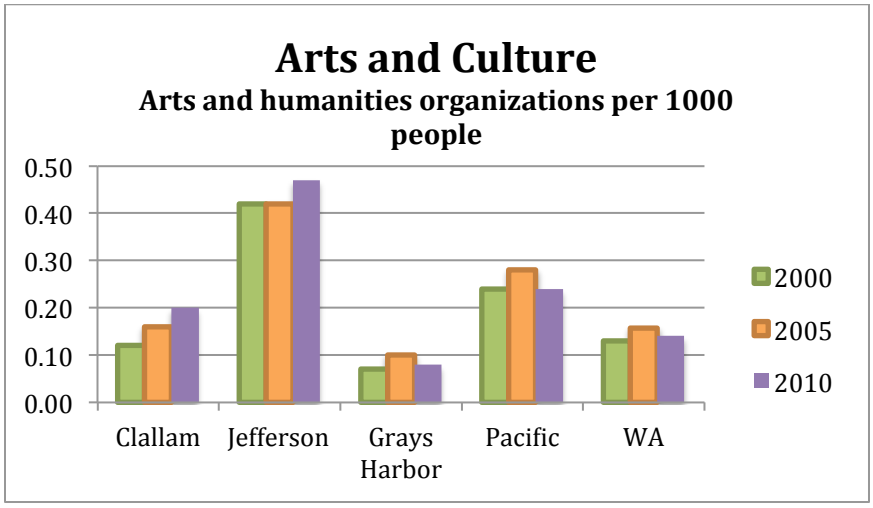


Figure 75: Arts and humanities organizations per 1000

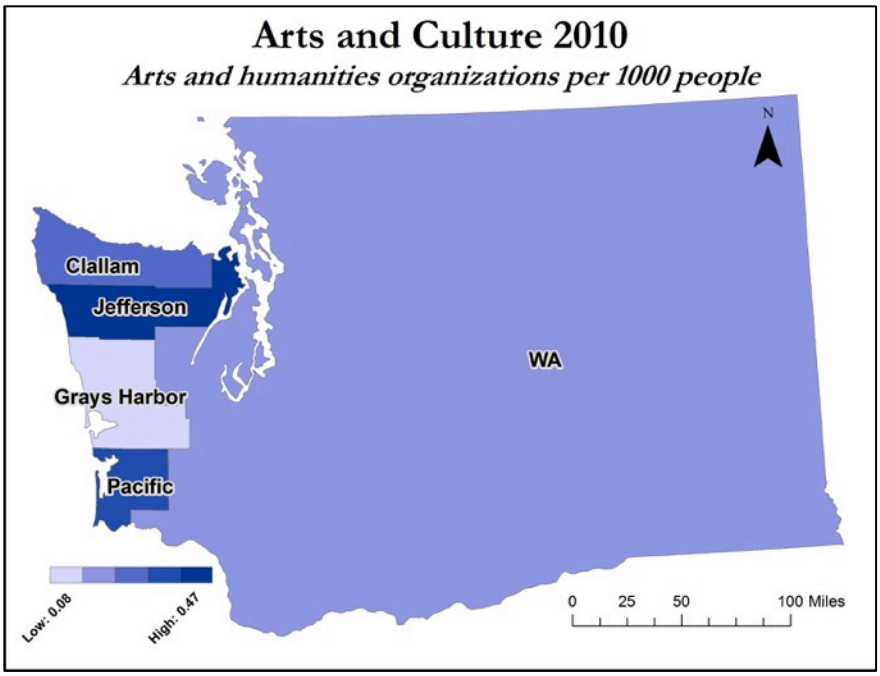


Figure 76: Geographic comparison of arts organizations, 2010

Tenure in community

The median number of years that a person lived in their household did not change from 2000 to 2010 for any coastal county, where people live in the same place for 8 years on average (Fig. 77, 78). Coastal County community tenure is a year longer than the state average, and suggests a degree of relative stability.

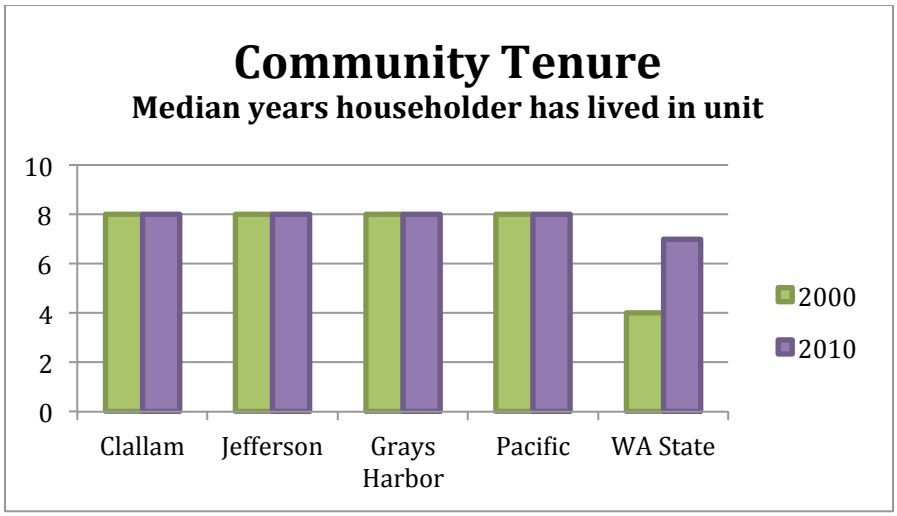


Figure 77: Community tenure

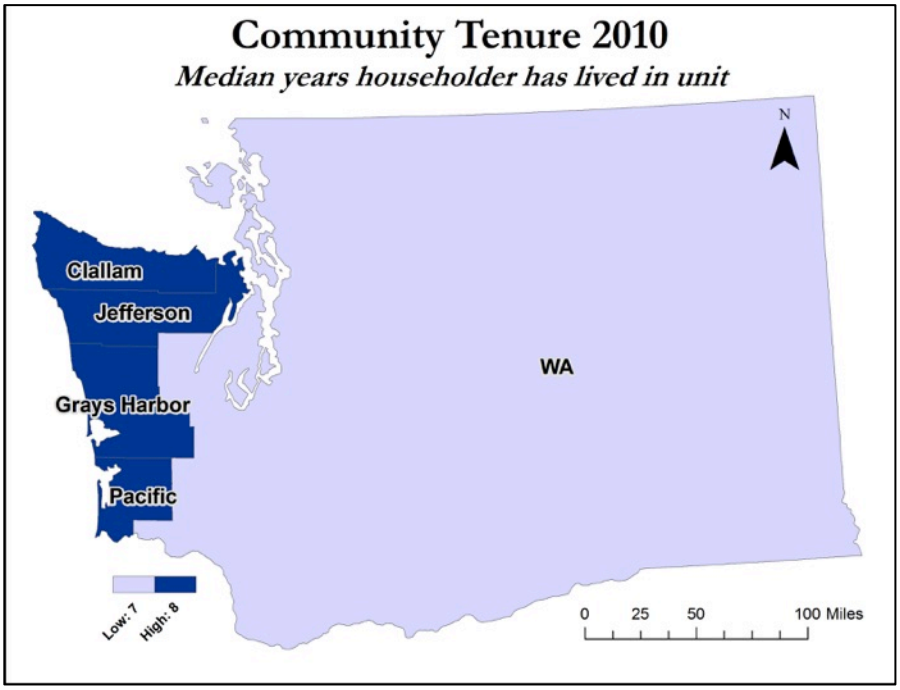


Figure 78: Geographic comparison of median years lived in household by county (2010)

Governance: planning and management

The Governance domain is comprised of three indicators to measure county planning, county management and emergency planning.

County planning

Clallam, Jefferson and Pacific counties each adopted their comprehensive plan sometime in previous 20 years (or after 1985) (Fig 79, 80). It's been 54 years since Grays Harbor adopted its comprehensive plan. Grays Harbor County workshop participants stated that it is not one of the counties under Washington State "Growth Management Act," which requires comprehensive planning.

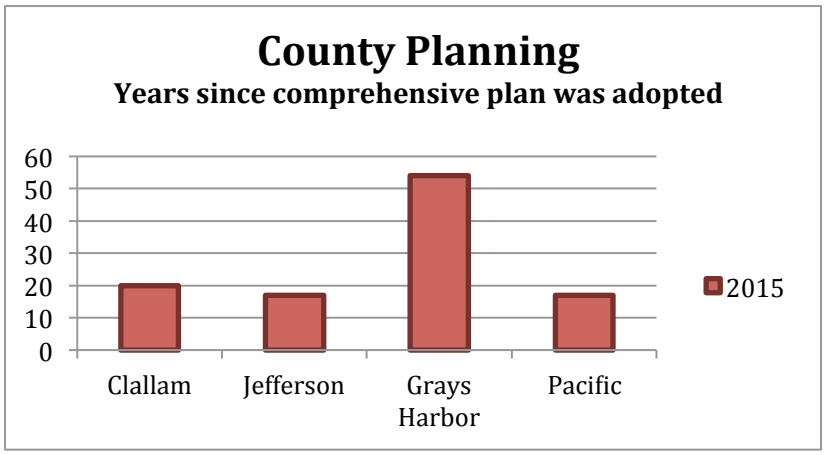


Figure 79: County planning

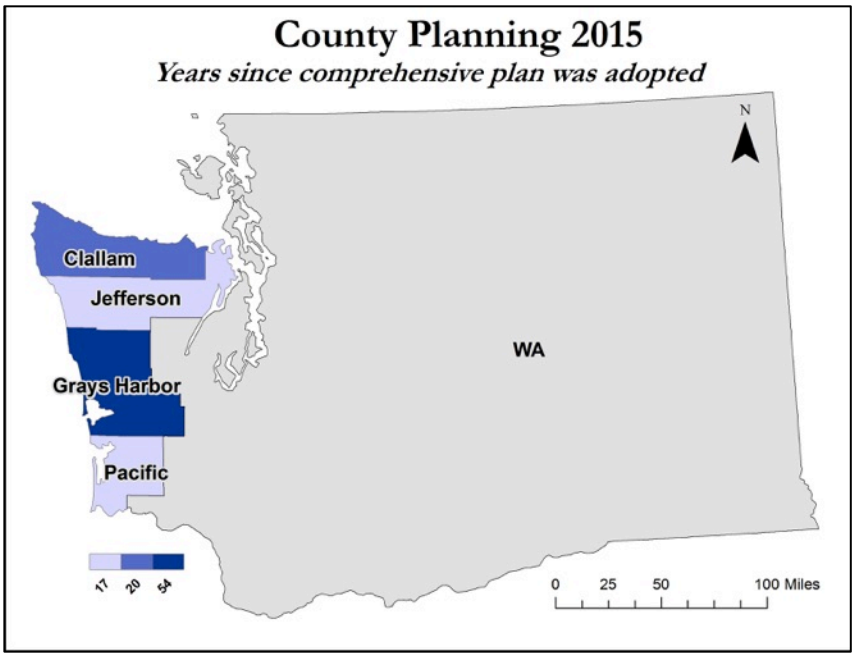


Figure 80: Geographic comparison of county planning, 2015 (WA not mapped)

County management

All four coastal counties have the lowest possible FEMA community ranking score of 10 (Fig. 81), indicating community floodplain management activities barely exceed minimum standards to prepare for and reduce exposure and vulnerability.

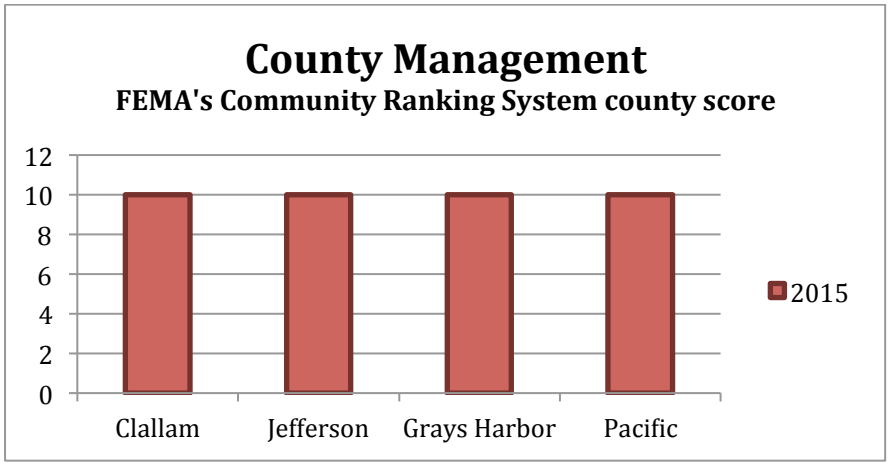
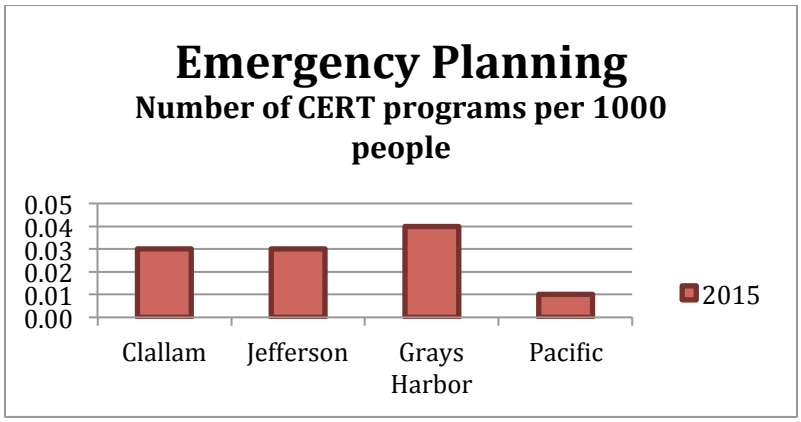


Figure 81: FEMA community ranking

Emergency planning

Emergency planning indicates the number of Community Emergency Response Team (CERT) programs per 1000 people in a county. As of 2015, there were between 1-3 total CERT programs carried out in each of the coastal counties (Figs. 82, 83). Grays Harbor County residents initiated more emergency planning activities per capita than other counties along the coast.



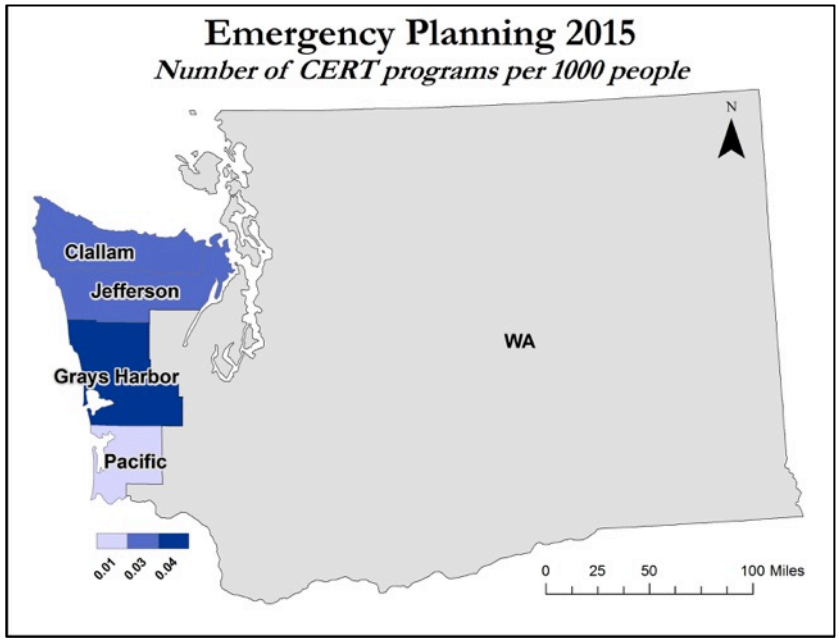


Figure 82: Map of CERT programs per 1000

Safety

The Safety domain is comprised of four indicators: two measuring environmental hazards (severe storms and floods) and two measuring personal safety (property and violent crime).

Exposure/Vulnerability to Severe Storms

The number of FEMA funded public assistance projects for declared natural hazard storm events per 1000 people increased for all coastal counties during the 5-year period from 2006-2010 from the previous 5 years (Figs. 83, 84). This change indicates an increase in the *Exposure to Severe Storms*, using declared events projects as a proxy. Between 2006-2010, there were 56 declared event projects in Jefferson County, and 380 in Grays Harbor County. Workshop participants agreed that the number of severe storms increased during the second half of the decade.

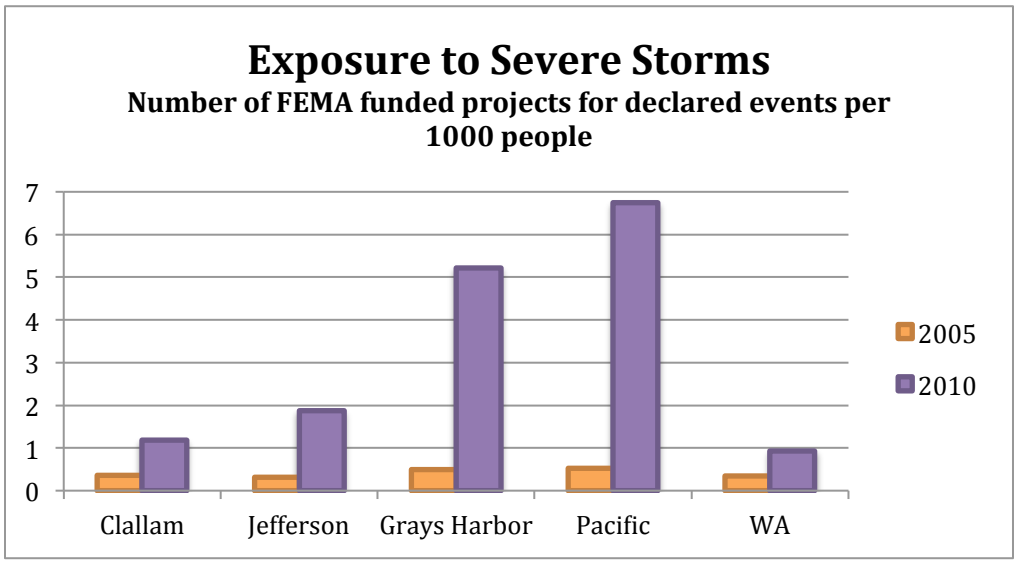


Figure 83: Exposure to severe storms

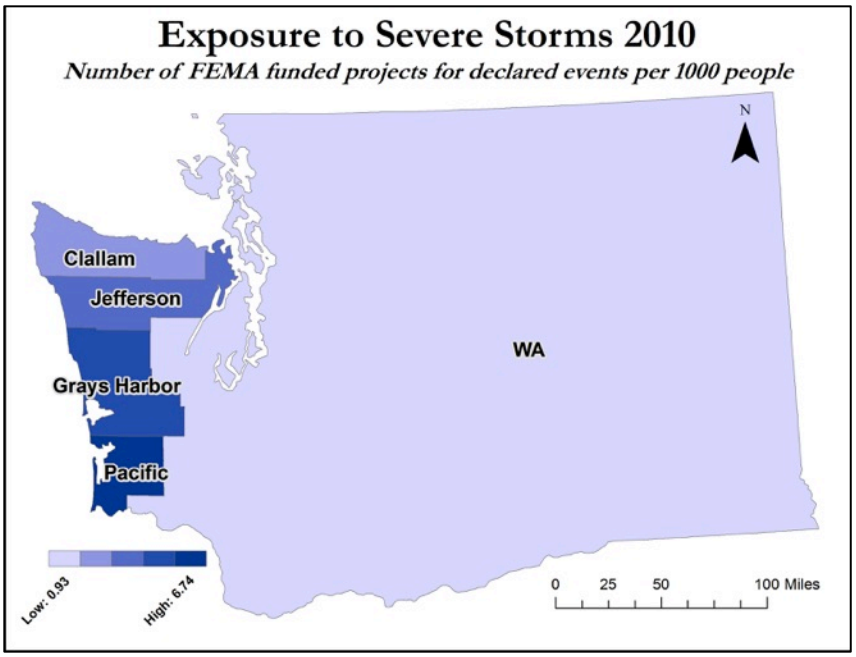


Figure 84: Map of number of FEMA funded severe storm projects per 1000

Exposure/Vulnerability to Floods

Grays Harbor County has the greatest proportion of population vulnerable to floods, where nearly 25% reside in the Special Flood Hazard Area (SFHA zone) (Figs. 85, 86). Pacific County flood exposure is just over 15% of the population. These figures compare to Jefferson and Clallam counties on the low ends of exposure, where fewer than 3% of the populations are located in the flood hazard area.

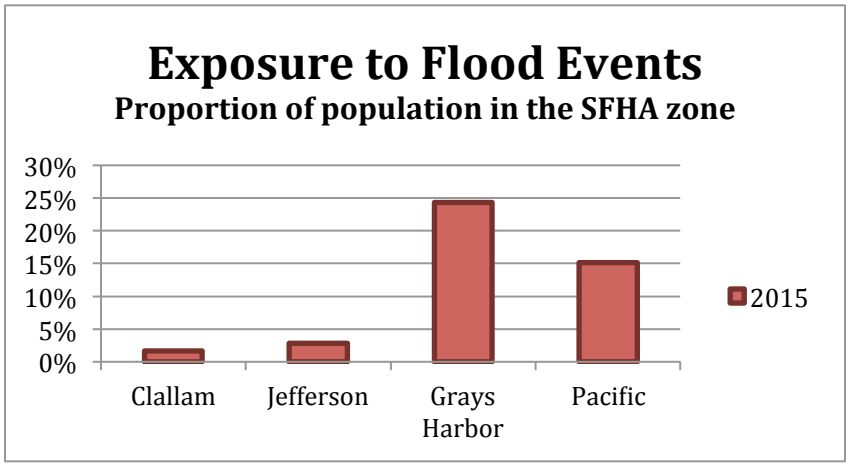


Figure 85: Exposure to floods

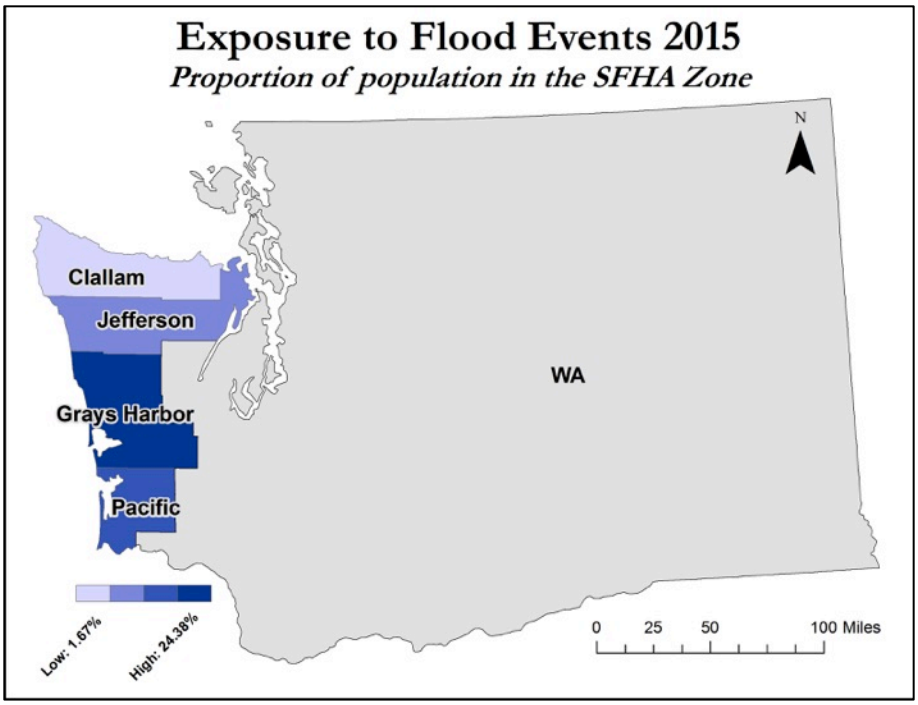


Figure 86: Geographic comparison of population in flood zone

Exposure/Vulnerability to Property Crime

Property crime rates fell in all four coastal counties, as is also the case for the state average (Figs. 87, 88). Property crime is lowest in Grays Harbor and Clallam County, followed by Jefferson. While Pacific County had higher property crimes than the other coastal counties, it is still below the state average by nearly half.

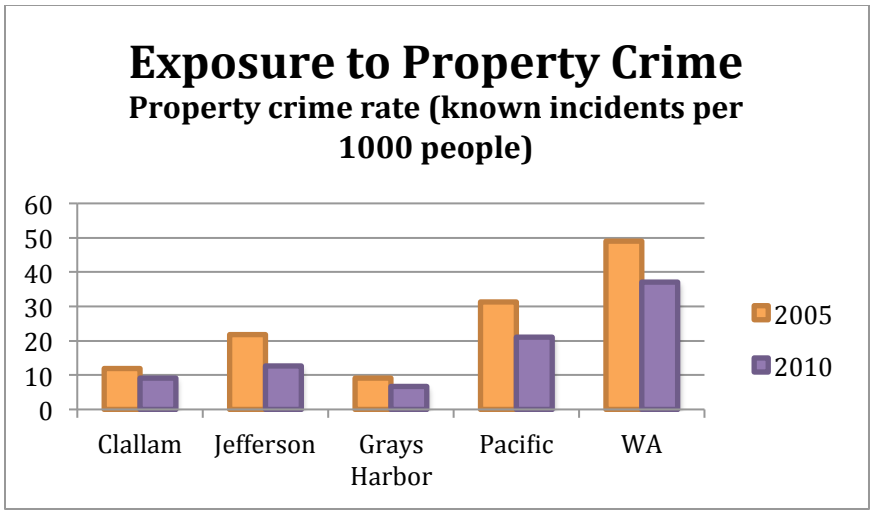


Figure 87: Exposure to property crime

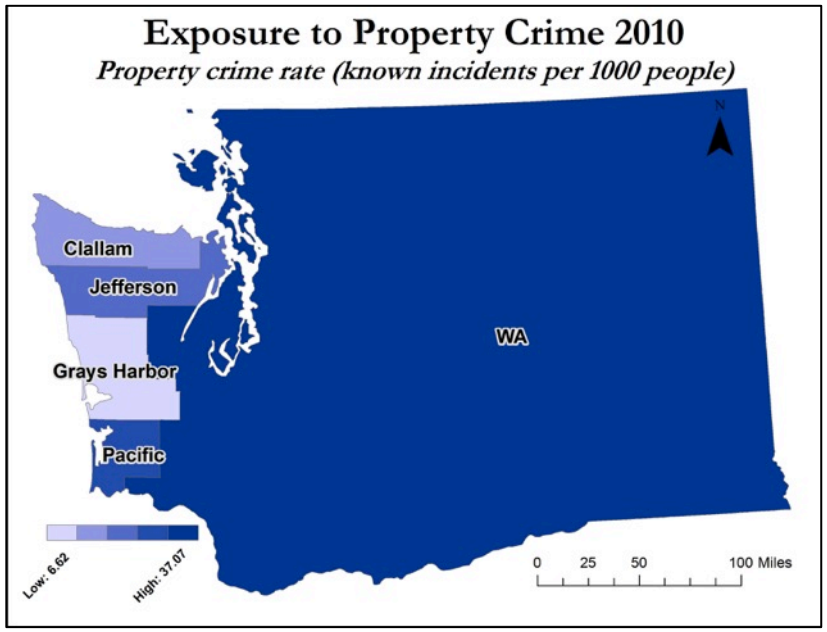


Figure 88: Geographic comparison of crime per 1000 (2010)

Exposure/Vulnerability to Violent Crime

Similarly, violent crimes in coastal counties are lower than Washington State averages by over half (Figs. 89, 90). These rates have fallen in all coastal counties between 2005 and 2010. Jefferson County had the highest rate of violent crime among the coastal counties, followed by Pacific County. Similar to property crime rates, Grays Harbor County had the lowest violent crime rates for coastal counties.

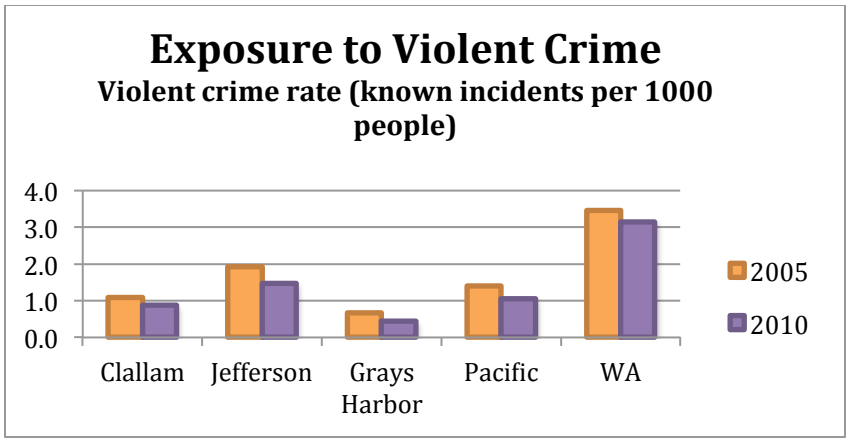


Figure 89: Exposure to violent crime

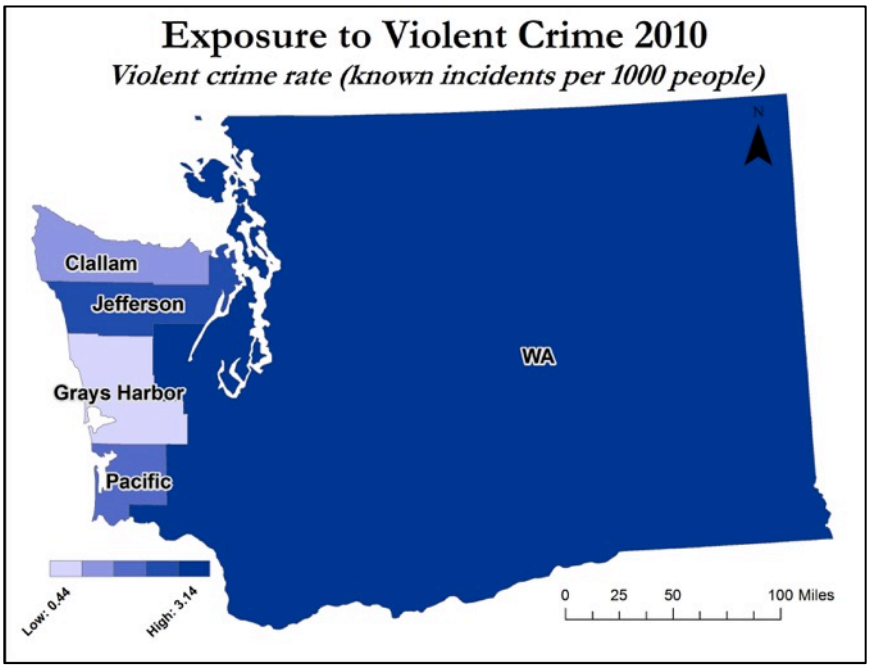


Figure 90: Geographic comparison of exposure to violent crime, 2010

Environmental conditions

The Environmental conditions domain is comprised of four indicators: air quality, beach water quality, beach closures, and impervious cover.

Air quality

Air quality scores improved in Clallam County over the decade of 2000-2010 by 10 points, but worsened in Jefferson and Grays Harbor counties, where the air quality is poorer than Washington State average (Figs. 91, 92). Data were not available for Pacific County.

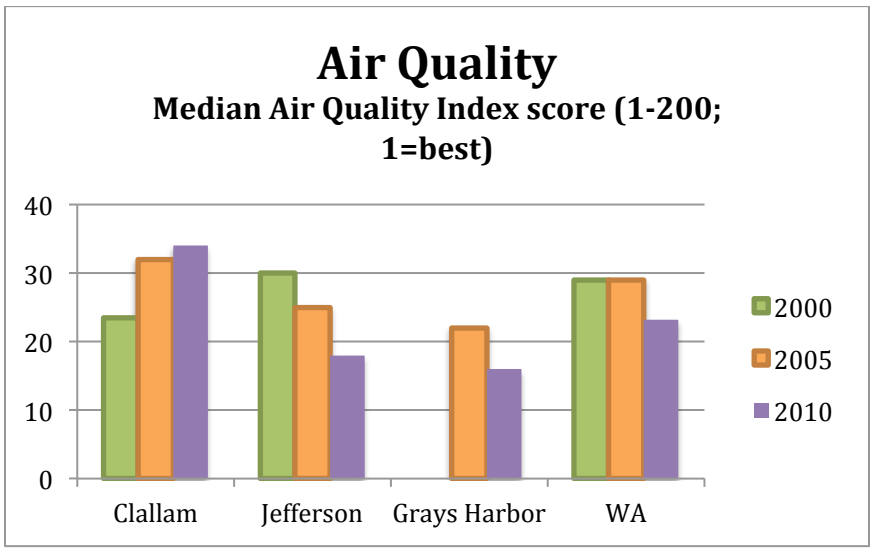


Figure 91: Air quality

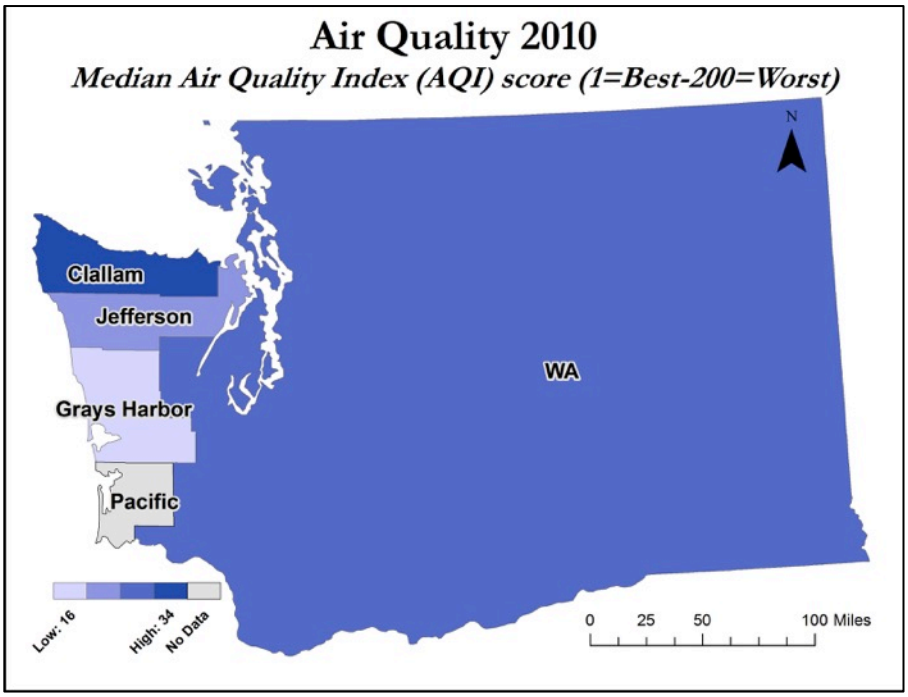


Figure 92: Geographic comparison of median air quality

Beach water quality

Coastal beach water quality improved to the best grades in Clallam and Grays Harbor from 2005 to 2010 (Figs. 93). Data were only partially available for Jefferson County, and were not available for Pacific County.

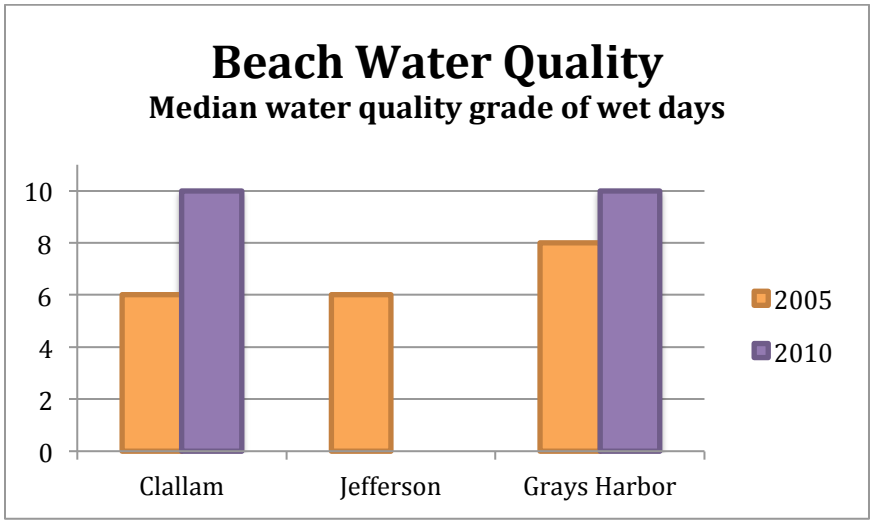


Figure 93: Beach water quality

Beach closures

Despite better water quality grades in the second half of the decade, there was an increase in the number of recreational harvest beach closures per mile of shoreline in Clallam County (4 closures in 2005, and 6 in 2010) (Figs. 94, 95). Consistent with the time periods in this assessment, we graphed data for the 2000, 2005 and 2010 periods. Data collection on beach closures started in 2002, thus there is no data for 2000. There were no reported recreational harvest beach closures in Grays Harbor and Pacific counties for these two time periods. Closures remained the same (5 closures) during each period Jefferson County. During the intervening years (every year from 2002-20013) there were additional closures important to consider (see table 1).

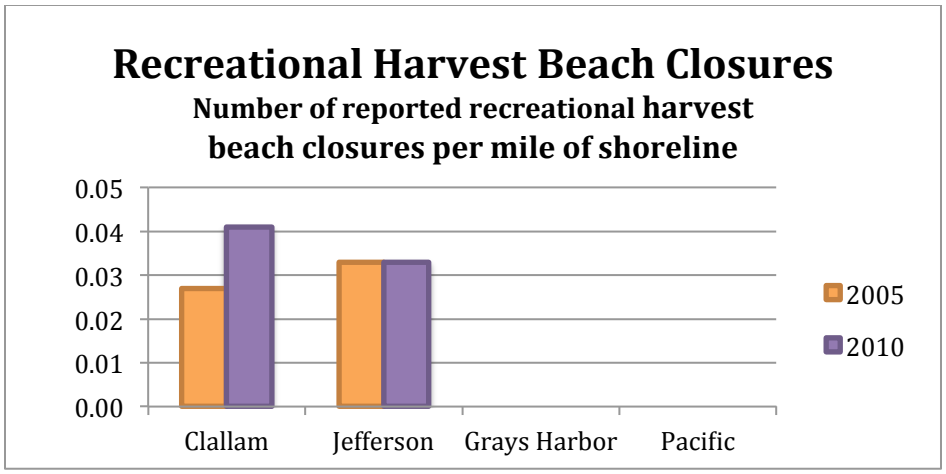


Figure 94: Recreational harvest beach closures

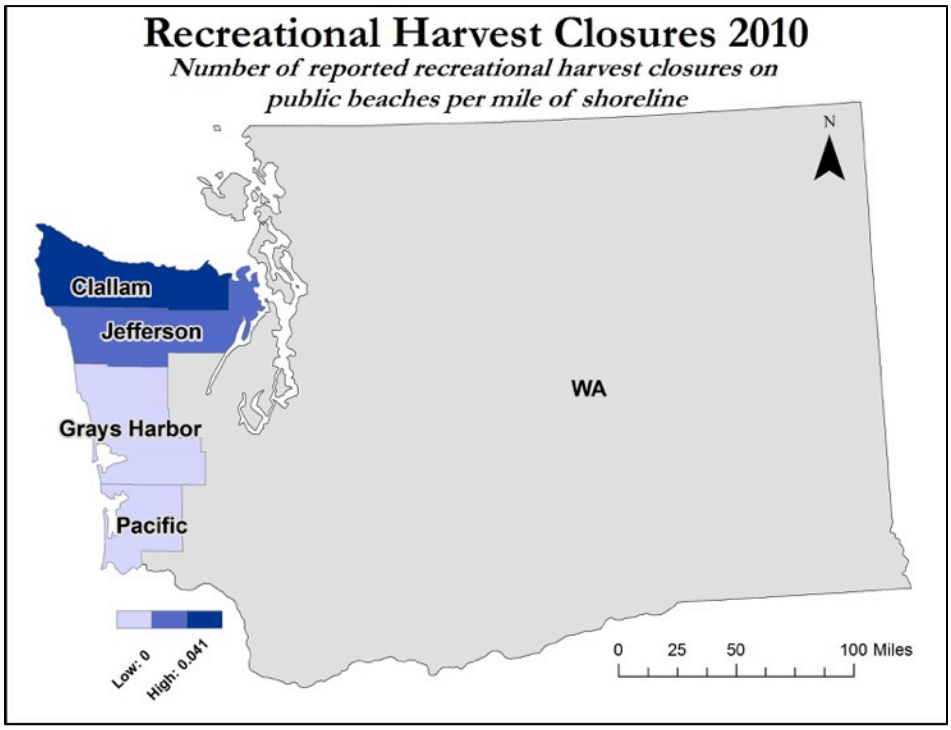


Figure 95: Geographic comparison of harvest beach closures, 2010

Table 1. Total number of recreational harvest beach closures for each coastal county, 2002-2013

County	Closed to all harvest species (# of closures)	Closed to butter clams or varnish clams (# of closures)	Total # of full or partial harvest beach closures (2002-2013)
Clallam	49	30	**79**
Jefferson	48	29	**77**
Grays Harbor	2	0	**2**
Pacific	3	2	**5**

Impervious cover

All four coastal counties experienced less than 10% development or change in impervious land cover from 2000 to 2010 (Figs. 96, 97). The greatest change occurred in Clallam County. Grays Harbor County remains the county with the most percent of land cover that is developed, which is still on the low end at just over 2%.

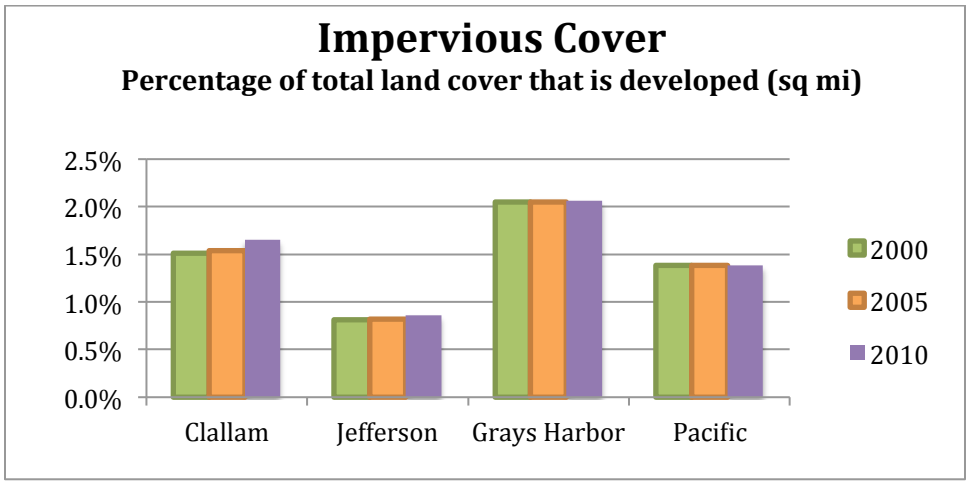


Figure 96: Impervious cover

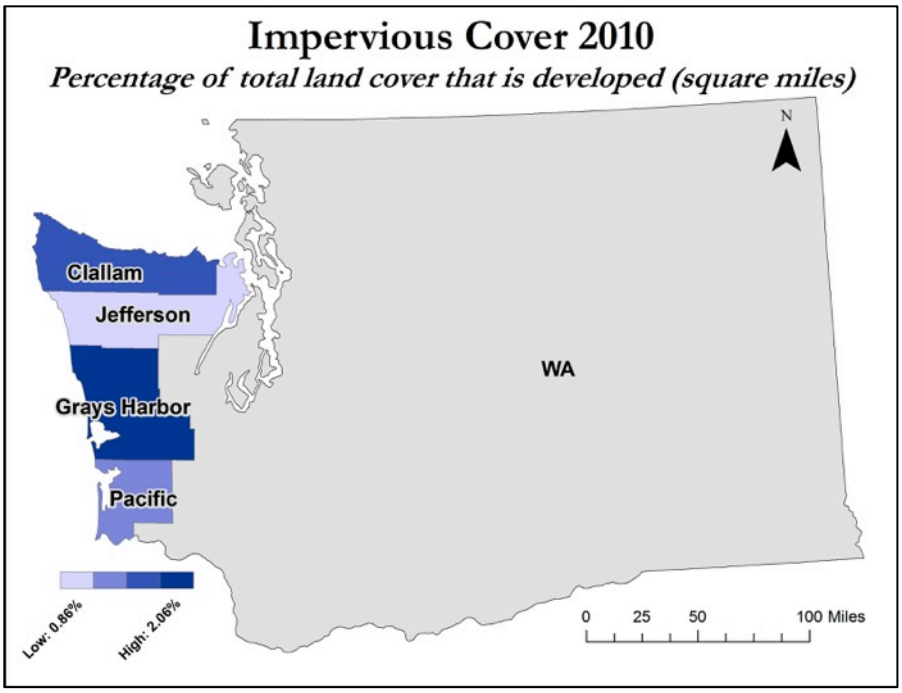


Figure 97: Geographic comparison of % impervious cover, 2010

Economic Security

For the economic security domain, we evaluated 10 indicators: median household income, poverty, childhood poverty, income inequality, unemployment, employment diversity, industry distribution, gross domestic product, federal governmental expenditure, local governmental revenues.

Median Household Income

All four coastal counties saw nominal increases to median household income in 2005, 2010, and 2013 (Figs. 98, 99). However, all four counties saw decreases to real income (based on 2013 inflation adjusted dollars) between 2000 and 2013, experiencing a decrease in household purchasing power over this time. Jefferson County has the highest median household income in 2013 at $46,320 and Pacific County has the lowest at $39,830. Even though Jefferson County has the highest median income, it experienced the largest decline in real wages with a decrease of 9.6% or $4,910.

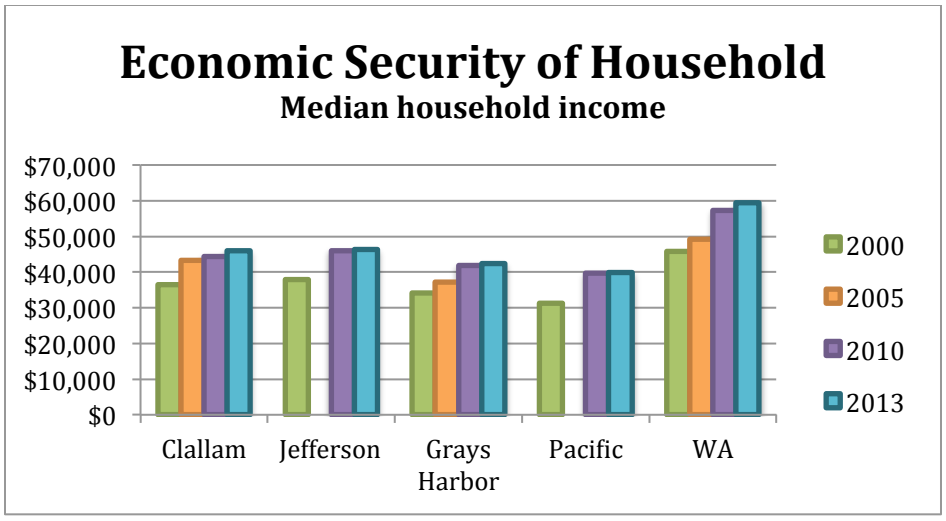


Figure 98: Median household income

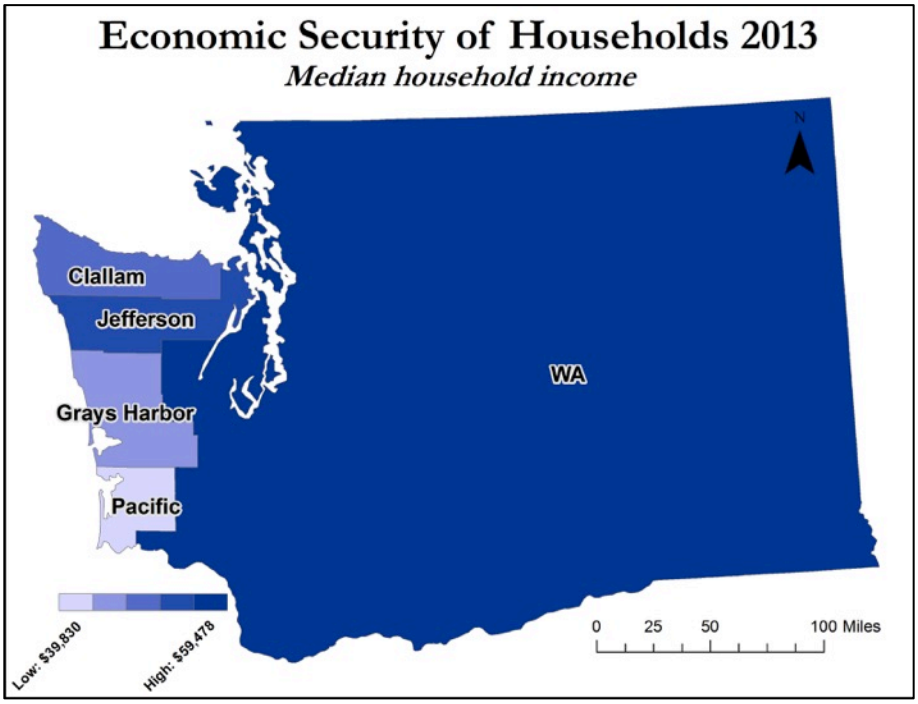


Figure 99: Geographic comparison of median household income

Poverty

The percent of people below the poverty line is higher in all four coastal counties that the state average in 2010 of 12% (Figs. 100, 101). Poverty grew from 2000 to 2010 for all

counties except Grays Harbor. While relatively stable, poverty in Grays Harbor County is second highest on the coast (at 16%) following Pacific County (17%). Pacific and Jefferson counties experience the greatest rate of change during our study period (3 percentage point increases).

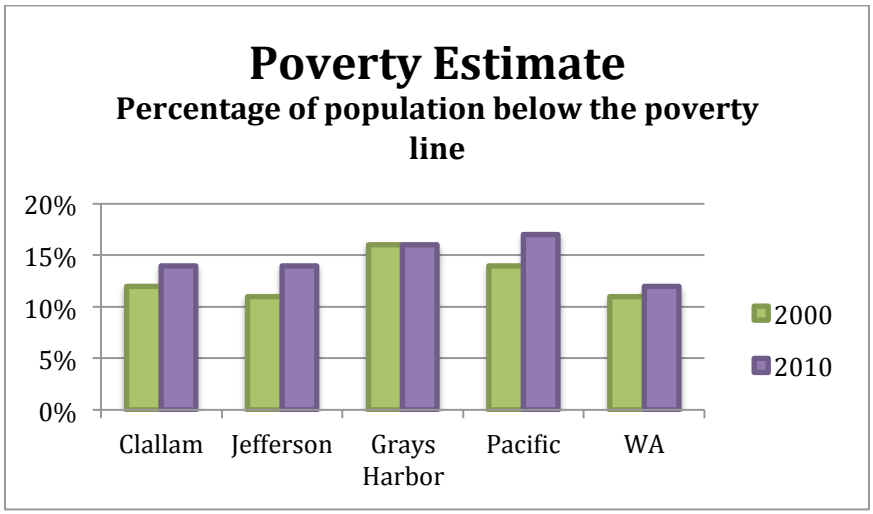


Figure 100: Percent population below poverty line

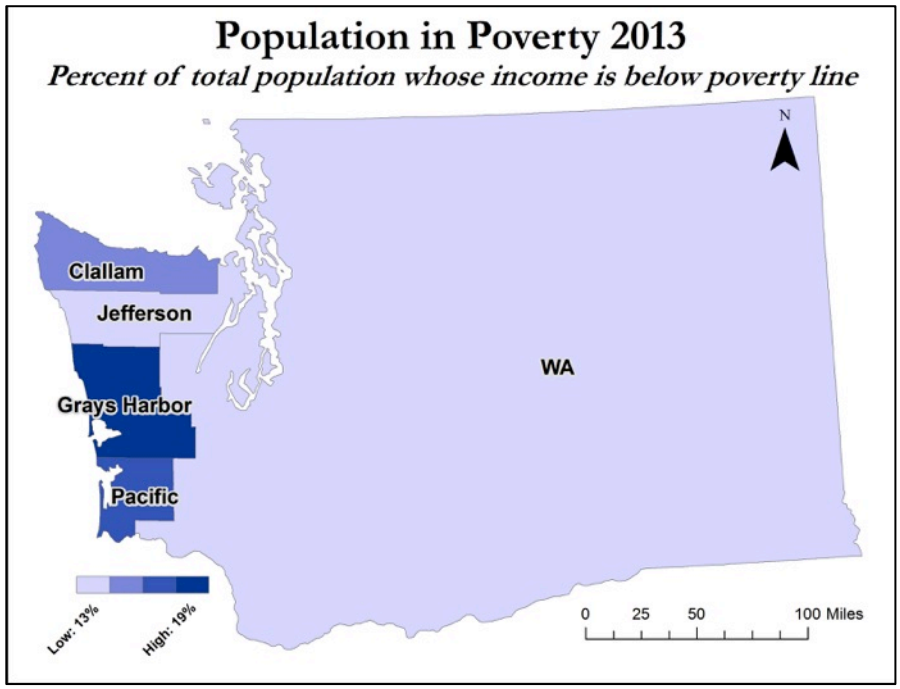


Figure 101: Geographic comparison of population in poverty, 2013

Childhood Poverty

The percent of people under 18 years of age in poverty increased in all four coastal counties from 2000 – 2010 (Figs. 102, 103). Poverty rates continued to increase through 2013 for three of the four coastal counties. Clallam County is the only county to experience a decrease in 2013. Pacific County saw the largest increase in poverty rates between 2010 and 2013, with an increase of 6.1%.

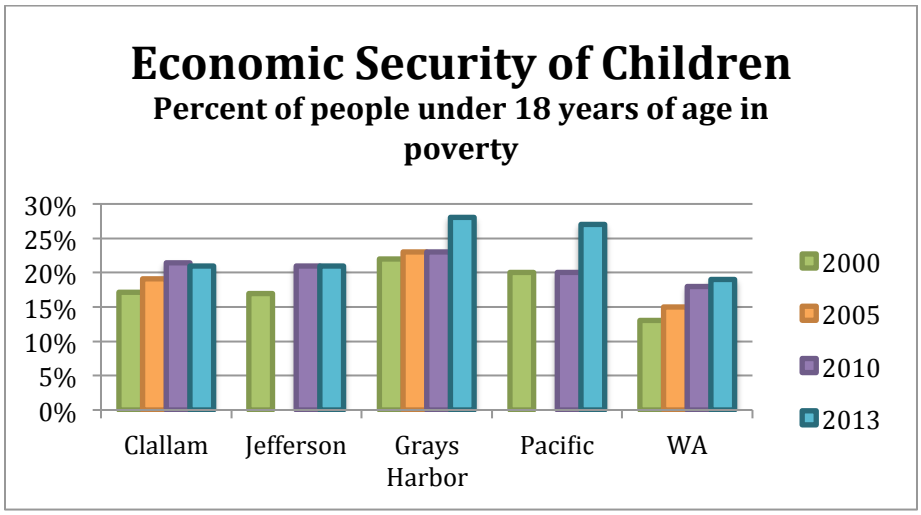


Figure 102: Percent of children in poverty

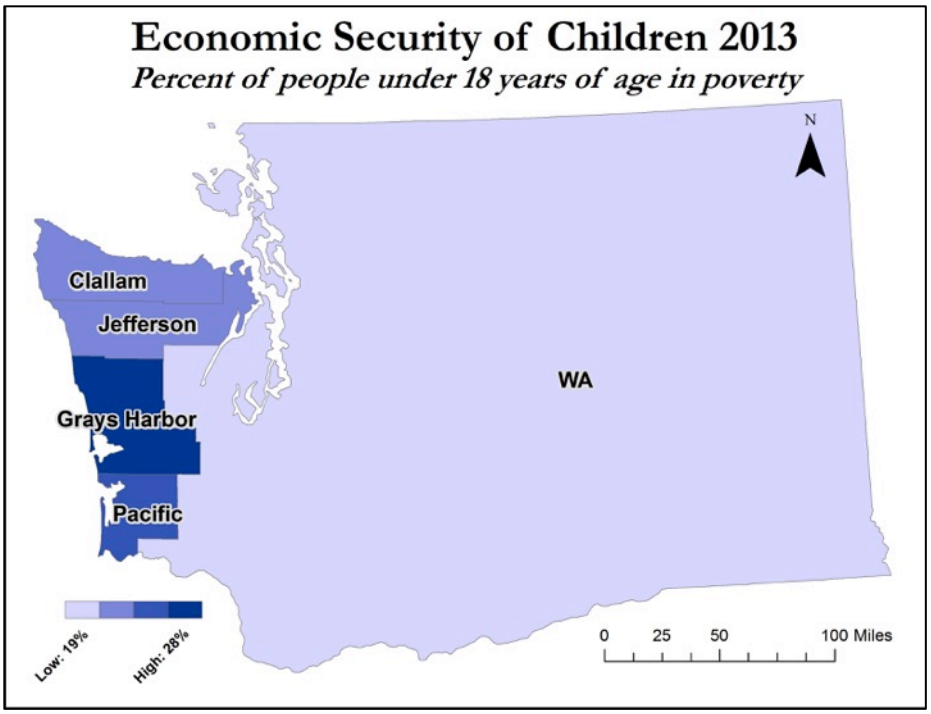


Figure 103: Geographic comparison of children in poverty, 2013

Income Inequality

Household income inequality is measured by the Gini coefficient, which is a ratio used to assess the distribution of wealth (i.e., "the gap between rich and poor") in an area. Numbers closer to 1 indicate the greatest inequality, and 0 would indicate that wealth (measured as income) is equal among everyone. The average ratio in Washington State in 2010 was 44, and the range for counties in the state is between 40-51 (Robert Wood Johnson: 2015). Jefferson and Pacific counties had slightly higher inequality than Clallam or Grays Harbor counties (Figs. 104, 105). Inequality grew between 2010 and 2013 in Grays Harbor more than the other counties. Clallam County has the lowest inequality.

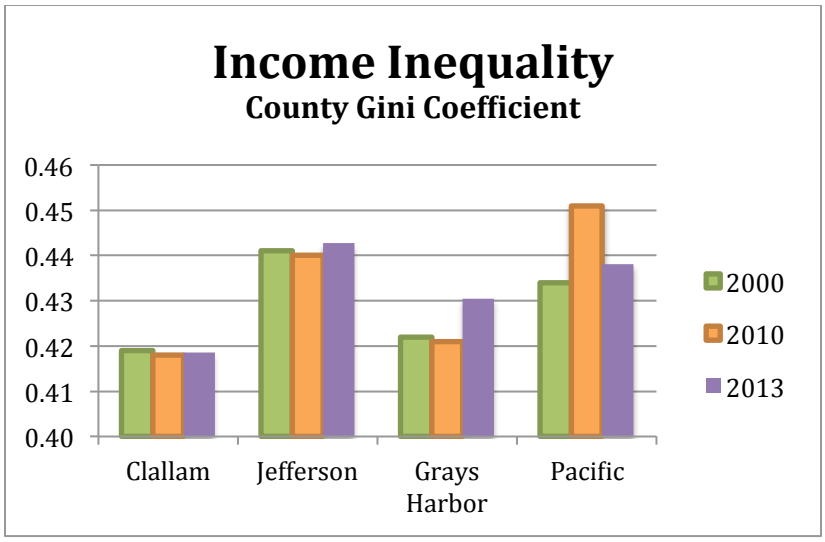


Figure 104: Income inequality

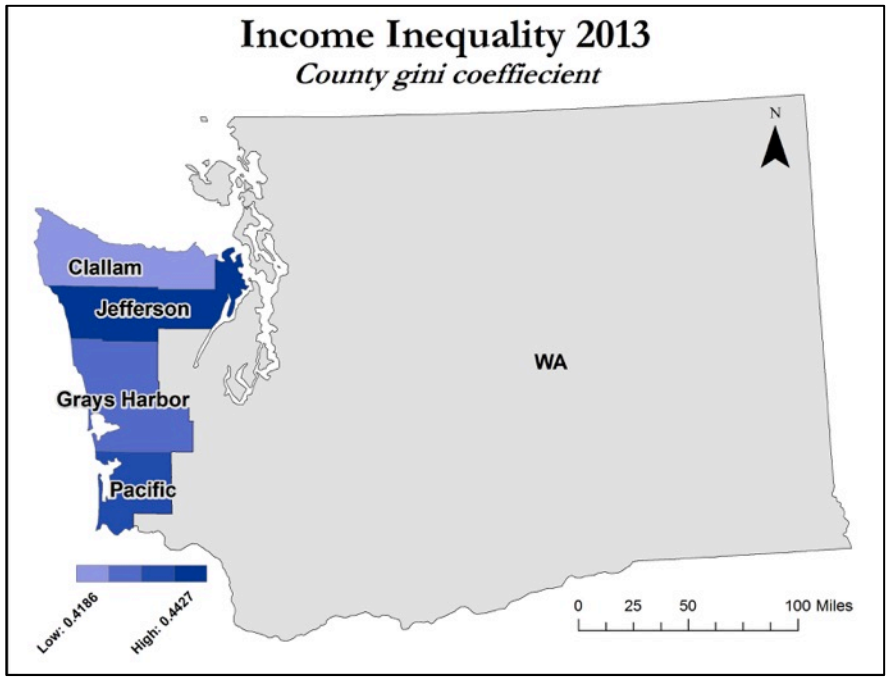


Figure 105: Geographic comparison of income inequality, 2013

Unemployment

All four counties saw increases in their unemployment from 2000 to 2010, but had decreases in unemployment between 2010 and 2013 (Figs. 106, 107). All four counties continue to have unemployment at levels above what they were in 2000 and 2005. These

patterns match changes to unemployment for the state of Washington. Jefferson County had the lowest unemployment in 2013 at 9%, and Grays Harbor had the highest at 11.8%, both are well above the state average of 7%.

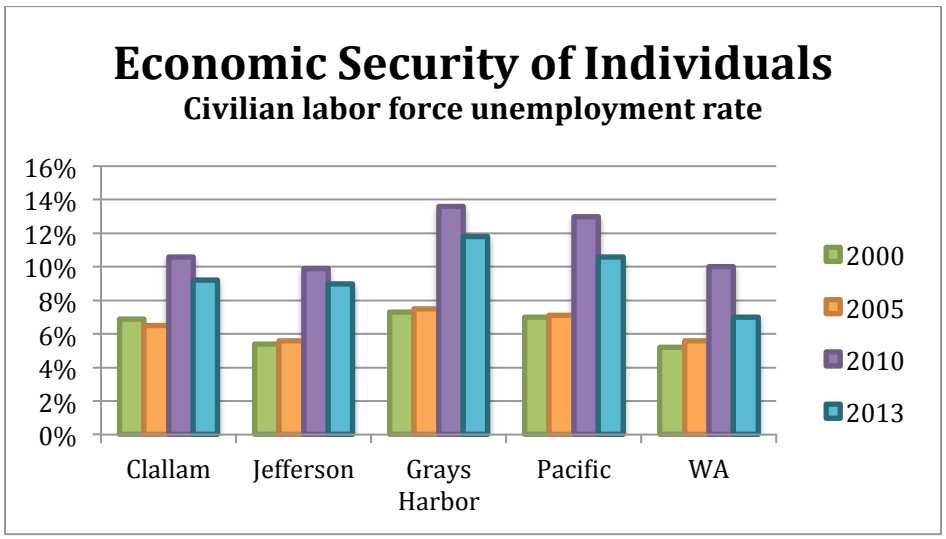


Figure 106: Unemployment rates

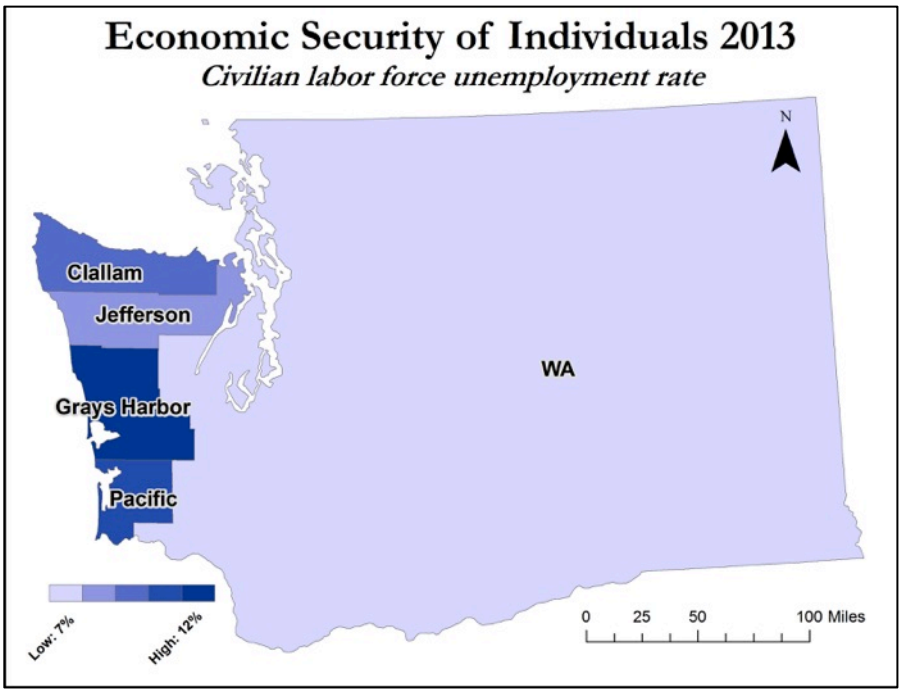


Figure 107: Geographic comparison of unemployment, 2013

Employment Diversity

Economic resilience is sometimes measured by economic diversity, where greater diversity represents more resilience or economic stability for a county. We use the Ogive index to measure this indicator, representing an index of the percentage of employment in different industries. All four coastal counties increased their economic diversity of employment between 2000 and 2013, a positive change for wellbeing (Fig. 108). Clallam County had the highest economic diversity, and Pacific County had the lowest economic diversity (Fig. 109). Jefferson County experienced the largest increase in economic diversity between 2000 and 2013. Pacific County experienced the smallest increase in economic diversity between 2000 and 2013.

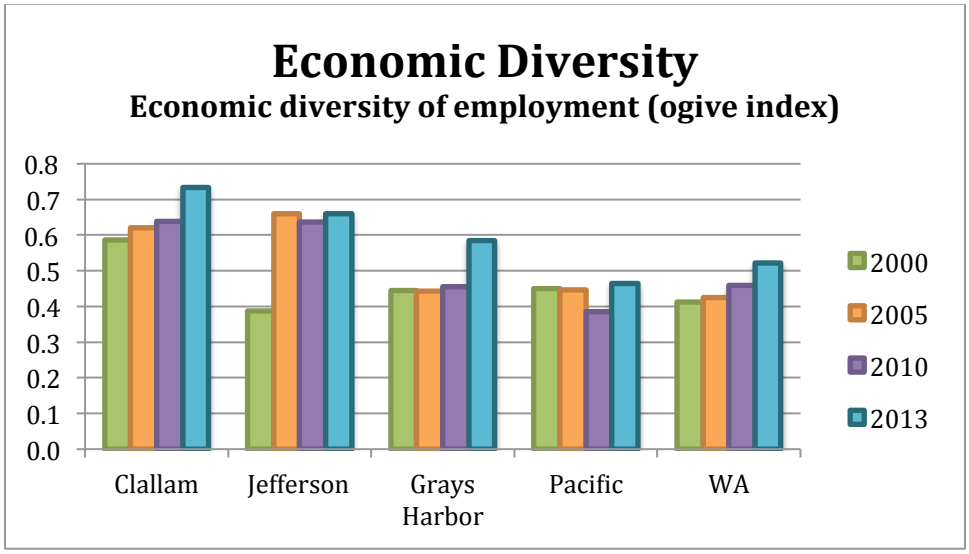


Figure 108: Economic diversity

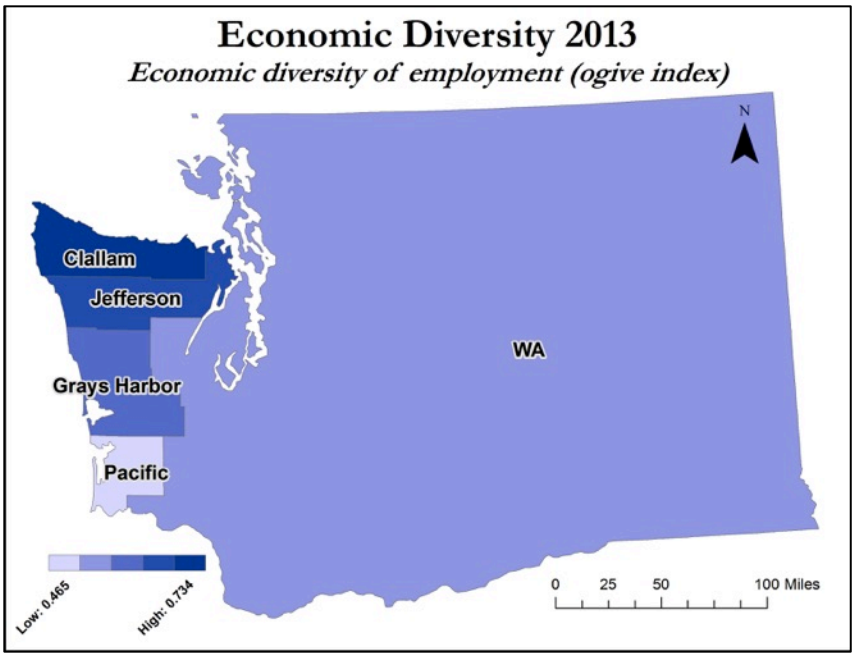


Figure 109: Geographic comparison of economic diversity, 2013

Industry Distribution

Another way to assess economic diversity is by measuring the distribution of jobs by industry sector. The largest industry sector is education and health (between 18% to 28% of coastal employment was comprised of this sector) (Figs. 110, 111, 112, 113). Leisure and hospitality, public administration, manufacturing, and construction are the other top industries for coastal counties. Natural resources based livelihoods (forestry, fishing, and mining) were identified in the 2013 local values and marine spatial planning workshops as one of the most important sectors characterizing coastal communities (see chapter 4). Natural resources jobs played the biggest role in Pacific County, comprising 9% of county employment in 2000, 2005 and 2010; increasing to 10% in 2013, with nearly 600 jobs. Natural resources played a relatively smaller role in the other counties, which ranged between 2-5%, with the lowest in Jefferson County (2%). The Bureau of Labor Statistics does not disaggregate natural resources jobs by activity (fishing, forestry, mining). Fishing sectors are arguably more sensitive to marine changes (e.g., new ocean uses) than other natural resource industries.

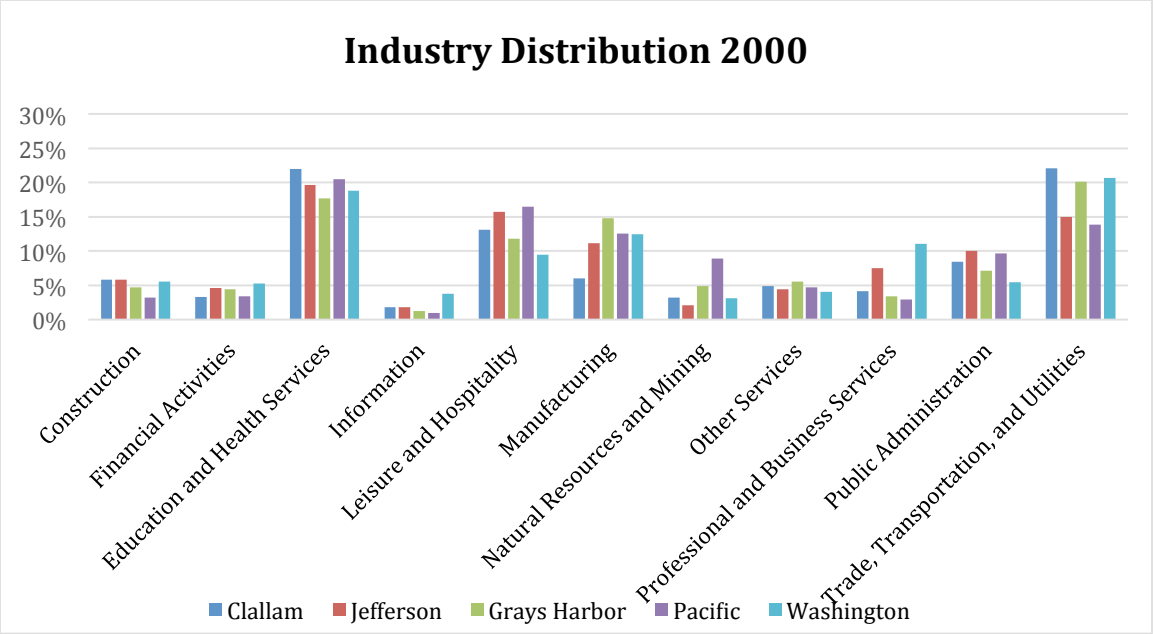


Figure 110: Industry distribution, 2000

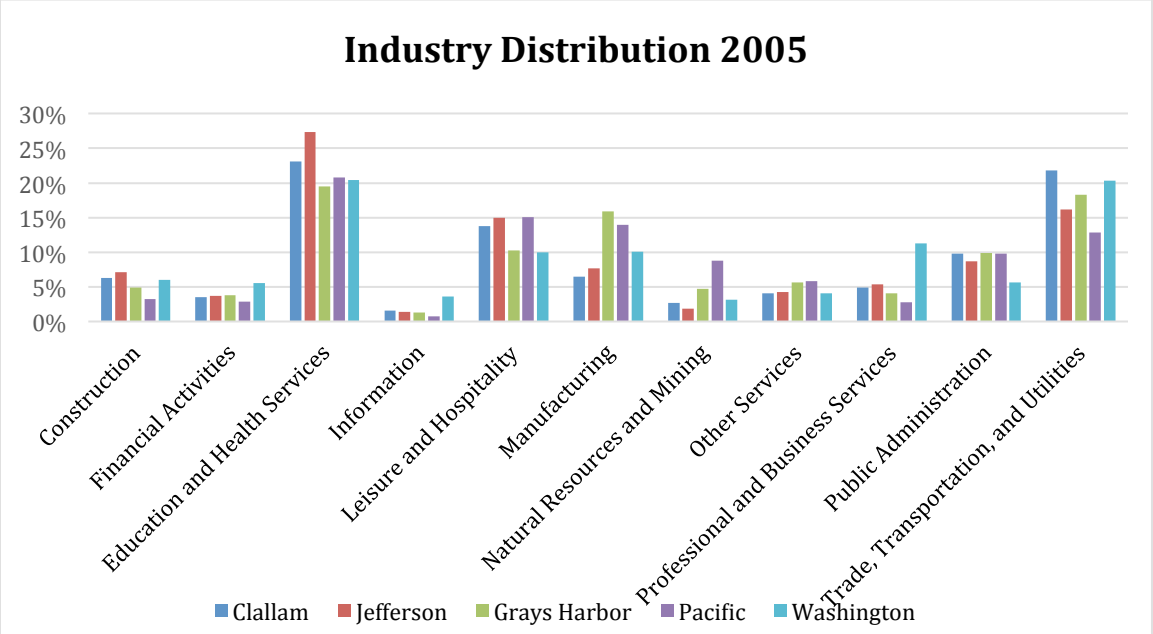


Figure 111: Industry distribution, 2005

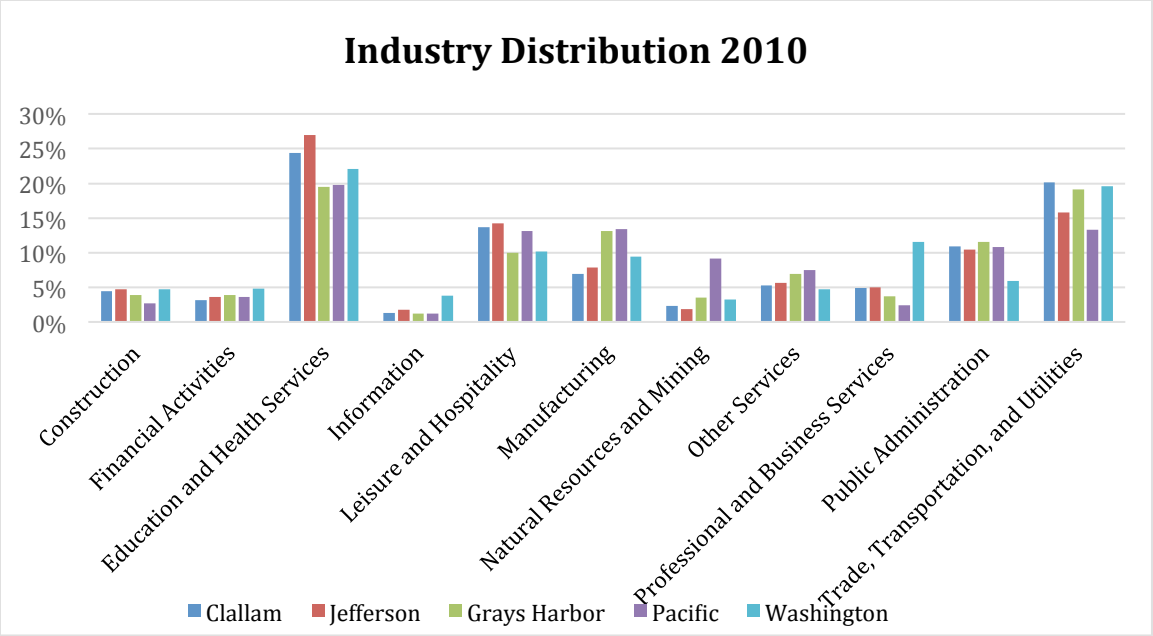


Figure 112: Industry distribution, 2010

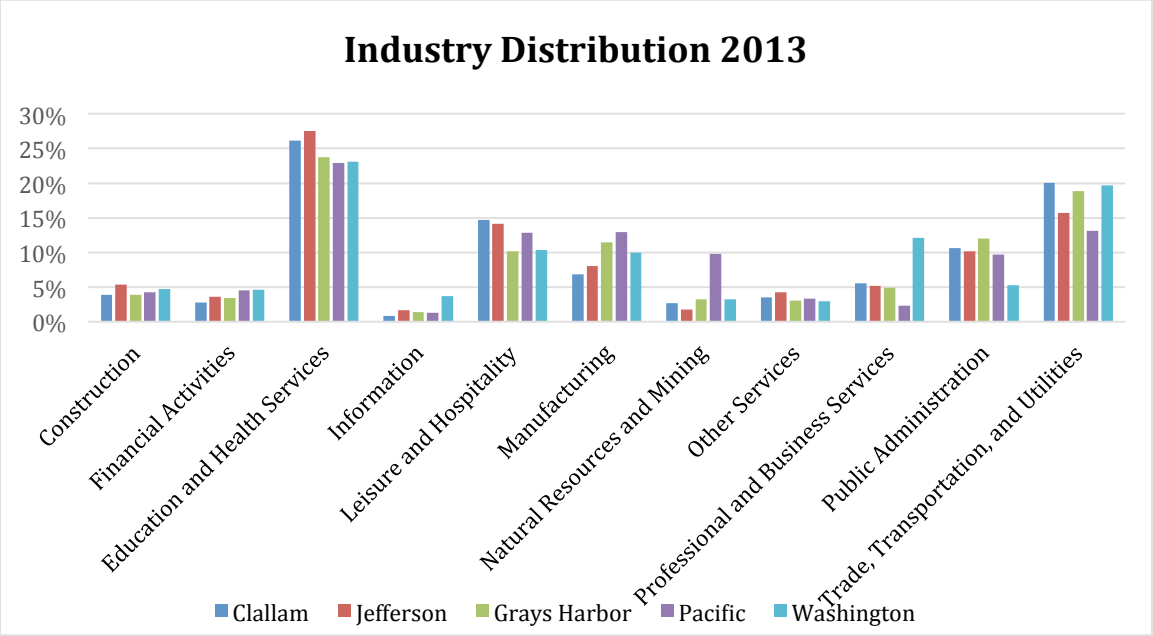


Figure 113: Industry distribution, 2013

Gross Domestic Product

All 4 counties experienced growth in Gross domestic product from 2000 – 2005, 2005 – 2010, and 2010 – 2013 (Figs. 114, 115, 116). The difference in GDP between Grays Harbor and Clallam has declined between 2000 and 2013. In 2000, Clallam County's GDP was $1.2B and Grays Harbor County's GDP was $1.5B, with a difference of approximately $326M. In 2013, Clallam County's GDP was $2.03B and Grays Harbor County's GDP was $2.04B, with a difference of approximately $4.4M. Grays Harbor has the largest GDP, just barely above Clallam County. Pacific County has the smallest GDP at $519.4M

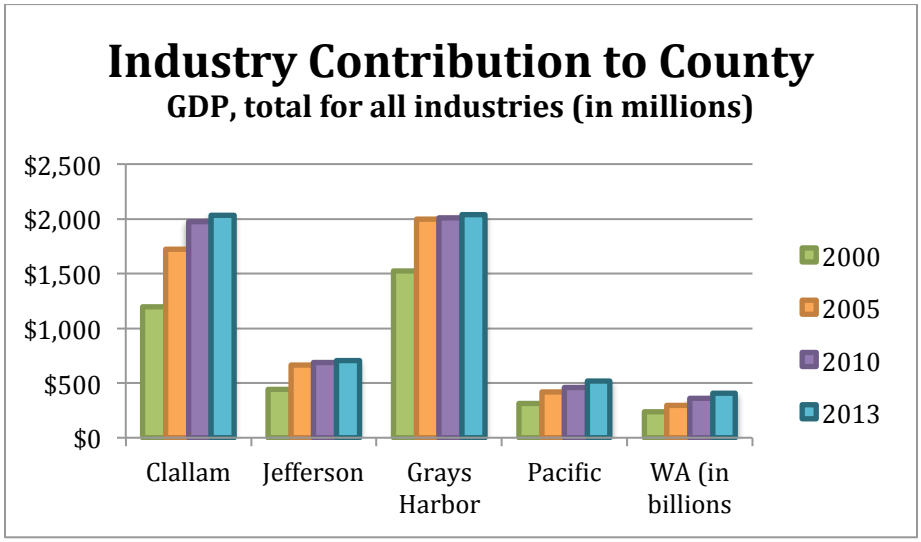


Figure 114: GDP total

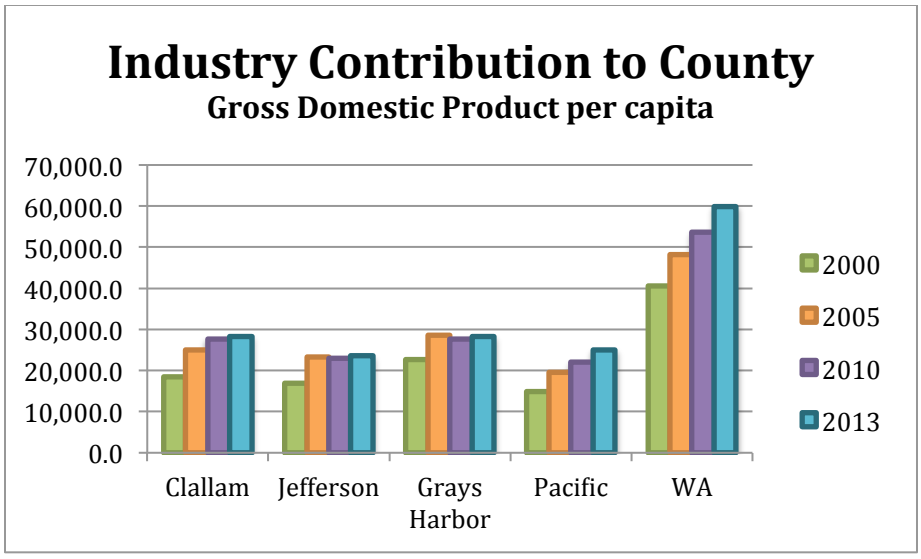


Figure 115: GDP per capita

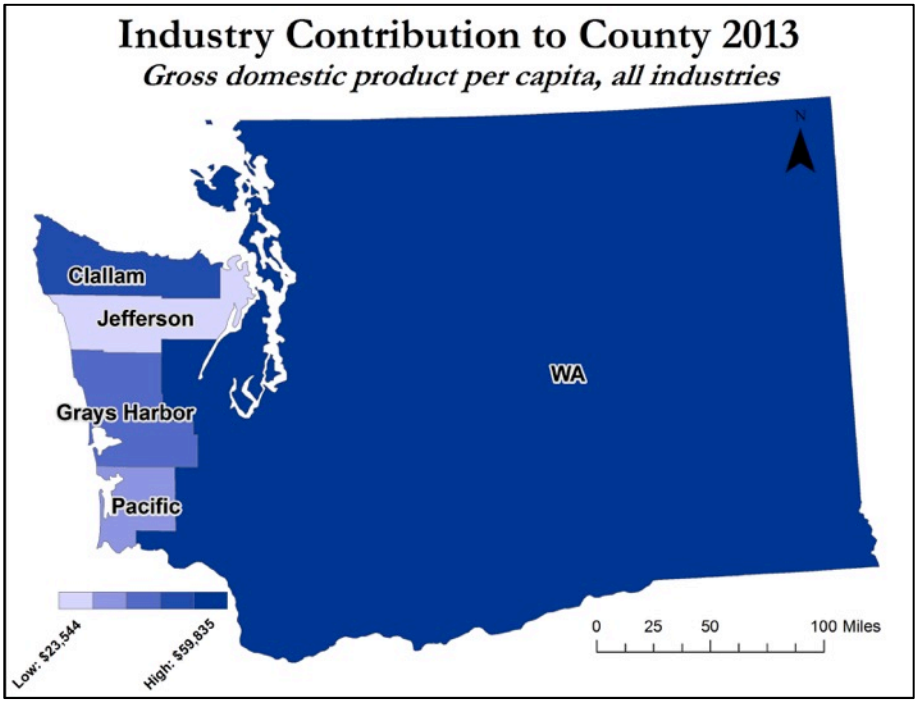


Figure 116: Geographic comparison of GDP, 2013

Federal Governmental Expenditure

Federal expenditures have increased every year in all four coastal counties. Grays Harbor County receives the lowest federal expenditures at $9.5M/1,000 people and Clallam County receives the highest at $11.9M/1,000 people (Figs. 117, 118).

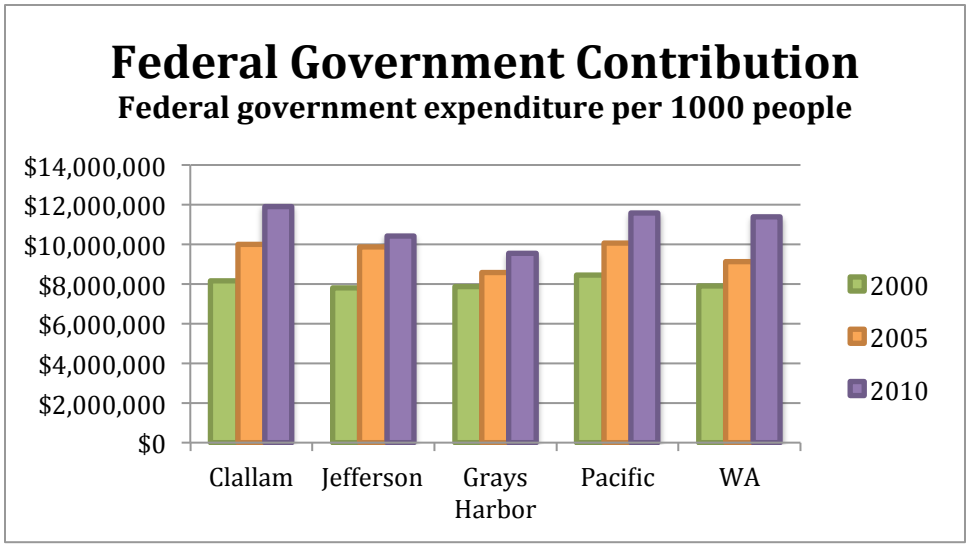


Figure 117: Federal expenditure per 1000

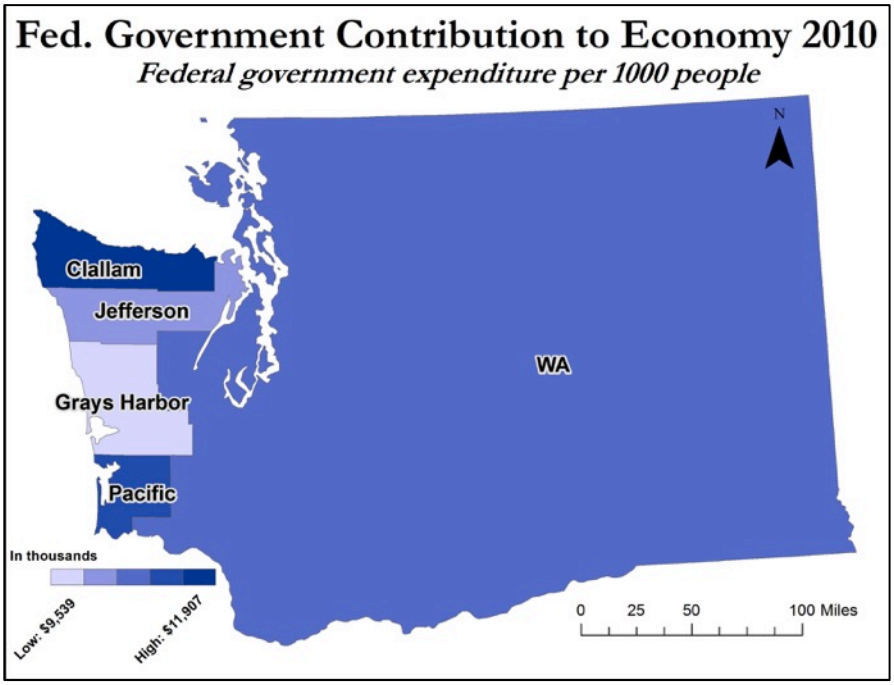


Figure 118: Geographic comparison of federal expenditures, 2010

Local Governmental Revenues

Government revenues were only available for 2013, no trend analysis available. Clallam County receives the lowest local government revenues at $775.6K/1,000 people and Jefferson receives the highest at $1,146.2K/1,000 people (Figs 119, 120).

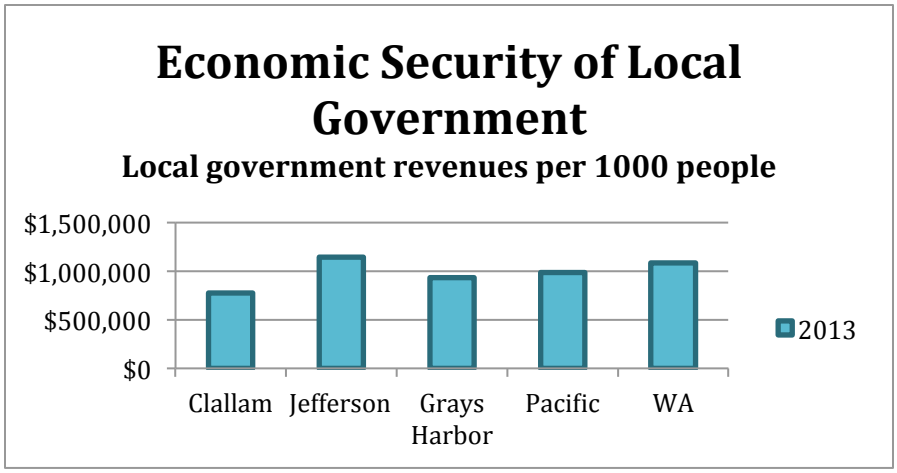


Figure 119: Local government revenues

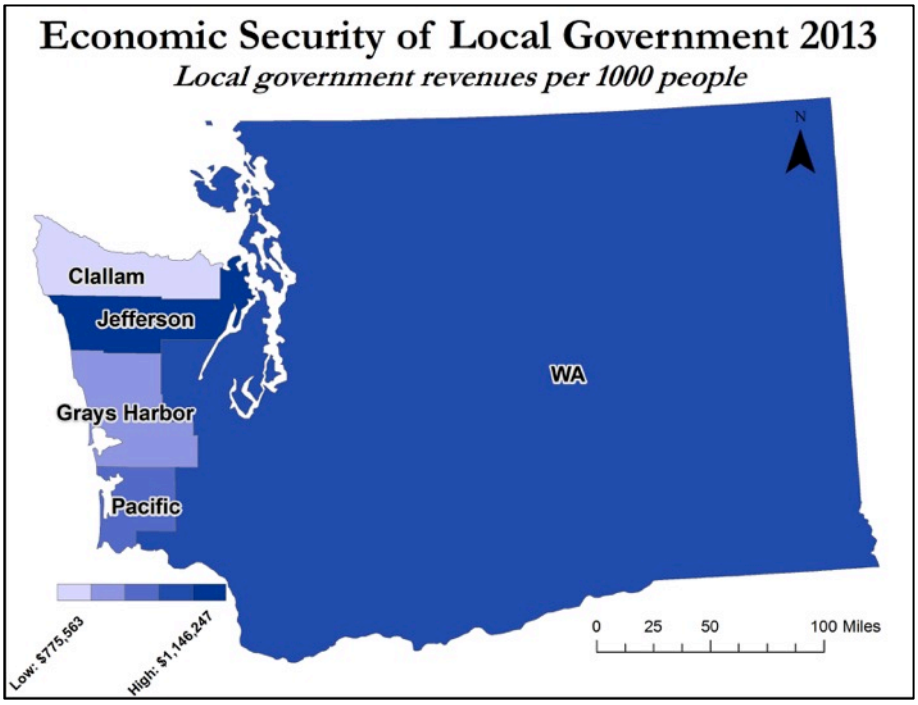


Figure 120: Geographic comparison of local government revenues, 2013

Population Demographics

We selected seven basic demographic indicators useful for analyzing changes in social conditions in a county: population, age, gender, race/ethnicity, language, disability, and veteran status. We conduct trend analysis for each county separately (see appendices B, C, D, E).

The only two coast-wide demographic indicator assessments we conducted were for population change and age distribution.

Population change

Clallam and Grays Harbor counties are the most populated coastal counties, with just over 70 thousand people in each county (Figs. 121, 122). This is over twice as much as the populations in either Jefferson or Pacific County. The biggest increases in population from 2000 to 2013 were in Jefferson (+15%) and Clallam (+11%) counties. Population numbers declined in Pacific County slightly (-1%).

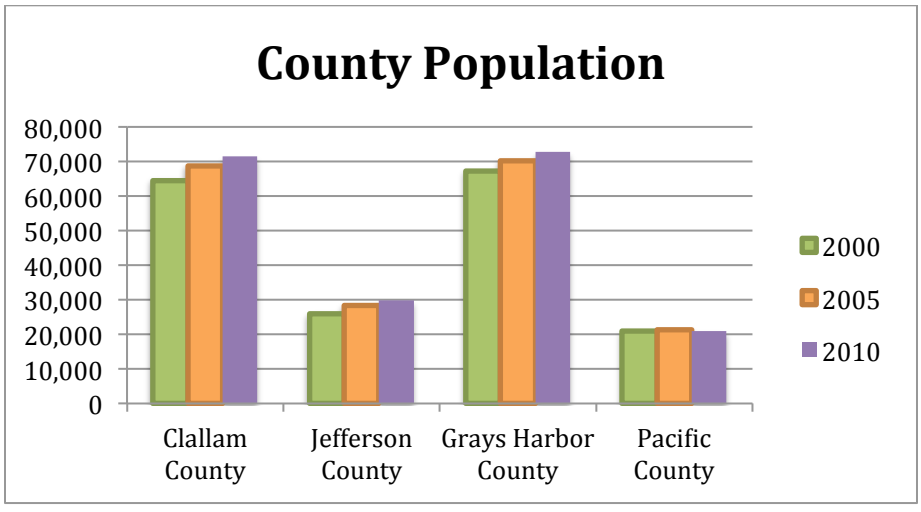


Figure 121: County populations

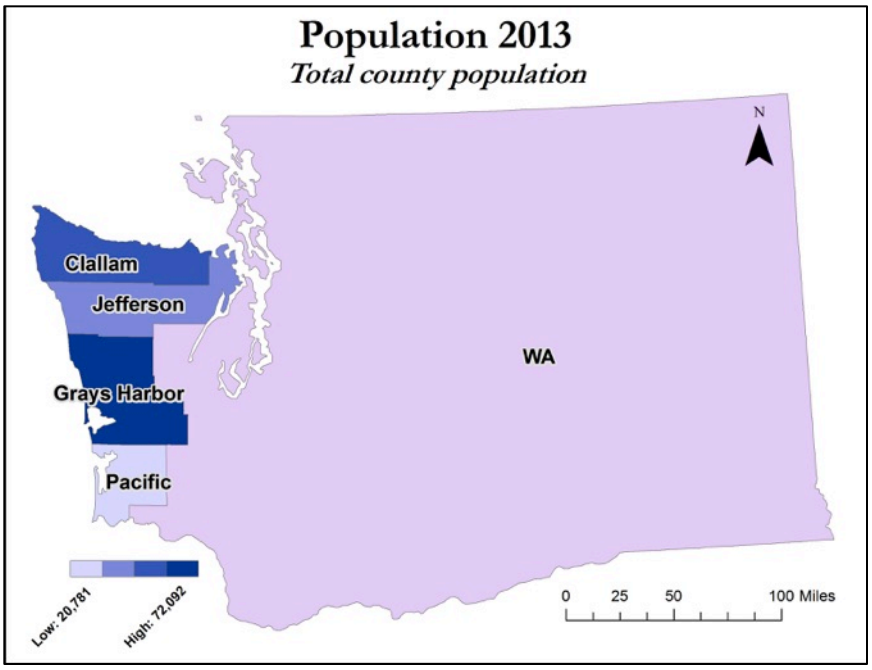


Figure 122: Geographic comparison of total population, 2013

Age distribution

Distributions across age classes and changes of over time can indicate whether or not working age individuals are staying in the community, and whether or not seniors might be staying in or leaving the county, as well as trends in fertility and child-bearing age changes in population. Clallam, Jefferson, and Pacific had disproportionately high numbers of people above age 55 (Fig. 123). Grays Harbor County is more similar to Washington averages, but still a slight higher percentage of population over 55. Coastal counties have lower "college age" and "working age" groups (ages 18-24, 25-34, and 35-44) than the state, with the exception of those ages 45-54, which was almost identical. Fewer people in the age groups under 17 are living in coastal counties when compared to the state average (for changes from 2000 to 2013, see tabulated county details in appendices B, C, D, E).

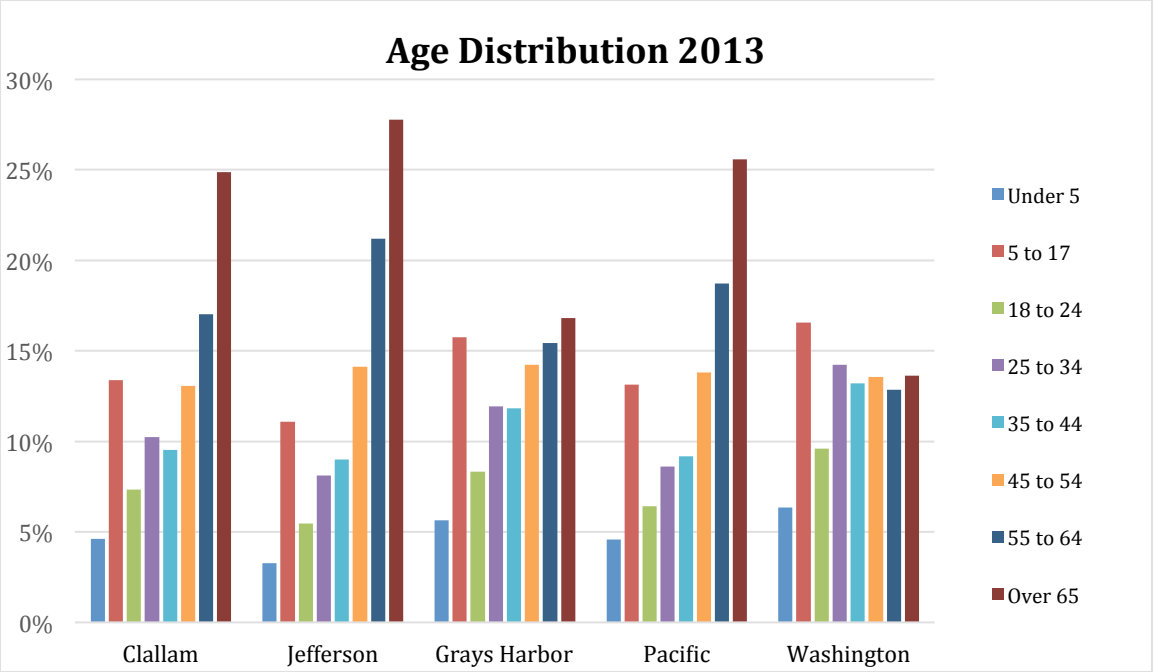


Figure 123: Age distribution, 2013

Chapter 4. Community engagement in social indicator development

Social indicators are tools to evaluate changes in socioeconomic conditions in communities as various scales. While our methodology used in the quantitative assessment in this report draws from secondary data to facilitate a coast-wide comparative assessment of social changes since 2000, important information about communities, their values and aspirations, and their own assessments of wellbeing can also be elicited to complement the methods we use here. In this project, we engaged local communities in social indicator development in two important ways. First, we consulted reports and materials based on a series of local values workshops held in 2013 to guide marine spatial planning. To the extent possible, we used theme-based analysis from these local values workshop to help identify potential quantitative indicators to modify the NCCOS model for Washington coastal communities. Second, we conducted a series of social indicator workshops in the spring of 2015 to elicit input on our social indicator framework and assessment.

Identifying local coastal community values

As part of the Washington coast marine spatial planning process, workshops were held with coastal community members to help facilitate a conversation about the local values to incorporate into marine spatial planning. In 2013, a three-day workshop gathered representatives of local industry leaders and local, state, tribal and federal governments to identify goals, objectives and a boundary for the Washington coast MSP.[5] Another series of workshops was hosted by each of the coastal marine resource committees in 2013. This workshop series resulted in a report called "Coastal Voices"[6]. The focus of these meetings

[5] WSG MSP outreach report. http://www.msp.wa.gov/wp-content/uploads/2014/02/SeaGrant_OutreachSummary.pdf).
[6] MRC Coastal Values Report. http://www.msp.wa.gov/wp-content/uploads/2013/06/060413_Coastal-Voices-Version-Final.pdf

was to gather expectations and recommendations for the planning process. At these workshops, participants described what they value about the coast and what they hope to protect for future generations. One phrase that was heard at all of the workshops is "protect and preserve existing, sustainable uses." Several other value themes also emerged at the workshops.

Washington Sea Grant conducted a review of the Coastal Voices report and workshop notes to help identify the local values that could be used to guide the selection of social indicators. Below we summarize seven topical areas that were most important to workshop participants, and where possible we link each value to an indicator in our Social Indicators model (see Fig. 124). Other studies conducted in conjunction with Washington Marine Spatial Planning efforts (e.g. recreational use, marine economic and sector studies) may be sources for evaluating conditions related to these identified coast values, but which are beyond the scope of the Social Indicators IEA (see http://www.msp.wa.gov/msp-projects/).

Figure 124: Local Social Values for Washington Coastal Planning

Healthy ecosystems

The most commonly discussed attribute for coastal stakeholders was the importance of healthy marine resources. This is an essential piece to ecological, social and economic stability and improvement of the coastal culture. Participants went into great detail discussing the "biodiversity of the coast with its abundance of fish and wildlife, intertidal and offshore deep canyons, coral and sponge communities, rocky habitat and upwelling that drives a productive system." Participants also discussed the importance of the estuaries for the whole coastal system and access to freshwater resources. Participants discussed how the WA coast is relatively healthy compared to other nearby West coast estuaries and ecosystems. The links between healthy ecosystems and human wellbeing are numerous; in this report, we evaluated air quality, water quality, beach closures, and

impervious land cover (see chapter 2 and 3). Other efforts assessing ecosystem health are ongoing, including the substantial work carried out by NOAA's Northwest Fisheries Science Center (Andrews, et al. 2013).

Access to natural resources

Another one of the most commonly discussed topics at the workshops was the desire to preserve access to marine resources. Participants described the historical and continuous year-round accessibility to consumptive and non-consumptive ocean uses. This includes everything from public beach access, commercial and recreational fishing for harvest, freedom of navigation for vessels and recreational activities like wildlife viewing, surfing and shellfishing. Three indicators in our model can be used to begin an analysis of access to natural resources: area of public lands, impervious cover, and water quality (including harmful bacteria scores and beach closures).

Natural resources livelihoods

Participants described the historical and current dependence of the coastal community on natural resources. There is a strong relationship with natural resources and communities take pride in the self-sufficiency that comes with making a living directly from local natural resources. Even participants who are not members of the fishing, shellfishing, timber or recreational activities expressed a strong desire to see that these uses continue for future generations. Products derived from natural resources are a large source of income on the coast and have historically played an even larger role in the economy. The direct tie to natural resources is a component of the coastal culture that participants find essential to the Washington coast way of life. The primary indicator in our study to assess natural resources livelihoods is the industry distribution indicator and the number of jobs in the natural resources and mining sector.

Aesthetic beauty

Many participants discussed the benefits of experiencing the aesthetic beauty of the coast with the open space, rocky cliffs, sandy beaches, and wildlife. The coast was described by one participant as "mystic beauty that exists no where else in the country or maybe even world." A contributing factor to the coast's beauty is the preserved spaces of the marine sanctuary and the national and state parks that extend a large portion of the water's edge and upland. Participants mentioned the scenic byway. Aesthetic beauty is a subjective measure and predominant methods for eliciting data for this attribute include qualitative assessments of sense of place and landscape values, using surveys, participatory mapping, and interviews (see McLain et al 2013a and b). Only two quantitative indicators in our model might have potential for use as proxies to assess aesthetic beauty: area of public lands and impervious cover.

Tribes are important to the coast

One of the most unique characteristics of the coast is the presence of Treaty tribes. Nontribal workshop participants noted having shared values with coastal tribes, such as "keeping coastal areas natural, support sustainability, harvest, community development and economic stability." Coastal tribal cultures were identified among the features that draw visitors to the coast. An indication of the importance of tribal cultures is the ubiquity of indigenous place names. The quantitative social indicators used in our study are inadequate for capturing unique cultural values of coastal tribes and their contribution to coast-wide benefits. Demographic details on race and ethnic make up can indicate changes in tribal populations. Another proxy to consider is tenure in community (social connectedness domain) when correlated with census tract information in the tribal areas. Qualitative assessments such as interviewing, oral histories and ethnographies are better methods to improve understanding of unique indigenous values and their contribution to overall coastal wellbeing (Poe et al 2014). Tribal sovereignty is an important consideration in selection of methods, indicators, and data sharing for assessments and planning.

Community interest in decision-making

Coastal populations value being involved in decision making at all levels of government. Participants described themselves as "engaged communities with local investment". Coastal communities have become more involved as they perceive various threats to ecological resources increasing. All workshop groups mentioned oil spills, ocean acidification and climate change and marine pollution. Within the Governance domain in our study, we include a measure for the number of community emergency response team (CERT) activities in a county, which can indicate public involvement in management. As well, we provide the indicator of voting participation in the Social Connectedness domain.

Rural and small town lifestyle

One participant described the coast as having "get away potential" where people can escape from the urban areas. The coastal residents view their way of life as distinctly different from the Puget Sound populations "characterized by small, remote communities tied together through commonalities with access to urban centers". The Washington coast is not highly developed and there are extensive areas without houses lining the shores. In our social indicators collection, the indicator impervious cover is one proxy for undeveloped areas and possibly rural lands. Variables in our study can be joined to approximate rural/urban densities: population density by county and census tract area is a method to get at this measure.

Social Indicator Workshops with Washington Coast Marine Resource Committees

Washington Sea Grant conducted three social indicator workshops in April and May 2015 at each of the Washington coastal Marine Resource Committee (MRC): in Montesano, Pacific County; in Aberdeen, Grays Harbor County; and Forks, Clallam and Jefferson Counties. The workshops were approximately 1.5 to 2 hours long and included MRC members and other members of the public.

The goals for the Social Indicators workshops were to:

- Present social indicators and draft assessments of wellbeing for each county, 2000-2010
- Provide opportunity for participants to give feedback on how well the suite of social indicators communicate wellbeing and socioeconomic change in their county and communities
- Seek explanations of noteworthy changes and breaks in the data from community perspectives and local knowledge
- Identify a select number of priority indicators *with data available* missing from draft current set
- Solicit input on *primary* data needs to recommend in summary.

Washington Sea Grant presented a PowerPoint presentation of the draft social indicators and provided handouts with assessed social indicators data. WSG facilitated a discussion and fielded questions and concerns from local MRC members about social indicators, how these relate to human wellbeing and integrated ecosystem assessments, and the role social indicators for IEA plays in other efforts associated with marine spatial planning.

Community recommendations from the workshops included urging the social science team to update the assessment with data available after 2010 (this report reflects that change wherever more recent data was available.) MRC members and other public attendees also stressed the importance of examining changes and differences at smaller spatial scales (e.g. census tract and zip code) to evaluate variability *within* counties, not just across counties.

Data is not consistently available at smaller scales, but we assessed the availability of census tract and zip code data noted which indicators could be refined (see appendix: full data list and description). Participants in the workshops also requested information about social conditions that would require new data collection (e.g. to include subjective measures and locally-identified priority areas, such as wild food access, safety for fishing communities, etc.). We documented workshop participants' recommendations in the full notes (appendix F) to guide future iterations of social indicator development and assessment.

The quantitative social indicator assessment presented in this report includes updated indicators based on workshop feedback whenever possible. These updates are described in the sections above as relevant.

Chapter 5. Conclusion and next steps

Human communities are connected to ecosystems, and human wellbeing can be affected by ecosystem changes. Integrated ecosystem assessments (IEAs) are tools used to examine the dynamic status and trends of changing of socio-ecological systems (including ecological, economic and social interactions). IEAs provide science to support environmental management and planning. This report documents the development and assessment of social indicators of human wellbeing as part of the IEA for Washington State's Pacific Coast.

Washington Sea Grant (WSG) defined and evaluated ten domains of human wellbeing: basic needs; access to social services; health; education; social connectedness; governance: planning and management; safety; environmental conditions; economic security; and population demographics. We collected, organized, and evaluated secondary data for 59 indicators mapped to the domains of wellbeing. Data was gathered from various public sources to assess conditions and changes in the four Pacific Coast counties of Washington State: Clallam, Jefferson, Grays Harbor, and Pacific counties. Each indicator was assessed for geographic and longitudinal comparisons, using GIS and graphed calculations for each coastal county. We conducted trend analyses for changes across the coast, and produced in-depth quantitative assessments for each individual county in the study for the time period 2000 to 2013. Finally, we conducted and reported on a series of workshops to refine the social indicator model based on local values, and using input from community members and stakeholders. We conclude by highlighting how these results and baseline social indicators can be used to guide public planning and ecosystem management going forward.

Three key principles of IEAs are to: (a) define and link indicators to ecosystem-based management goals; (b) conduct iterative IEAs to reflect updated goals and system changes; and (c) use results to refine and adapt ecosystem based management.

Marine Spatial Planning authorities and the Washington State legislature mandated the completion of a social indicators assessment as part of the IEA. However, human wellbeing goals were less clearly articulated by State planners and legislators. In this report, in the

absence of a specific set of wellbeing goals, we used a definition of wellbeing for socio-ecological systems developed by NOAA's Northwest Fisheries Science Center IEA team. Future wellbeing goals and targets might emerge, for which new indicators not evaluated here would be necessary. The social indicators IEA in this study can be used to help set targets and goals for environmental management and human wellbeing. These goals might include current, future and historic uses and values of coastal spaces and resources, as well as human wellbeing conditions of communities connected to coastal ecosystems.

A second IEA principle is that assessments be iterative (not "one-off"). We designed this study in a way that could be repeated by future analysts, following an established methodology developed by the NOAA's National Center for Coastal and Ocean Science. The methods are clearly defined, straightforward, and replicable. We included details and links to original data sources to facilitate future assessments. As new data become available, it will be important to evaluate changes in socioeconomic conditions. Changes in indicator performance may signify impacts from ecological or policy changes from ecological management.

Social indicator assessments are important tools that can be used to monitor, anticipate, and mitigate impacts from conditions. Indicators provide baselines for ecosystem planning and recovery, and help identify strategies for mitigation and adaptation planning for ecological integrity and human wellbeing. This study can be used as a baseline to evaluate the social impacts of marine changes.

County-level quantitative indicators, such as those evaluated in this report, are often the best available data for spatial and temporal comparisons for local jurisdictions. While these reveal greater variability and detail than state- or nationally-aggregated wellbeing data, county-level data can also mask socioeconomic variability. Data at smaller spatial scales (e.g., census tract and zip code) and for specific populations (e.g., age group, race/ethnic group, income category) are important to evaluate as they may show patterns of disproportionate impacts and burdens to particular populations (see Appendix G for an illustration of the types of correlations that can be run with census tract units of analysis).

Variable and disproportionate impacts are concerns for environmental justice. Social indicators, carefully assessed and scaled, can help identify and avoid adverse human health and environmental effects to vulnerable populations from environmental and policy changes. A key challenge to conducting fine-scale analyses, however, is reliable and comprehensive availability of data sets.

Future human wellbeing studies for the Washington coast steps could focus on specific community sectors and unique environment and social vulnerabilities. The social indicators presented here, for example, could be integrated with NOAA's Community Social Vulnerability Index for fishing-reliant and dependent communities. These social indicators can also be used to evaluate different management scenarios (i.e., social impact assessments), including alternatives being considered in marine spatial planning. The Washington social indicators can be used to conduct regional comparisons (with other Pacific Coast states, and other coastal regions in the U.S. and elsewhere). Finally, the quantitative indicators, and the community-based workshops presented in this report can be used to guide the identification and evaluation of new social indicators for specific ecosystem and wellbeing goals, including indicators that require new data gathering methods (e.g., qualitative interviewing, surveys, and participatory mapping) and draw from both objective (observed) and subjective (experienced) data at a variety of meaningful spatial and temporal scales.

To conclude, integrated ecosystem assessments support adaptive ecosystem-based management. The IEA iterative process enables planners and analysts to be flexible in the approaches and methods used to meet science needs for evolving goals.

Acknowledgements

This work is funded through an Interagency Agreement between the Washington Department of Natural Resources and Washington Sea Grant (IAA 14-204).

We'd like to acknowledge Dr. Maria Dillard at NCCOS for consulting on the social indicators development framework, Robyn Ricks for help with graphic design and indicator icons, the Washington Coast Marine Advisory Council, the Marine Resource Committees and community members who participated in workshops, and the science reviewers.

References

Cited publications are listed below. The data sources for assessed social indicators in chapter 4 are found in Appendix 1.

Andrews, K.S.; Harvey, C.J.; Levin, P.S. (2013). Conceptual Models and Indicator Selection Process for Washington State's Marine Spatial Planning Process. Report. Conservation Biology Division, *Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic & Atmospheric Administration*. http://www.msp.wa.gov/wp-content/uploads/2013/07/NOAA_NWFSC_ConceptualModel_FinalReport.pdf

Ban, N. C., Mills, M., Tam, J., Hicks, C. C., Klain, S., Stoeckl, N., ... & Chan, K. M. (2013). A social-ecological approach to conservation planning: embedding social considerations. *Frontiers in Ecology and the Environment*, *11*(4), 194-202.

Biedenweg, K., Hanein, A., Nelson, K., Stiles, K., Wellman, K., Horowitz, J., & Vynne, S. (2014). Developing human wellbeing indicators in the Puget Sound: focusing on the watershed scale. *Coastal Management*, *42*(4), 374-390.

Boyd, H. and A. Charles (2006). "Creating community-based indicators to monitor sustainability of local fisheries." *Ocean & Coastal Management* 49(5-6): 237-258.

Breslow, S; Holland, D; Levin, P; Norman, K; Poe, M; et al. (2014) "Human Dimensions of the CCIEA." in: Harvey, C.J., N. Garfield, E.L. Hazen and G.D. Williams (eds.). *The California Current Integrated Ecosystem Assessment: Phase III Report*. Available from http://www.noaa.gov/iea/CCIEA-Report/

Buttolph, Lita P.; Kay, William; Charnley, Susan; Moseley, Cassandra; Donoghue, Ellen M. (2006). Northwest Forest Plan—the first 10 years: socioeconomic monitoring of the Olympic National Forest and three local communities. *Gen. Tech. Rep. PNWGTR- 679. Portland, OR: U.S. Department of Agriculture, Forest Service*, Pacific Northwest Research Station. 84 p.

Colburn, L. L. and M. Jepson (2012). "Social Indicators of Gentrification Pressure in Fishing Communities: A Context for Social Impact Assessment." *Coastal Management* 40(3): 289-300.

Cutter, S. L., Mitchell, J. T., & Scott, M. S. (2000). Revealing the vulnerability of people and places: a case study of Georgetown County, South Carolina. *Annals of the Association of American Geographers*, *90*(4), 713-737.

Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards*. *Social science quarterly*, *84*(2), 242-261.

Dillard, M. K., Goedeke, T. L., Lovelace, S., & Orthmeyer, A. (2013). Monitoring well-being and changing environmental conditions in coastal communities: development of an assessment method. *NOAA Technical Memorandum NOS NCCOS 174*, 176 pp. http://aquaticcommons.org/14677/

Donatuto, J., Grossman, E. E., Konovsky, J., Grossman, S., & Campbell, L. W. (2014). Indigenous community health and climate change: integrating biophysical and social science indicators. *Coastal Management*, *42*(4), 355-373.

Jepson, M., & Colburn, L. L. (2013). Development of Social Indicators of Fishing Community Vulnerability and Resilience in the US Southeast and Northeast Regions. *NOAA Technical Memorandum NMFS-F/SPO-129 (US Dept Commerce, 2013)*.

Jepson, M. (2007). "Social Indicators and Measurements of Vulnerability for Gulf Coast Fishing Communities." NAPA Bulletin 28(1): 57-68.

Johnson, T. R., Henry, A. M., & Thompson, C. (2014). Qualitative Indicators of Social Resilience in Small-Scale Fishing Communities: An Emphasis on Perceptions and Practice. *Human Ecology Review*, *20*(2), 97.

Kershner, J., Samhouri, J. F., James, C. A., & Levin, P. S. (2011). Selecting indicator portfolios for marine species and food webs: a Puget Sound case study. *PLoS One*, *6*(10), e25248.

Levin, P. S., Kelble, C. R., Shuford, R. L., Ainsworth, C., Dunsmore, R., Fogarty, M. J., ... & Werner, F. (2013). Guidance for implementation of integrated ecosystem assessments: a US perspective. *ICES Journal of Marine Science: Journal du Conseil*, fst112.

Levin, P. S., Fogarty, M. J., Murawski, S. A., & Fluharty, D. (2009). Integrated ecosystem assessments: developing the scientific basis for ecosystem-based management of the ocean. *PLoS biology*, *7*(1), 23.

McLain, R, Poe, M, Biedenweg, K, Cerveny, L, Besser, D and Blahna, D. 2013. “Making sense of human ecology mapping: Approaches to integrating sociocultural data into GIS-based environmental planning.” *Human Ecology.* Volume 41 (5): 651-665

McLain, R., Cerveny, L., Besser, D., Banis, D., Biedenweg, K., Todd, A., ... & Rohdy, S. (2013). *Mapping Human-Environment Connections on the Olympic Peninsula: An Atlas of Landscape Values*. Accessed 10/10/2013 at http://www. pdx. edu/geography/mapping-local-perspectives.

Moerlein, K. J., & Carothers, C. (2012). Total environment of change: impacts of climate change and social transitions on subsistence fisheries in northwest Alaska. *Ecology and Society*, *17*(1), 10

Poe, M. R., Norman, K. C., & Levin, P. S. (2014). Cultural Dimensions of Socioecological Systems: Key Connections and Guiding Principles for Conservation in Coastal Environments. *Conservation Letters*, *7*(3), 166-175.

Robert Wood Johnson Foundation. County Health Rankings and Roadmaps. http://www.countyhealthrankings.org/app/washington/2010/measure/factors/44/map?sort=sc-1

Samhouri, J. F., Haupt, A. J., Levin, P. S., Link, J. S., & Shuford, R. (2013). Lessons learned from developing integrated ecosystem assessments to inform marine ecosystem-based management in the USA. *ICES Journal of Marine Science: Journal du Conseil*, fst141.

Singleton, S. (2009). "Native People and Planning for Marine Protected Areas: How "Stakeholder" Processes Fail to Address Conflicts in Complex, Real-World Environments." *Coastal Management 37*(5): 421-440.

Smith, C. L. and P. M. Clay (2010). "Measuring Subjective and Objective Well-being: Analyses from Five Marine Commercial Fisheries." *Human Organization* 69(2): 158-168.

Tuler, S., J. Agyeman, P. P. da Silva, K. R. LoRusso and R. Kay (2008). "Assessing vulnerabilities: Integrating information about driving forces that affect risks and resilience in fishing communities." *Human Ecology Review* 15(2): 171-184.
U.S. Census.

Indicators	Description	Contribution	Source	URL	Locations	Years
ACCESS TO SOCIAL SERVICES						
Nutrition Assistance	Proportion of those in poverty participating in SNAP	positive	US Census - Small Area Income and Poverty Estimates (SAIPE)	https://www.census.gov/did/www/saipe/data/model/snap.html	All county and WA	2000, 2010
Human Services	Social Assistance establishments per 1000 people	positive	County Business Patterns - Health Care and Social Assistance (Social Assistance Establishments)	http://www.census.gov/econ/cbp/	All county, WA, and zip	2000, 2005, 2010, 2013
Transportation	Proportion of households without a vehicle	negative	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010, 2013
Medical facilities	Hospital beds per 1000 people	positive	Department of Health and Human Services - Health Resources and Services Administration - Area Health Resource File (AHRF13-14)	http://ahrf.hrsa.gov/download.htm	All county and WA	2005, 2010, 2012
Medical Care	Physicians per 1000 people (*Total MD's)	positive	Department of Health and Human Services - Health Resources and Services Administration - Area Health Resource File (AHRF13-14)	http://ahrf.hrsa.gov/download.htm	All county and WA	2005, 2010, 2012
BASIC NEEDS						
Housing Value	Median dollar value of housing units	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Housing Facilities	Proportion of total housing units without complete kitchen facilities	negative	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Housing facilities and water disposal	Proportion of total housing units without complete plumbing	negative	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Housing Size	Average rooms per person in average household	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Housing Availability	Number of housing units available per household	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Housing Age	Median years of age of housing units	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010. 2013
Availability of Clean Water	Proportion of total population served by public water supply	positive	USGS National Water Information System	http://waterdata.usgs.gov/nwis/wu	All county and WA	2000, 2005, 2010
Availability of Healthy Food	Healthy food outlets per 1000 people	positive	County Business Patterns - Retail Trade (Grocery Stores)	http://www.census.gov/econ/cbp/	All county, WA, and zip	2000, 2005, 2010, 2013
Child Nutrition	Proportion of enrolled students eligible for the National School Lunch Program	negative	Washington Superintendent of Public Instruction	http://data.k12.wa.us/PublicDWP/web/Washingtonweb/DataTables/StudentNeedDT.aspx	All county, WA, and district	2005, 2010, 2013
ECONOMIC SECURITY						
fed government contribution to economy	Federal government expenditure per 1000 people	positive	US Census - Censtats, USA Counties Data, Federal Government	http://censtats.census.gov/	All county and WA	1983 - 2010
economic security of local government	local government revenues per 1000 people	positive	WA Office of Financial Management	http://www.ofm.wa.gov/localdata/default.asp	All county	2013
economic security of children	percent of people under 18 years of age in poverty	negative	US Census Bureau	http://factfinder.census.gov	All county, WA, and tract	2000, 2005, 2010, 2013
economic security of household	median household income	positive	US Census Bureau	http://factfinder.census.gov	All county, WA, and tract	2000, 2005, 2010, 2013
economic security of individuals	civilian labor force unemployment rate	negative	Bureau of Labor Statistics, Local Area Unemployment Statistics	http://www.bls.gov/lau/	All county, WA, Cities 25,000+	1990 - 2015
industry contribution to county	gross domestic product, total for all industries (year 2000 and 2010 value)	positive	National Ocean Economics Program	http://www.oceaneconomics.org/	All county and WA	1997 - 2013
economic diversity	economic diversity of employment (ogive index)	positive	National Ocean Economics Program	http://www.oceaneconomics.org/	All county and WA	1998 - 2013
Income Inequality	county gini coefficient	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county and WA	2000, 2010, 2013
EDUCATION						
Expenditure	Average education expenditure per student enrolled in public school (K-12)	positive	US Census Bureau National Center for Educational Statistics (Elementary/Secondary Information System)	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml http://nces.ed.gov/ccd/elsi/	All county, WA, and district	2000, 2010, 2013
Attainment	Proportion of total population over 25 years of age with at least a high school diploma or equivalent	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010, 2013
Enrollment	Proportion of total school age (5-17) population enrolled in public school (K-12)	positive	US Census Bureau National Center for Educational Statistics (Elementary/Secondary	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml http://nces.ed.gov/ccd/elsi/	All county, WA, and tract (tract only via	2000, 2010, 2012
GOVERNANCE PLANNING AND MANAGEMENT						
County Planning	years since comprehensive plan was adopted	negative	Project Collection	Individivual county websites	All county	N/A
County Management	FEMA's Community Rating System county score	negative	FEMA National Flood Insurance Program Community Ranking System	https://www.fema.gov/national-flood-insurance-program-community-rating-system#	All county	N/A
Emergency Planning	Number of CERT programs per 1000 people	positive	FEMA Citizen Corps	http://www.citizencorps.fema.gov/cc/CertIndex.do?reportsForState&cert=&state=WA	All county	N/A
Public Lands	proportion of county area that is covered by public lands (sq mi)	positive	ArcGIS USA Federal Lands Washington State Recreation and Conservation	http://www.arcgis.com/home/item.html?id=26c2a38f94c54ad880ff877f884ff931 http://www.rco.wa.gov/data/	All county, WA, and tract (if find GIS)	N/A

HEALTH						
Fertility, population health/well-	birth rates (births per 1000	positive	WA Department of Health	http://www.doh.wa.gov/DataandS	All county and	2000,
Life Expectancy (M)	male life expectancy	positive	UW Institute for Health Metric and	http://ghdx.healthdata.org/record/	All county and	2000,
Life Expectancy (F)	female life expectancy	positive	UW Institute for Health Metric and	http://ghdx.healthdata.org/record/	All county and	2000,
Mortality due to chronic disease	proportion of deaths caused by major cardiovascular diseases per 1000 people	negative	CDC Wonder	http://wonder.cdc.gov/controller/datarequest/D77;jsessionid=A466395A4DF3EB443F1BC6A31E4DA43D	All county and WA	2000, 2005, 2010
Mortality due to chronic disease	proportion of deaths caused by lower respiratory diseases per 1000 people	negative	CDC Wonder	http://wonder.cdc.gov/controller/datarequest/D77;jsessionid=A466395A4DF3EB443F1BC6A31E4DA43D	All county and WA	2000, 2005, 2010
Mortality due to chronic disease	proportion of deaths caused by all cancers per 1000 people	negative	CDC Wonder	http://wonder.cdc.gov/controller/datarequest/D77;jsessionid=A466395A4DF3EB443F1BC6A31E4DA43D	All county and WA	2000, 2005, 2010
Mortality due to alcohol or drug consumption	proportion of deaths caused by alcohol or drug	negative	CDC Wonder	http://wonder.cdc.gov/controller/datarequest/D77;jsessionid=A466395A4DF3EB443F1BC6A31E4D	All county and WA	2000, 2005, 2010
Behavioral health	percent of adults that report excessive drinking, either	negative	CDC BRFSS	http://www.healthindicators.gov/Indicators/Excessive-drinking-adults-	All county and WA	2005, 2011
Recreational Opportunity	recreational facilities per 1000 people	positive	County Business Patterns - Arts, Entertainment, and Recreation (Other amusement & recreation industries)	http://www.census.gov/econ/cbp/	All county, WA, and zip	2000, 2005, 2010, 2013
SOCIAL CONNECTEDNESS						
participation in democracy	proportion of registered voters who participated in national/presidential elections	positive	Office of the Secretary of State Elections and Voting	https://wei.sos.wa.gov/agency/oos/en/press_and_research/PreviousElections/Pages/default.aspx	All county and WA	2000, 2005 (2004), 2010 (2008), 2013 (2012)
access to communication	proportion of households without telephone service	negative	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010, 2013
social gathering places	religious organizations per 1000 people	positive	Census Business Patterns - Other Services - Religious Organizations	http://www.census.gov/econ/cbp/	All county, WA, and zip	2000, 2005, 2010, 2013
arts and culture	arts and humanities organizations per 1000 people	positive	Census Business Patterns - Arts, Entertainment, and Recreation (Performing arts, spectator sports, & related industries AND Museums, historical sites & like institutions)	http://www.census.gov/econ/cbp/	All county, WA, and zip	2000, 2005, 2010, 2013
tenure in community	median years householder has lived in unit	positive	US Census Bureau	http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml	All county, WA, and tract	2000, 2010, 2013
SAFETY						
exposure/vulnerability to flood events	proportion of population in SFHA zone	negative	ArgGIS SFHA exposure analysis	http://www.arcgis.com/home/webmap/viewer.html?useExisting=1	All county	NA
exposure/vulnerability to property crime	property crime rate (known incidents per 1000 people)	negative	FBI Uniform Crime Report	http://www.fbi.gov/stats-services/crimestats	All county and WA	2005, 2010, 2013
exposure/vulnerability to violent crime	violent crime rate (known incidents per 1000 people)	negative	FBI Uniform Crime Report	http://www.fbi.gov/stats-services/crimestats	All county and WA	2005, 2010, 2013
exposure/vulnerability to severe storms	Number of FEMA funded projects for declared events per 1000 people	negative	FEMA Public Assistance	https://www.fema.gov/media-library/assets/documents/28344	All county and WA	2005 (2001-2005), 2010 (2006-2010)
ENVIRONMENTAL CONDITIONS						
impervious cover	percentage of total land cover that is developed (square miles)	negative	NOAA Coastal Change Analysis Program	http://www.coast.noaa.gov/ccapatlas/	All county (WA?)	2000 (2001), 2005 (2006), 2010 (2011)
Beach Water Quality	Median Water Quality Grade of wet days	positive	Heal the Bay Beach Report Card	http://brc.healthebay.org/	All county	2005 (2008) and 2010 (2012)
coastal water quality	number of days bacterial level exceeds EPA's water quality standards	negative	Washington DOE Beach Query	http://www.ecy.wa.gov/apps/eap/beach/beachquery.asp	All county	2005, 2010
Beach closures	number of reported recreational beach closures **PER MILE OF SHORELINE*	negative	WA Dept of Health	retreived from DOH	All county	2002-2013
air quality	median Air Quality Index (AQI) score (1-200; 1=best; 200=worst) - INVERSE VALUES- negative	negative	EPA Air Quality Index	http://www.epa.gov/airquality/airdata/	CL, JE, and WA	2000 (2001), 2005, 2010 (2008)
ADDITIONAL MEASURES						
county population	population estimate/count		US Census Bureau	http://www.census.gov/	All county, WA, and tract	2000, 2005, 2010, 2013
county housing units	Housing unit total		US Census Bureau	http://www.census.gov/	All county, WA, and tract	2000, 2010, 2013
county population under 18 yrs/school age	population under 18 years of age		US Census Bureau	http://www.census.gov/	All county, WA, and tract	2000, 2010, 2013
county population in poverty	poverty estimate		US Census Bureau	http://www.census.gov/	All county, WA, and tract	2000, 2010, 2013
county average household size	average household size		US Census Bureau	http://www.census.gov/	All county, WA, and tract	2000, 2010, 2013
county area (sq mi)	county area (sq mi)		US Census Bureau	http://quickfacts.census.gov/qfd/states/53000.html	All county and WA	NA

Appendix B: Detailed Assessment of Clallam County, 2000-2013

(Notes: A dash means there is no data. % change is the percentage points that the indicator increased or decreased. The color green indicates that the direction of change is positive for wellbeing; red indicates that the direction of change is negative for wellbeing; and black indicates that the change is neutral or unclear for wellbeing).

Clallam County Basic Needs	2000	2005	2010	% Change
Housing Value Median dollar value of housing units	$125,200	-	$241,500	**77%**
Housing Facilities Proportion of total housing units without complete kitchen facilities	0.89%	-	0.77%	**-13%**
Housing Water Disposal Proportion of total housing units without complete plumbing	0.72%	-	0.99%	**38%**
Housing Size Average rooms per person in average household	2.15	-	2.35	**9%**
Housing Availability Number of housing units available per household	1.13	-	1.13	**0%**
Housing Age Median years of age of housing units	24	-	31	**29%**
Availability of Clean Water Proportion of total population served by public water supply	78.72%	74.14%	75.52%	**-4%**
Availability of Healthy Food Healthy food outlets per 1000 people	0.4 *(26 total)*	0.47 *(32 total)*	0.36 *(26 total)*	**-10%**
Child Nutrition Proportion of public school students eligible for free/reduced lunch	-	39%	44%	**13%**

* In 2013, housing values in Clallam County had fallen to $222,200.

Clallam County Access to Social Service	2000	2005	2010	% Change
Nutrition Assistance Proportion of those in poverty participating in SNAP	52.64%	-	112.45%	**114%**
Human Services Social Assistance establishments per 1000 people	0.87 *(56 total)*	0.9 *(62 total)*	0.87 *(62 total)*	**0%**
Transportation Proportion of households without a vehicle	6.90%	-	5.82%	**-16%**
Medical Facilities Hospital beds per 1000 people	-	1.95 *(134 total)*	1.72 *(123 total)*	**-12%**
Medical Care Physicians per 1000 people	-	3.07 *(211 total)*	2.90 *(207 total)*	**-6%**

Clallam County Health	2000	2005	2010	% Change
Fertility Births per 1000 people	9.6	9.0	9.50	**-1%**
Life Expectancy (M) Male life expectancy	75.2	76.2	76.3	**1%**
Life Expectancy (F) Female life expectancy	81.2	81.8	81.6	**0%**
Mortality - Cardiovascular Proportion of deaths caused by major cardiovascular diseases per 1000 people	4.71 *(304 total)*	4.32 *(297 total)*	3.84 *(274 total)*	**-18%**
Mortality - Respiratory Proportion of deaths caused by lower respiratory diseases per 1000 people	0.79 *(51 total)*	0.67 *(46 total)*	0.41 *(29 total)*	**-48%**
Mortality - Cancer Proportion of deaths caused by all cancers per 1000 people	2.77 *(179 total)*	2.76 *(190 total)*	3.50 *(250 total)*	**26%**
Mortality - Alcohol and Drug Consumption Proportion of deaths caused by alcohol or drug consumption per 1000 people	0.23 *(15 total)*	0.35 *(24 total)*	0.35 *(25 total)*	**52%**
Behavioral Health Percent of adults that report excessive drinking, either chronic high alcohol consumption or binge drinking	-	14.8%	11.2%	**-24%**
Recreational Opportunity Recreational facilities (marinas, golf, fitness, sports, and amusement centers) per 1000 people	0.26 *(17 total)*	0.32 *(22 total)*	0.31 *(22 total)*	**19%**

Clallam County Education	2000	2005	2010	% Change
Expenditure Average expenditure per student enrolled in public school (K-12)	$7,741	$8,299	$9,143	**18%**
Attainment Proportion of total population over 25 years of age with at least a high school diploma or equivalent	85%	-	91%	**6%**
Enrollment Proportion of total school age (5-17) population enrolled in public school	95%	-	118%	**25%**

Clallam County Social Connectedness	2000	2005	2010	% Change
Participation in Democracy	82%	86%	86%	**5%**

Proportion of registered voters who participated in national/ presidential elections				
Access to Communication Proportion of households without telephone service	1.69%	-	2.55%	**51%**
Social Gathering Places Religious organizations per 1000 people	0.59 *(38 total)*	0.57 *(39 total)*	0.55 *(39 total)*	**-7%**
Arts and Culture Arts and humanities organizations (performing arts, spectator sports, and museums) per 1000 people	0.12 *(8 total)*	0.16 *(11 total)*	0.20 *(14 total)*	**67%**
Community Tenure Median years since householder moved into unit (no variance)	8	-	8	**0%**

Clallam County Governance	**2015**
County Planning Years since comprehensive plan was adopted	20
County Management FEMA's Community Rating System county score (10=low, 1=high)	10
Emergency Planning Number of CERT programs per 1000 people	0.03 *(2 total)*
Public Lands Proportion of county area that is covered by public lands (sq mi)	55%
Exposure/Vulnerability to Floods Percentage of population within Special Flood Hazard Area (SFHA)	1.67

Clallam County Safety	**2005**	**2010**	**% Change**
Exposure to Property Crime Property crime rate (known incidents per 1000 people)	11.93	9.15	**-23%**
Exposure to Violent Crime Violent crime rate (known incidents per 1000 people)	1.09	0.88	**-19%**
Exposure to Severe Storms Number of FEMA funded projects for declared events per 1000 people	*(2000-2005)* 0.36 *(25 total)*	*(2006-2010)* 1.19 *(85 total)*	**231%**

Clallam County Environmental Conditions	2000	2005	2010	% Change
Impervious Cover Percentage of total land cover that is developed (sq mi)	1.51%	1.54%	1.65%	**9%**
Air Quality Median Air Quality Index (AQI) score	23.50	32	34	**45%**
Coastal Beach Water Quality Median Water Quality Grade of wet days (grade 1-10; 10=highest grade)	-	6	10	**N/A**
Coastal (Salt) Water Quality Number of days bacterial level exceeds EPA's water quality standards	-	0	0	**0%**
Recreational Harvest Beach Closures Number of reported beach advisories or closures per shoreline mile	-	0.027 (4 total)	.041 (6 total)	**52%**

Clallam County Economic Security	2000	2005	2010	2013	% Change
Federal Gov. Contribution Federal government expenditure per 1000 people	$8,148,183	$10,007,879	$11,907,326	-	**46%**
Of Local Government Local government revenues per 1000 people	-	-	-	$775,564	**N/A**
Of Children Percent of people under 18 years of age in poverty	17.1%	19.1%	21.4%	21.0%	**23%**
Of Households Median household income	$36,449	$43,357	$44,398	$46,033	**26%**
Of Individuals Civilian labor force unemployment rate	6.90%	6.50%	10.60%	9.2%	**33%**
Industry Contribution to County Gross domestic product per capita	$18,525 *($1,195,357,465 total)*	$25,022 *($1,720,217,543 total)*	$27,662 *($1,975,212,434 total)*	$28,355 *($2,033,926,792 total)*	**53%**
Economic Diversity Economic diversity of employment (ogive index)	0.5869	0.6214	0.6377	0.7340	**25%**
Income Inequality County Gini Coefficient	0.4190	-	0.4180	0.4186	**0%**

Clallam County Demographics	2000	2005	2010	2013	% Change
Total Population	64,525	68,749	71,404	71,731	**11%**
% in Poverty	12	-	14	-	**17%**
% Female	50	-	50	-	**0%**
% Under 18 years	20	-	19	-	**-5%**
% Over 65 years	21	-	24	-	**14%**
% Black	0.8	-	0.8	-	**0%**
% Asian	1.1	-	1.4	-	**27%**
% American Indian/Alaska Native	5.1	-	5.1	-	**0%**
% White	89.1	-	87	-	**-2%**
% Hispanic/Latino	3.4	-	5.1	-	**50%**
% Speak English Only	93.7	-	92.5	-	**-1%**
% Speak Spanish	3.2	-	3.5	-	**9%**
% Speak Other Indo-European Language	1.5	-	2.27	-	**54%**
% Speak Asian and Pacific Island Language	0.9	-	1.26	-	**38%**
% Veteran over age 18	21.0	-	17.18	-	**-18%**
% Disability over age 5	23.2	-	19.94	-	**-14%**

Clallam County Age Distribution	2000	2010
Under 5	5%	5%
5 to 17	17%	14%
18 to 24	7%	7%
25 to 34	9%	9%
35 to 44	14%	10%
45 to 54	15%	15%
55 to 64	12%	17%
Over 65	21%	23%

Appendix C: Detailed Assessment of Jefferson County, 2000-2013

(Notes: A dash means there is no data. % change is the percentage points that the indicator increased or decreased. The color green indicates that the direction of change is positive for wellbeing; red indicates that the direction of change is negative for wellbeing; and black indicates that the change is neutral or unclear for wellbeing).

Jefferson County Basic Needs	2000	2005	2010	2013	% Change
Housing Value Median dollar value of housing units	$157,400	-	$308,500	$284,100	**80%**
Housing Facilities Proportion of total housing units without complete kitchen facilities	1.15%	-	1.12%	-	**-3%**
Housing Water Disposal Proportion of total housing units without complete plumbing	1.47%	-	0.89%	-	**-39%**
Housing Size Average rooms per person in average household	2.16	-	2.45	-	**13%**
Housing Availability Number of housing units available per household	1.21	-	1.22	-	**1%**
Housing Age Median years of age of housing units	20	-	26	-	**30%**
Availability of Clean Water Proportion of total population served by public water supply	75.18%	70.97%	78.71%	-	**5%**
Availability of Healthy Food Healthy food outlets per 1000 people	0.5 *(13 total)*	0.42 *(12 total)*	0.33 *(10 total)*	-	**-34%**
Child Nutrition Proportion of public school students eligible for free/reduced lunch	-	36%	44%	-	**22%**

Jefferson County Access to Social Service	2000	2005	2010	% Change
Nutrition Assistance Proportion of those in poverty participating in SNAP	37.12%	-	99.13%	**167%**
Human Services Social Assistance establishments per 1000 people	1.19 *(31 total)*	1.06 *(30 total)*	0.9 *(27 total)*	**-24%**
Transportation	5.32%	-	5.10%	**-4%**

Proportion of households without a vehicle				
Medical Facilities Hospital beds per 1000 people	-	0.88 *(25 total)*	0.84 *(25 total)*	**-5%**
Medical Care Physicians per 1000 people	-	3.06 *(87 total)*	2.91 *(87 total)*	**-5%**

Jefferson County Health	**2000**	**2005**	**2010**	**% Change**
Fertility Births per 1000 people	8.1	7.2	6.70	**-17%**
Life Expectancy (M) Male life expectancy	76.5	77.8	78.0	**2%**
Life Expectancy (F) Female life expectancy	81.1	81.9	83.4	**3%**
Mortality - Cardiovascular Proportion of deaths caused by major cardiovascular diseases per 1000 people	3.78 *(98 total)*	3.73 *(106 total)*	3.28 *(98 total)*	**-13%**
Mortality - Respiratory Proportion of deaths caused by lower respiratory diseases per 1000 people	0.69 *(18 total)*	0.67 *(19 total)*	0.64 *(19 total)*	**-7%**
Mortality - Cancer Proportion of deaths caused by all cancers per 1000 people	3.12 *(81 total)*	2.46 *(70 total)*	3.28 *(98 total)*	**5%**
Mortality - Alcohol and Drug Consumption Proportion of deaths caused by alcohol or drug consumption per 1000 people	0.12 *(3 total)*	0.53 *(15 total)*	0.40 *(12 total)*	**233%**
Behavioral Health Percent of adults that report excessive drinking, either chronic high alcohol consumption or binge drinking	-	17.7%	19.6%	**11%**
Recreational Opportunity Recreational facilities (marinas, golf, fitness, sports, and amusement centers) per 1000 people	0.58 *(15 total)*	0.63 *(18 total)*	0.47 *(14 total)*	**-19%**

Jefferson County Education	**2000**	**2005**	**2010**	**% Change**
Expenditure Average expenditure per student enrolled in public school (K-12)	$8,540	$8,698	$11,168	**31%**
Attainment Proportion of total population over 25 years of age with at least a high school diploma or equivalent	92%	-	94%	**3%**
Enrollment Proportion of total school age (5-17) population enrolled in public school	92%	-	83%	**-10%**

Jefferson County Social Connectedness	2000	2005	2010	% Change
Participation in Democracy Proportion of registered voters who participated in national/presidential elections	85%	89%	91%	**8%**
Access to Communication Proportion of households without telephone service	2.34%	-	1.41%	**-40%**
Social Gathering Places Religious organizations per 1000 people	0.73 *(19 total)*	0.63 *(18 total)*	0.64 *(19 total)*	**-12%**
Arts and Culture Arts and humanities organizations (performing arts, spectator sports, and museums) per 1000 people	0.42 *(11 total)*	0.42 *(12 total)*	0.47 *(14 total)*	**12%**
Community Tenure Median years since householder moved into unit (no variance)	8	-	8	**0%**

Jefferson County Governance	2015
County Planning Years since comprehensive plan was adopted	17
County Management FEMA's Community Rating System county score (10=low)	10
Emergency Planning Number of CERT programs per 1000 people	0.03 *(1 total)*
Public Lands Proportion of county area that is covered by public lands (sq mi)	64%
Exposure/Vulnerability to Floods Percentage of population within Special Flood Hazard Area (SFHA)	2.84

Jefferson County Safety	2005	2010	% Change
Exposure to Property Crime Property crime rate (known incidents per 1000 people)	21.77	12.72	**-42%**
Exposure to Violent Crime Violent crime rate (known incidents per 1000 people)	1.93	1.47	**-24%**
Exposure to Severe Storms	*(2000-2005)*	*(2006-2010)*	**484%**

Number of FEMA funded projects for declared events per 1000 people	0.32 *(9 total)*	1.87 *(56 total)*	

Jefferson County Environmental Conditions	**2000**	**2005**	**2010**	**% Change**
Impervious Cover Percentage of total land cover that is developed (sq mi)	0.81%	0.82%	0.86%	**6%**
Coastal Beach Water Quality Median Water Quality Grade of wet days (10=high)	-	6	-	**N/A**
Coastal (Salt) Water Quality Number of days bacterial level exceeds EPA's water quality standards	-	0	0	**0%**
Recreational Beach Closures Number of reported beach advisories or closures per shoreline mile	-	0.033 *(5 total)*	0.033 *(5 total)*	**N/A**
Air Quality Median Air Quality Index (AQI) score	30	25	18	**-40%**

Jefferson County Economic Security	**2000**	**2005**	**2010**	**2013**	**% Change**
Federal Gov. Contribution Federal government expenditure per 1000 people	$7,788,900	$9,874,142	$10,423,186	-	**34%**
Of Local Government Local government revenues per 1000 people	-	-	-	$1,146,247	**N/A**
Of Children Percent of people under 18 years of age in poverty	16.6%	-	20.8%	21.0%	**27%**
Of Households Median household income	$37,869	-	$46,048	$46,320	**22%**
Of Individuals Civilian labor force unemployment rate	5.40%	5.60%	9.90%	9.0%	**67%**
Industry Contribution to County Gross domestic product per capita	$16,912 *($438,908,074 total)*	$23,332 *($663,318,002 total)*	$22,922 *($684,717,840 total)*	$23,544 *($703,542,197 total)*	**39%**
Economic Diversity Economic diversity of employment (Ogive index)	0.3870	0.6601	0.6363	0.6609	**71%**
Income Inequality County Gini Coefficient	0.4410	-	0.4400	0.4427	**0%**

Jefferson County Demographics	2000	2005	2010	2013	% Change
Total Population	25,953	28,430	29,872	29,882	**15%**
% in Poverty	11		14	-	**27%**
% Female	51		50	-	**-2%**
% Under 18 years	20		15	-	**-25%**
% Over 65 years	21		26	-	**24%**
% Black	0.4		0.8	-	**100%**
% Asian	1.2		1.6	-	**33%**
% American Indian/Alaska Native	2.3		2.3	-	**0%**
% White	92.2		91	-	**-1%**
% Hispanic/Latino	2.1		2.8	-	**33%**
% Speak English Only	96.0		94.55	-	**-2%**
% Speak Spanish	1.0		2.54	-	**149%**
% Speak Other Indo-European Language	1.9		2.17	-	**12%**
% Speak Asian and Pacific Island Language	0.8		0.59	-	**-24%**
% Veteran over age 18	21.2		19.49	-	**-8%**
% Disability over age 5	19.11		18.99	-	**-1%**

Jefferson County Age Distribution	2000	2010
Under 5	4%	3%
5 to 17	16%	12%
18 to 24	5%	5%
25 to 34	7%	8%
35 to 44	14%	10%
45 to 54	18%	16%
55 to 64	14%	21%
Over 65	21%	24%

Appendix D: Detailed Assessment of Grays Harbor County, 2000-2013

(Notes: A dash means there is no data. % change is the percentage points that the indicator increased or decreased. The color green indicates that the direction of change is positive for wellbeing; red indicates that the direction of change is negative for wellbeing; and black indicates that the change is neutral or unclear for wellbeing).

Grays Harbor County Basic Needs	2000	2005	2010	2013	% Change
Housing Value Median dollar value of housing units	$93,500	-	$158,200	$157,600	**69%**
Housing Facilities Proportion of total housing units without complete kitchen facilities	0.61%	-	0.83%	-	**36%**
Housing Water Disposal Proportion of total housing units without complete plumbing	0.48%	-	0.60%	-	**25%**
Housing Size Average rooms per person in average household	2.16	-	2.12	-	**-2%**
Housing Availability Number of housing units available per household	1.21	-	1.23	-	**2%**
Housing Age Median years of age of housing units	34	-	39	-	**15%**
Availability of Clean Water Proportion of total population served by public water supply	82.36%	74.86%	75.12%	-	**-9%**
Availability of Healthy Food Healthy food outlets per 1000 people	0.6 *(40 total)*	0.58 *(41 total)*	0.66 *(48 total)*	-	**10%**
Child Nutrition Proportion of public school students eligible for free/reduced lunch	-	48%	57%	-	**19%**

Grays Harbor County Access to Social Service	2000	2005	2010	% Change
Nutrition Assistance Proportion of those in poverty participating in SNAP	55.47%	-	141.58%	**155%**
Human Services Social Assistance establishments per 1000 people	0.79 *(53 total)*	0.71 *(50 total)*	0.65 *(47 total)*	**-18%**
Transportation Proportion of households without a vehicle	9.56%	-	6.71%	**-30%**

Medical Facilities Hospital beds per 1000 people	-	1.88 *(132 total)*	2.83 *(206 total)*	**51%**
Medical Care Physicians per 1000 people	-	1.03 *(72 total)*	1.07 *(78 total)*	**4%**

Grays Harbor County Health	**2000**	**2005**	**2010**	**% Change**
Fertility Births per 1000 people	11.8	12.2	11.60	**-2%**
Life Expectancy (M) Male life expectancy	73.1	73.4	74.2	**2%**
Life Expectancy (F) Female life expectancy	79.2	78.8	79.3	**0%**
Mortality - Cardiovascular Deaths caused by major cardiovascular diseases per 1000 people	4.70 *(316 total)*	3.64 *(255 total)*	3.17 *(231 total)*	**-33%**
Mortality - Respiratory Deaths caused by lower respiratory diseases per 1000 people	0.79 *(53 total)*	0.74 *(52 total)*	0.62 *(45 total)*	**-22%**
Mortality - Cancer Deaths caused by all cancers per 1000 people	2.84 *(191 total)*	2.59 *(182 total)*	2.93 *(213 total)*	**3%**
Mortality - Alcohol and Drug Consumption Proportion of deaths caused by alcohol or drug consumption per 1000 people	0.28 *(19 total)*	0.46 *(32 total)*	0.47 *(34 total)*	**68%**
Behavioral Health Percent of adults that report excessive drinking, either chronic high alcohol consumption or binge drinking	-	17.0%	20.9%	**23%**
Recreational Opportunity Recreational facilities (marinas, golf, fitness, sports, and amusement centers) per 1000 people	0.34 *(23 total)*	0.31 *(22 total)*	0.25 *(18 total)*	**-26%**

Grays Harbor County Education	**2000**	**2005**	**2010**	**% Change**
Expenditure Average expenditure per student enrolled in public school (K-12)	$6,873	$9,441	$11,995	**75%**
Attainment Proportion of total population over 25 years of age with at least a high school diploma or equivalent	81%	-	84%	**4%**
Enrollment Proportion of total school age (5-17) population enrolled in public school	98%	-	96%	**-2%**

Grays Harbor County Social Connectedness	2000	2005	2010	% Change
Participation in Democracy Proportion of registered voters who participated in national/presidential elections	75%	77%	81%	**8%**
Access to Communication Proportion of households without telephone service	3.35%	-	1.72%	**-49%**
Social Gathering Places Religious organizations per 1000 people	0.82 *(55 total)*	0.61 *(43 total)*	0.70 *(51 total)*	**-15%**
Arts and Culture Arts and humanities organizations (performing arts, spectator sports, and museums) per 1000 people	0.07 *(5 total)*	0.10 *(7 total)*	0.08 *(6 total)*	**14%**
Community Tenure Median years since householder moved into unit (no variance)	8	-	8	**0%**

Grays Harbor County Governance	2015
County Planning Years since comprehensive plan was adopted	54
County Management FEMA's Community Rating System county score (1 = best)	10
Emergency Planning Number of CERT programs per 1000 people	0.04 *(3 total)*
Public Lands Proportion of county area that is covered by public lands (sq mi)	21%
Exposure/Vulnerability to Floods Percentage of population within Special Flood Hazard Area (SFHA)	24.38

Grays Harbor County Safety	2005	2010	% Change
Exposure to Property Crime Property crime rate (known incidents per 1000 people)	9.08	6.62	**-27%**
Exposure to Violent Crime Violent crime rate (known incidents per 1000 people)	0.67	0.44	**-34%**
Exposure to Severe Storms Number of FEMA funded projects for declared events per 1000 people	*(2000-2005)* 0.5 *(35 total)*	*(2006-2010)* 5.22 *(380 total)*	**944%**

Grays Harbor County Environmental Conditions	2000	2005	2010	% Change
Impervious Cover Percentage of total land cover that is developed (sq mi)	2.05%	2.05%	2.06%	**0%**
Coastal Beach Water Quality Median Water Quality Grade of wet days (10=high)	-	8	10	**N/A**
Coastal (Salt) Water Quality Number of days bacterial level exceeds EPA's water quality standards	-	0	0	**0%**
Beach Closures Number of reported beach advisories or closures per shoreline mile (5 years)	-	0	0	**N/A**
Air Quality Median EPA Air Quality Index Score	-	22.00	16.00	**-27%**

Grays Harbor County Economic Security	2000	2005	2010	2013	% Change
Federal Gov. Contribution Federal government expenditure per 1000 people	$7,877,419	$8,588,155	$9,538,849	-	**21%**
Of Local Government Local government revenues per 1000 people	-	-	-	$933,170	**N/A**
Of Children Percent of people under 18 years of age in poverty	21.6%	22.5%	23.1%	27.5%	**27%**
Of Households Median household income	$34,160	$37,120	$41,899	$42,405	**24%**
Of Individuals Civilian labor force unemployment rate	7.30%	7.50%	13.60%	11.8%	**62%**
Industry Contribution to County Gross domestic product per capita	$22,653 *($1,522,138,876 total)*	$28,517 *($2,000,294,592 total)*	$27,626 *($2,011,106,738 total)*	$28,275 *($2,038,376,371 total)*	**25%**
Economic Diversity Economic diversity of employment (Ogive index)	0.4443	0.4428	0.4564	0.5848	**32%**
Income Inequality County Gini Coefficient	0.4220	-	0.4210	0.4305	**2%**

Grays Harbor County Demographics	2000	2005	2010	2013	% Change
Total Population	67,194	70,144	72,797	72,092	**7%**
% in Poverty	16		16	-	**0%**

% Female	50		49	-	**-2%**
% Under 18 years	26		22	-	**-15%**
% Over 65 years	15		16	-	**7%**
% Black	0.3		1.1	-	**267%**
% Asian	1.2		1.4	-	**17%**
% American Indian/Alaska Native	4.7		4.6	-	**-2%**
% White	88.3		84.9	-	**-4%**
% Hispanic/Latino	4.8		8.6	-	**79%**
% Speak English Only	93.6		91.21	-	**-3%**
% Speak Spanish	3.9		6.21	-	**60%**
% Speak Other Indo-European Language	1.3		0.89	-	**-32%**
% Speak Asian and Pacific Island Language	1.0		1.32	-	**32%**
% Veteran over age 18	16.95		14.26	-	**-16%**
% Disability over age 5	24.1		21.54	-	**-11%**

Grays Harbor County Age Distribution	**2000**	**2010**
Under 5	6%	6%
5 to 17	19%	16%
18 to 24	8%	9%
25 to 34	11%	11%
35 to 44	15%	13%
45 to 54	15%	15%
55 to 64	10%	14%
Over 65	15%	16%

Appendix E: Detailed Assessment of Pacific County, 2000-2013

(Notes: A dash means there is no data. % change is the percentage points that the indicator increased or decreased. The color green indicates that the direction of change is positive for wellbeing; red indicates that the direction of change is negative; and black indicates that the change is neutral or unclear for wellbeing).

Pacific County Basic Needs	2000	2005	2010	2013	% Change
Housing Value Median dollar value of housing units	$96,200	-	$165,400	$162,000	**68%**
Housing Facilities Proportion of total housing units without complete kitchen facilities	0.47%	-	0.71%	-	**51%**
Housing Water Disposal Proportion of total housing units without complete plumbing	0.61%	-	1.06%	-	**74%**
Housing Size Average rooms per person in average household	2.2	-	2.2	-	**0%**
Housing Availability Number of housing units available per household	1.54	-	1.58	-	**3%**
Housing Age Median years of age of housing units	28	-	35	-	**25%**
Availability of Clean Water Proportion of total population served by public water supply	77.45%	86.40%	85.27%	-	**10%**
Availability of Healthy Food Healthy food outlets per 1000 people	0.81 *(17 total)*	0.89 *(19 total)*	0.76 *(16 total)*	-	**-6%**
Child Nutrition Proportion of public school students eligible for free/reduced lunch		56%	58%	-	**4%**

Pacific County Access to Social Service	2000	2005	2010	% Change
Nutrition Assistance Proportion of those in poverty participating in SNAP	56.54%	-	117.64%	**108%**
Human Services Social Assistance establishments per 1000 people	0.57 *(12 total)*	0.71 *(15 total)*	0.86 *(18 total)*	**51%**
Transportation Proportion of households without a vehicle	7.38%	-	6.62%	**-10%**
Medical Facilities Hospital beds per 1000 people	-	1.41 *(30 total)*	1.96 *(41 total)*	**39%**
Medical Care Physicians per 1000 people	-	0.99 *(21 total)*	1.20 *(25 total)*	**21%**

Pacific County Health	2000	2005	2010	% Change
Fertility Births per 1000 people	9.3	10.3	9.60	3%
Life Expectancy (M) Male life expectancy	74.3	74	75.3	1%
Life Expectancy (F) Female life expectancy	79.4	80.2	81	2%
Mortality - Cardiovascular Proportion of deaths caused by major cardiovascular diseases per 1000 people	5.91 *(124 total)*	5.17 *(110 total)*	4.4 *(92 total)*	-26%
Mortality - Respiratory Proportion of deaths caused by lower respiratory diseases per 1000 people	0.62 *(13 total)*	0.8 *(17 total)*	0.81 *(17 total)*	31%
Mortality - Cancer Proportion of deaths caused by all cancers per 1000 people	3.72 *(78 total)*	3.29 *(70 total)*	3.97 *(83 total)*	7%
Mortality - Alcohol and Drug Consumption Proportion of deaths caused by alcohol or drug consumption per 1000 people	0.33 *(7 total)*	0.33 *(7 total)*	0.76 *(16 total)*	130%
Behavioral Health Percent of adults that report excessive drinking, either chronic high alcohol consumption or binge drinking	-	18.1%	15.7%	-13%
Recreational Opportunity Recreational facilities (marinas, golf, fitness, sports, and amusement centers) per 1000 people	0.52 *(11 total)*	0.56 *(12 total)*	0.33 *(7 total)*	-37%

Pacific County Education	2000	2005	2010	% Change
Expenditure Average expenditure per student enrolled in public school (K-12)	$8,365	$14,388	$13,458	61%
Attainment Proportion of total population over 25 years of age with at least a high school diploma or equivalent	79%	-	86%	9%
Enrollment Proportion of total school age (5-17) population enrolled in public school	98%	-	105%	8%

Pacific County Social Connectedness	2000	2005	2010	% Change
Participation in Democracy Proportion of registered voters who participated in national/presidential elections	76%	80%	85%	12%

Access to Communication Proportion of households without telephone service	2.23%	-	2.34%	5%
Social Gathering Places Religious organizations per 1000 people	0.95 *(20 total)*	0.75 *(16 total)*	1 *(21 total)*	5%
Arts and Culture Arts and humanities organizations (performing arts, spectator sports, and museums) per 1000 people	0.24 *(5 total)*	0.28 *(6 total)*	0.24 *(5 total)*	0%
Community Tenure Median years since householder moved into unit (no variance)	8	-	8	0%

Pacific County Governance	2015
County Planning Years since comprehensive plan was adopted	17
County Management FEMA's Community Rating System county score (1 = best)	10
Emergency Planning Number of CERT programs per 1000 people	0.10 *(2 total)*
Public Lands Proportion of county area that is covered by public lands (sq mi)	9%
Exposure/Vulnerability to Floods Percentage of population within Special Flood Hazard Area (SFHA)	15.15

Pacific County Safety	2005	2010	% Change
Exposure to Property Crime Property crime rate (known incidents per 1000 people)	31.23	20.98	-33%
Exposure to Violent Crime Violent crime rate (known incidents per 1000 people)	1.41	1.05	-26%
Exposure to Severe Storms Number of FEMA funded projects for declared events per 1000 people	*(2000-2005)* 0.52 *(11 total)*	*(2006-2010)* 6.74 *(141 total)*	1196%

Pacific County Environmental Conditions	2000	2005	2010	% Change
Impervious Cover Percentage of total land cover that is developed (sq mi)	1.38%	1.38%	1.38%	0%
Coastal Water Quality Number of days bacterial level exceeds EPA's water quality standards	-	0	0	0%

Recreational Beach Closures Number of reported beach advisories or closures per shoreline mile (5 years)	-	0	0	**N/A**

Pacific County Economic Security	**2000**	**2005**	**2010**	**2013**	**% Change**
Federal Gov. Contribution Federal government expenditure per 1000 people	$8,457,897	$10,053,816	$11,581,908	-	**37%**
Of Local Government Local government revenues per 1000 people	-	-	-	$988,448	**N/A**
Of Children Percent of people under 18 years of age in poverty	19.7%	-	20.4%	26.5%	**35%**
Of Households Median household income	$31,209	-	$39,642	$39,830	**28%**
Of Individuals Civilian labor force unemployment rate	7.00%	7.10%	13.00%	10.6%	**51%**
Industry Contribution to County Gross domestic product per capita	$14,889 *($312,420,409 total)*	$19,638 *($417,544,569 total)*	$22,044 *($461,160,793 total)*	$24,996 *($519,438,344 total)*	**68%**
Economic Diversity Economic diversity of employment (Ogive index)	0.4501	0.4467	0.3852	0.4647	**3%**
Income Inequality County Gini Coefficient	0.4340	-	0.4510	0.4381	**1%**

Pacific County Demographics	**2000**	**2005**	**2010**	**2013**	**% Change**
Total Population	20,984	21,262	20,920	20,781	**-1%**
% in Poverty	14		17	-	**21%**
% Female	50		50	-	**0%**
% Under 18 years	21		18	-	**-14%**
% Over 65 years	22		25	-	**14%**
% Black	0.2		0.4	-	**100%**
% Asian	2.1		2.0	-	**-5%**
% American Indian/Alaska Native	2.4		2.3	-	**-4%**
% White	90.5		87.4	-	**-3%**
% Hispanic/Latino	5.0		8.0	-	**60%**
% Speak English Only	91.8		91.0	-	**-1%**
% Speak Spanish	4.2		6.4	-	**52%**
% Speak Other Indo-European Language	1.8		0.8	-	**-54%**
% Speak Asian and Pacific Island Language	2.0		1.6	-	**-21%**
% Veteran over age 18	21.4		18.8	-	**-12%**
% Disability over age 5	27.4		25.5	-	**-7%**

Pacific County Age Distribution	2000	2010
Under 5	4%	5%
5 to 17	17%	14%
18 to 24	6%	6%
25 to 34	9%	8%
35 to 44	13%	10%
45 to 54	15%	15%
55 to 64	14%	18%
Over 65	22%	24%

Appendix F: Social Indicator workshop notes

Pacific County Workshop

Montesano, WA at the Marine Resource Committee meeting, April 9, 2015

General Comments/Questions:

- Indicators for fatality rates by occupations? Per fishing industry?
- What about economic indicators for support industries and marine industries data?
- County-level indicators makes it had to distinguish between coastal resource users (fishing) versus farmers?
- One person expressed more interest in ecological and marine economic communities rather than a full county scale
- Some indicators (Median house value, incomes, etc.) would be more meaningful at community scale (Census Block Group).
- Really important to make this report useful for policy makers.
- Consider including mental health data: Rehabilitation visits? Hospitalizations for substance overdose?

Comments on specific assessed social indicators by domain:

Basic Needs

Housing Age	a. Agree that this is a neutral indicator
Housing Value	a. Has severely dropped since 2010, everything in Pacific happens behind everyone else
Healthy Food	a. Does this include farmers markets? b. We go to Astoria or Olympia c. Great majority of population get food from hunting and subsistence
General Comments	a. Clallam and Jefferson are "Puget Sound" counties (affluent) b. Census tract of housing value and income c. Need census tract for investment, planning, and policy making d. Child nutrition redundant?

Social Services

Physicians	a. Hospital struggles to get doctors here b. Majority of population is on assistance so doctors don't want to come here because they wont get money c. Pacific County lost their OB so everyone goes to Grays Harbor
Social assistance	b. What kinds of organizations? (public, non profit?) c. How many people are receiving services, what is the participation?

Health

Recreation	a. A lot of recreational activity happens outdoors b. Boat launches?
General Comments	a. # 39 worst county in state for overall health, highest rate of smokers and alcoholism b. This is where you go to die c. Youth flight and people moving here to retire

Safety

Severe storms	a. Declared events has to meet state declared FEMA level b. Observed increase in severe storms

Education

Enrollment	a. Are homeschooled children included b. What about homeless unaccompanied kids?
Attainment	a. Now military requires a high school degree b. Implementation of no child left behind c. Maybe people who come in are more educated than those who go out? d. Mill closed, competition for jobs encourage need for diploma e. With the storm that occurred in '07, some of local economy tanked and combination of national economy, if fewer jobs available than kids might as well finish high school to get a diploma
Expenditure	f. Based on levies? We had 3 schools that were all upgraded in this time period
General Comments	a. Need to get net migration data b. More concerned with how the schools are doing c. Too many old folks moving in?

Economic Security

Industry	a. Has gone up while poverty has also gone up

contribution	
General Comments	a. Measure for distribution of wealth? b. Timber sales increased to go to china, but none of that actually comes to the county c. Pacific County is moving more and more towards a service oriented county which is prone to more unequal wealth distribution d. 4th most fish dependent county in the nation e. Marijuana growing in agriculture? Where's revenue going?

Grays Harbor County Workshop Notes

Aberdeen, WA April 14, 2015

General comments:

- Why stop at 2010?
- Overdoses or number of alcohol related deaths?
- A lot of people don't live here year round – age distribution explanation?

Comments on specific assessed social indicators by domain:

Basic Needs

Child Nutrition	a. Look at Office of Superintendent for Public Instruction (OSPI) data for more accurate results (*but this is the data we actually used) b. Agree on negative change - there have been changes since 2010
Access to Clean Water	a. There is no more basic need than clean water b. Data source is not the best - doesn't count people who have their own wells c. Percent change is caused by the development that happened in east county who mostly all have their own well (not counted in our numbers) most of those are clean water supplies that require permanent disinfection d. This reflects an influx of people who landed in rural places, while urban population stayed the same

Social Services

Nutrition Assistance	a. The stigma for getting SNAP has changed since there has been more generational poverty in the county

	b. Maybe this is related to changes in how SNAP can be used – availability of using fresh fruits/stands for SNAP as an indicator?

Health

Mortality	a. *No response
General Comments	b. Add access to local foods? – food grown or harvested locally c. The number of people hunting and fishing for their own food –Fish and Wildlife might have data on permits sold and catch records d. "I haven't bought a steak from the grocery store in 5 years cause I hunt all my game" e. "Most of the students hunt or fish for what they eat" f. "Store their freezer based on what they fish, clam, hunt. None of them buy meat." g. Master Gardens association for personal gardens data?

Safety

Severe storms	a. Hard to see significance in just two time points b. 2005-2010 was an anomaly c. *FEMA *public funding* for projects d. What is not included that would be a good indicator (that there is no data for) is if we knew the number of preparedness projects

Social Connectedness

Arts and Culture	a. Is there more philanthropy in those other counties? Does this make a different for how many orgs there are?
General Comments	a. This doesn't include fishing, etc but this is a big part of our culture – public lands? b. Hunting and clamming licenses – economic value to this? c. Add festivals

Governance

County Planning	b. Comprehensive plan – they know they have one, but no one has seen it or knows where it is – comp plan doesn't mean much for the county c. Add more background in our report about how amendments and resolutions are accounted for in comprehensive plans d. Grays Harbor is not a GMA (Growth Management Act) county which required most counties to need a new comp plan in the 90's (http://www.commerce.wa.gov/Services/localgovernment/GrowthManagement/Growth-Management-Planning-Topics/Pages/GMA-Periodic-Update.aspx) e. GH doesn't' plan under growth management (GMA), it may not fit the standards of the GMA but it may fit the needs of the people

	that live here a. What is this an indicator of? b. All city or county plans probably fall on a state required date

North Pacific (Clallam and Jefferson Counties) Workshop Notes

Forks, WA; May 19, 2015

General Comments/Questions:

- Trina Wellman, how is her survey project (social impact assessment) working together on this project?
- "east/west" sides of counties should be a particular concern to the "Marine" spatial planning, since half of county is not a Pacific Coast community
- Indicators best explained by difference in "east/west" county differences
  - Housing Value
  - Availability of Healthy Food
- Demographics – consider including Hispanic non-Spanish speakers
- Population of youth in 2000 compared to older age brackets in 2010
- Age distribution and educational enrollment correlation?
- Variable for dependency on local fishing/game?
- The social indicators presented are very important.

Comments on specific assessed social indicators by domain:

<u>Basic Needs</u>

Child Nutrition	c. Changes in eligibility requirements?
Availability of healthy food	d. Odd measure for *Jefferson* because west Jefferson did not have any of these markets in years e. How are you defining "healthy food"? f. Proportion change could also be a cause of an increase/decrease in population, not necessarily healthy food options
Housing Value	e. Gentrification of people coming from I-5 buying houses out here (on the coast) and renovating those homes and selling them at a high price – *owner occupied vs renter/seasonal occupied* f. *Clallam* - Sequim is booming but nothing else has changed

Social Services

Medical Facilities	c. *Clallam* – "I'm absolutely astonished" – are people moving in faster than the medical facilities can be built? d. It might help to look at the total and the total per population (proportion)
Transportation	e. Melissa stated "public" transportation, which this doesn't actually measure (households without a vehicle), but might be a good indicator to add if data is available.

Safety

Flooding	e. FEMA does less extensive work on the Lower Elwha River, community and their work is less detailed – lower resolution on mapping for GIS work f. Even when they came to Quileute River, they didn't do the same level of detail as other communities – not a criticism, but an observation

Education

Attainment	a. Development issue with more people coming in to build their homes and taking them out of public schools and putting them into private schools and more students eligible for free lunch
Enrollment	b. Several private schools and home-schooling that were thriving in that period c. More and more dissatisfaction with the public school system d. Need to verify – home school students captured in this data?

Social Connectedness

Communication	d. A lot of people are dumping their land lines, but a lot of people are switching to using the card (not cell phones with annual plans) to control their cost - *Jefferson*

Environmental Conditions

Air Quality	f. A lot timber harvests and slash burning in *Clallam*- biomass slash pile and co-generator burning g. Chinese industry plants a huge source of pollution h. Navy planes, many jet planes flying over – airplane pollution is huge and navy traffic is enormous – noise pollution? i. Ship affluent from smoke stacks is big for air pollution
Impervious Cover	e. Asked to define – for purposes of getting permits they will look at gravel as the same as paved roads; need to really tightly define this term because it is used differently by different types of governments and organization

Beach Closures	a. (*Jefferson*) Dungeness area b. Closures down Hood Canal c. Pacific had zero closures? - Have you looked at the HAB closures? OIHIB

Appendix G: Sample Census Tract Analysis

Census tract information and zip code level units of analysis can be used to explore more refined spatial and demographic variation of social indicators. Data is only available for some indicators at these refined scales (see Appendix A).

In addition to socio-demographic variation, analyses at these refined scales also enable research into statistical relationships between indicators. For example, chi squared correlation tests between housing value and population in poverty at the census tract level may show trends that occur within and across counties. The table below shows the chi square pilot test of these variables for all census tract levels in 2010. At the census tract level with 51 units, there is a significant correlation between housing value and population in poverty. At the county level, shown in figure # with four units for the four counties in 2010, there is not a strong enough correlation to be significant because of the few units of analysis among the counties. A detailed examination of the refined scale with census tracts, zip codes, or both, can assist in identifying social variables with the greatest potential impact from changes and planning.

Correlations 1

		Median Housing Value	Percent of population in poverty
Median Housing Value	Pearson Correlation	1	-.468**
	Sig. (2-tailed)		.001
	N	51	51
Percent of population in poverty	Pearson Correlation	-.468**	1
	Sig. (2-tailed)	.001	
	N	51	51

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations 2

		Median Housing Value	Percent of population in poverty
Median Housing Value	Pearson Correlation	1	-.876
	Sig. (2-tailed)		.124
	N	4	4
Percent of population in poverty	Pearson Correlation	-.876	1
	Sig. (2-tailed)	.124	
	N	4	4

Bios of Contributing Authors

Melissa Poe is the Social Science Specialist at Washington Sea Grant and liaison with NOAA's Northwest Fisheries Science Center. Melissa earned her Masters and Doctorate in Environmental Anthropology at the University of Washington. Melissa holds double Bachelors degrees in Sociology and Spanish, with a minor in Peace Studies from Whitworth University. Melissa is a contributing scientist for NOAA's California Current Integrated Ecosystem Assessment, and a collaborator with the NOAA/WSG Social Wellbeing Indicators for Marine Management project.

Melissa Watkinson joined Washington Sea Grant as a Research Assistant for the Social Indicators for IEA project. She completed her Masters in Policy Studies at University of Washington Bothell, and holds double Bachelors degrees in Global Studies, and Society, Ethics, & Human Behavior with a minor in Human Rights. Melissa is a 2015-2016 Hershman Marine Policy Fellow.

Bridget Trosin is the Coastal Policy Specialist at Washington Sea Grant. Bridget has a Masters degree from the School of Marine and Environmental Affairs at the University of Washington and a Bachelors degree in Environmental Biology with a minor in French from Saint Mary's University of Minnesota. Bridget was a 2011 Hershman Marine Policy Fellow.

Kevin Decker is a Coastal Outreach Specialist at Washington Sea Grant. He holds a Bachelors degree in Business Economics from Boise State University, Masters in Environmental Management from University of Maryland, University College and a Masters in Applied Economics, and is near completion of a PhD in Environmental Science from the University of Idaho.

Recommended Citation

Poe, Melissa R.; Watkinson, Melissa; Trosin, Bridget; Decker, Kevin (2015) *Social Indicators for Washington Coast Integrated Ecosystem Assessment*. Report to Washington Department of Natural Resources in fulfillment of Interagency Agreement No. IAA 14-204. Washington Sea Grant WSG-TR 15-07. 159pp.