

The Changing Ocean and Coastal Economy of the
United States:
A Briefing Paper for Governors

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SUMMARY OF FINDINGS

The United States Commission on Ocean Policy (Commission) has undertaken a major review of factors affecting the nation's coasts and oceans and will be reporting on its recommendations for changes in national policy in 2003. An important part of the changes affecting the coasts and oceans have been changes in the demographic and economic environment as well as the natural environment. To help understand these changes, the Commission asked the National Ocean Economics Project (NOEP) to prepare an analysis of these factors based on the Project's data on the ocean and coastal economy. The NOEP is an independent research project located at universities on the east and west coasts, and funded by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA).

This paper provides a summary of key findings on the socio-economic factors influencing the coastal and ocean economy that have been provided to the Commission and explores the implications of those trends. The report to the Commission primarily considers these trends from a national perspective; this paper explores some of the implications of these trends for state policies are discussed.

Ten major conclusions have been drawn from the socio-economic analysis:

1. The "coast" is not a single area. Socio-economic data suggests at least four different regions that are coastal (coastal states, coastal watershed counties, coastal zone counties, and the near shore).
2. The common perception that "everyone is moving to the coast" is incorrect. The pressure of population growth in coastal regions comes from the increasing size of the population within a fixed land area, not from a disproportionately large amount of growth. While the population growth rate in coastal areas has been consistent with national trends, the sheer size of the population density in the coastal area has major effects.
3. The most dramatic changes in the coast have come about from employment and economic growth, particularly in the near shore area. Nationally, employment growth was nearly three times population growth nearest the shore. North Carolina more than doubled its employment in the near shore area between 1990 and 2000, while four other states (Alabama, Mississippi, Florida, and New York) saw employment grow by more than 50% in the near shore area.
4. The coastal and ocean economy are related but not identical. The coastal economy comprises all economic activity in the coastal regions, while the ocean economy is that activity directly related to the ocean as an input. The ocean economy includes ocean dependent activities such as minerals extraction, fisheries, and marine transportation, while the coastal economy is a region which provides access to the services of the ocean as well as being a specific economy within a larger region.

5. Economic activity in coastal regions is very large. Seventy-five percent of the nation's Gross State Product came from the coastal states in 2000. Almost half of the economy came from the coastal watershed counties, and more than one-third came from those counties in which states operate their Coastal Zone Management programs. The near shore area, which is 4% of the nation's land, produces more than 11% of the nation's economic output.
6. The ocean economy is also large, with 2.3 million people employed and \$117 billion in output (gross state product) in 2000. The ocean economy comprised 1.6% of the nation's employment - ranging from 17.7 % of Hawaii's employment to 0.6% of Ohio and Indiana's employment.
7. The ocean economy has undergone dramatic change over the past decade. Tourism and recreation provided all of the job growth, while the other ocean economy sectors declined in employment (living resources, minerals, ship and boat building, and transportation) or grew only slightly (marine construction). The ocean economy grew more slowly than the national economy.
8. While the tourism and recreation sector has displayed significant job growth, the transportation and minerals industries play much larger roles in the ocean economy in their contribution to the economy than their employment share implies. These sectors, along with ship and boat building, pay the highest wages in the ocean economy.
9. More than 90% of the employment in the ocean economy is located in urban areas, but the ocean economy comprises a much larger proportion of employment in rural areas.
10. We have invested very little in the understanding of the ocean and coastal economy and in the value of its resources. Sound policy will require improved understanding of socio-economic factors, including expanding data collection, reporting, and management. States will play a critical role, in partnership with the federal government, in collecting the required data.

IMPLICATIONS FOR STATES

These findings suggest several important implications for state policies in several different areas, including coastal resource management, transportation, land use planning, economic development and state economic data collection and management:

For coastal resource management:

- From a population growth perspective, the coast is moving inland. Population growth is an issue for all coastal areas, but there are different trends within the different sub-regions of the coast that must be considered. Upland areas are growing faster than the near shore, in part due to the limited amount and high price of shoreline real estate. Thus population growth pressures are more likely to occur in the counties near the shore, but away from the immediate shoreline.

- The real population growth on the coasts is not from permanent residents near the shore but the large number of people who come to the shore for short periods of time. These include the large number of employees who must commute into the near-shore region to take the growing number of jobs there but who cannot live there because of high real estate prices. It also includes large numbers of tourists and recreationists who increase the population in coastal areas several fold in the summer. Cruise ship calls are an extreme example of short term population booms in a coastal community.
- The nature of economic growth in coastal regions is pushing up demand for land conversion from open space and wildlife habitat to residential and commercial uses. Land conversion for housing is occurring at a far faster rate than population growth alone suggests and is creating subsequent problems associated with “sprawl” such as increased nonpoint source pollution and storm water runoff.

For Transportation

- Coastal states and communities must plan for and build a transportation infrastructure to serve a much larger population in coastal areas than actually live there. Maine, for example, has a summer time population of 7 million but a year-round population of only a million. Because of rapid employment growth in near shore areas, transportation infrastructure must have the capacity to move employees on a daily basis and tourists on a seasonal basis. States should consider the best method for moving these populations while maintaining community and environmental character.
- State and local investments in marine transportation (facilities for the transportation of freight and passengers) are providing increasingly valuable services to the economy as a whole- particularly the economies of coastal states. But competitive pressures on the transportation industry and improved technologies are reducing the demand for labor, particularly in the handling of freight, even as the overall economic importance grows. Marine transportation investments will become increasingly critical to the competitiveness of state economies as a whole, as port facilities, even in neighboring states, play a larger role in moving the increasing volume of imports and exports. The development of the cruise ship industry as a increasing component of the fast-growing “ocean tourism” business also presents opportunities – and challenges- for virtually all coastal states.

For Land Use Planning

- The problem of “sprawl” is different in different parts of the coast. In some regions, population growth may drive sprawl, but in much of the coast it is commercial and retail growth- and its employment- that is driving changes in land use patterns. Residential sprawl is likely to be the greatest issue in inland areas away from the coast, where land prices are lower and population growth faster. But commercial growth is likely to be the major issue in sprawl the nearer the coast, with shopping

malls, strip developments, and commercial office space growth rising the fastest in the near-shore areas. This trend of faster growth in employment near the coast and of residences away from the coast creates additional strains on transportation systems, as well as requiring even more land space to accommodate the needs of roads and parking.

- These trends are greatly exacerbated by the concentration of growth in tourism and recreation industries. This growth must accommodate seasonal peaks in population, and is centered in those retail and service activities which require the greatest amount of land for development. Finding ways to better accommodate the growing demand for coastal and ocean tourism within the limited resources of the coastal environment needs to be a high priority for coastal states.

For Economic Development

- Changes in the ocean economy are presenting major economic development challenges. Tourism and recreation is growing robustly, but coastal states may be competing with one another for that market.
- Tourism and recreation are increasingly taking over for other traditional uses of the ocean, such as fisheries, boat building, and marine transportation. Those uses remain very valuable to state economies, and cannot be forgotten merely because they are in decline. These issues can be especially acute for rural coastal economies.
- Coastal and ocean resources are key resources to the nation's urban regions. The growth of tourism and recreation in urban coastal areas reflects both an attraction for national and international tourists, but also a key part of making coastal cities attractive places in which to live and work.
- The transition of people and communities away from dependence on declining fisheries will continue to be an issue for the foreseeable future. Aquaculture will only partially replace the employment and economic activity associated with wild fisheries.

For Economic Data and Information

Knowledge of the ocean and coastal economy is very imprecise because little has been invested in developing the needed data, especially in comparison with the investment in understanding other natural resource industries. States need to work closely with the federal government to provide the basic data that measures the coastal and ocean economies.

- One needed improvement is the development of systematic measures of employment in the commercial fishing industry, which is largely exempt from all state and federal reporting requirements. State departments of labor and marine resources agencies will have to work cooperatively with their federal counterparts to develop this critical information.

1. Defining the Coast

Numerous studies have been done describing population changes in the coastal region. The coast, it is said, is the home to over half the population of the U.S. But what is the coast? A moment's reflection will indicate that it is unlikely that half the population of the United States (over 140 million people) lives immediately adjacent to the shore of the ocean or Great Lakes. In fact, the term "coast" has been used to apply to a wide variety of geography, sometimes defined by political boundaries, other times by natural features. The first step in understanding the demographic and economic factors affecting the "coast" is to define that term. For purposes of analysis, the coast consists of four tiers. From largest to smallest they are:

- *Coastal States* – The 30 states bordering an ocean or Great Lakes. Currently, the coastal and ocean economic data is available only for states, not for Commonwealths or territories.
- *Coastal Watershed Counties* – Coastal watershed counties have been defined by NOAA as a means of more closely aligning political and natural boundaries. There are 640 watershed counties covering the areas in which major rivers and streams flowing into the oceans and Great Lakes are found.ⁱ
- *Coastal Zone Counties* – This category includes counties which are defined by the states for purposes of the Coastal Zone Management Act (CZMA).ⁱⁱ The CZMA definition of coastal zone varies significantly from state to state. In four states, the coastal zone includes the entire state.ⁱⁱⁱ In other states the coastal zone is defined by political jurisdictions such as towns and counties. Others define it by natural features.^{iv} There are 340 coastal zone counties.

Near shore – The near shore is defined using zip codes for both population and employment data. These definitions are imperfect, since they vary in size and shape across the country and are only loosely related to natural features of shoreline or rivers. But they are consistent with existing demographic and economic data sets and permit broad trends to be identified.

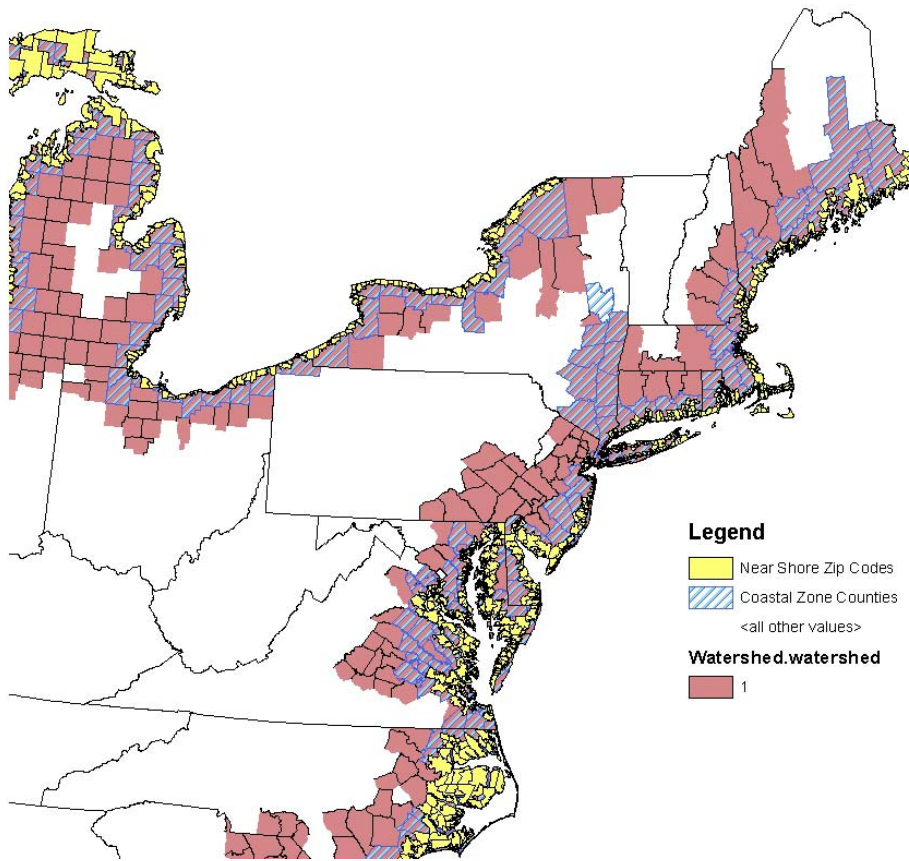


Figure 1: Illustrates the Four Definitional Tiers that Comprise the “Coast” in Northeast and Great Lake States.

2. Population Growth Pressures

Population growth pressures in coastal regions arise from significantly increasing population densities rather than a trend of disproportionate growth.

The common perception that “everyone is moving to the coast” is incorrect measured over the three decades. The pressure of population growth in coastal regions comes from the increasing size of the population on the fixed land of the coastal area, not from a disproportionate “move to the coasts.” The share of U.S. population accounted for by each of the four coastal regions in 1970 and 2000 was roughly the same. As Figure 2 demonstrates, the coastal watershed counties actually grew slightly slower than the national population and housing figures over this thirty year period. Coastal watershed counties also grew at a reduced rate. Over the 1990 to 2000 decade (the only decade where the near shore region can be measured using zip codes), the near shore region population grew at 11% compared with the U.S. growth of 13%.

Population and Housing Changes in Coastal Watershed Counties

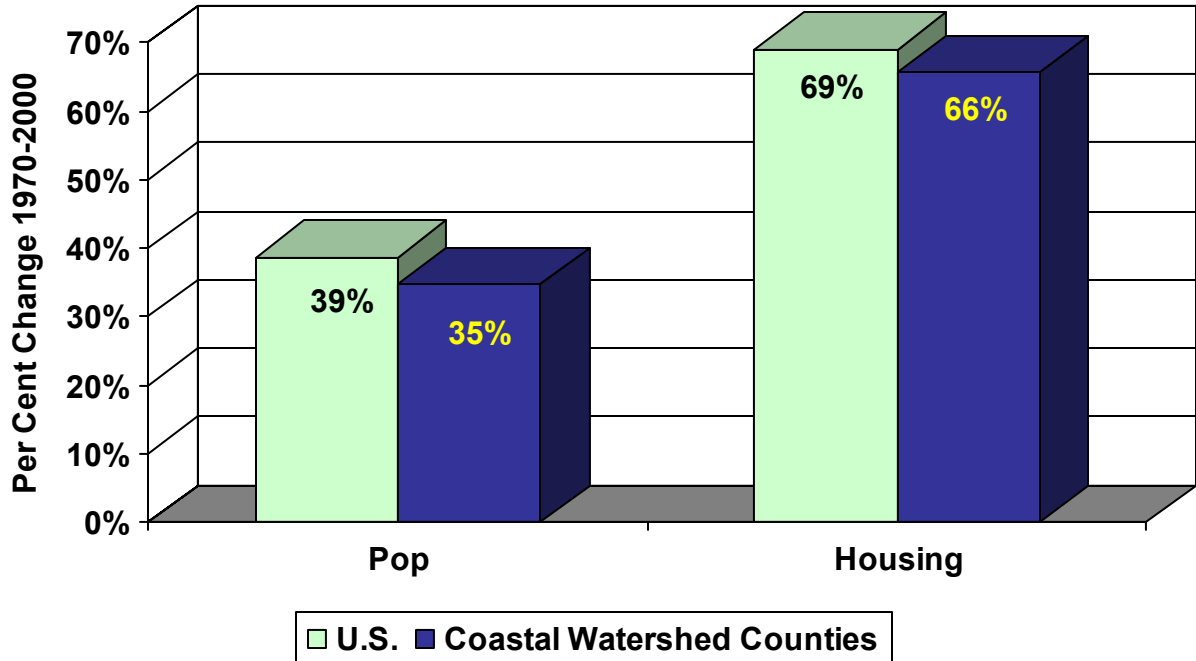


Figure 2: Illustrates Population and Housing Growth Rates for the U.S. versus Coastal Watershed Counties.

The oft-cited fact that the coastal regions are growing disproportionately greater was true during the 1980s, but not during the 1970s or 1990s or over the whole thirty year period. The slower growth in coastal areas should not be surprising. The coastal regions contain many of the nation's largest cities, which have not been growing rapidly. Moreover, land nearest the shoreline is among the most expensive real estate in the nation. Within the coastal watersheds, population and housing growth has been fastest in the coastal zone counties over 1970-2000 (37%) compared with coastal watershed counties (35%).

The impact of population growth on the coast does not depend on the percentage of growth, but rather on the sheer magnitude of growth in such a finite geographic area. In 1970, the coastal watershed counties held 53% of the U.S. population, and, in 2000, they held 52% of the population, all on slightly less than 25% of the land area. But during those three decades, a population equal to the State of California today was added to those counties, increasing the population density of these counties from 123 people per square mile to 167 people per square mile. (Figure 3)

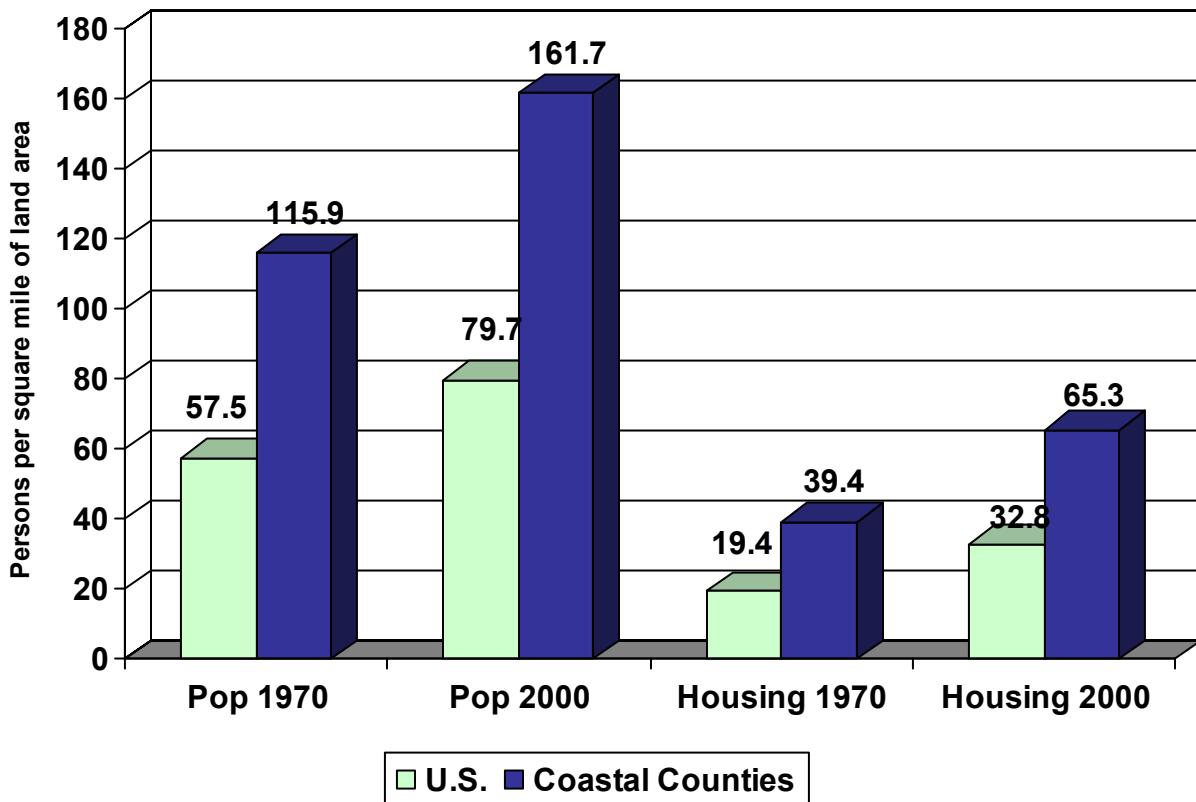


Figure 3: Illustrates Population and Housing per Square Mile of Land Area

The issue of population density is particularly acute in the near shore area. This region contains 11% of U.S. population on 4% of the land. At over 230 persons per square mile, the population density of the near shore is three times that of the nation as a whole.

3. Employment Growth Pressures

The socio-economic dimension that is changing the most in the coastal region is employment and economic growth.

Employment growth is substantially outpacing population growth in coastal regions, with the greatest difference coming in the near shore area. Between 1990 and 2000, employment in this region grew by nearly 35%, compared with population growth of just over 11%. (Figure 4)

These trends make the near shore among the most economically vibrant regions in the states. But that vibrancy on the narrow land base of the near shore region makes for potentially large stresses on its natural resources. This is particularly acute when combined with the population growth and the stresses of seasonal tourism demands (discussed below).

Comparison of Population and Employment Growth

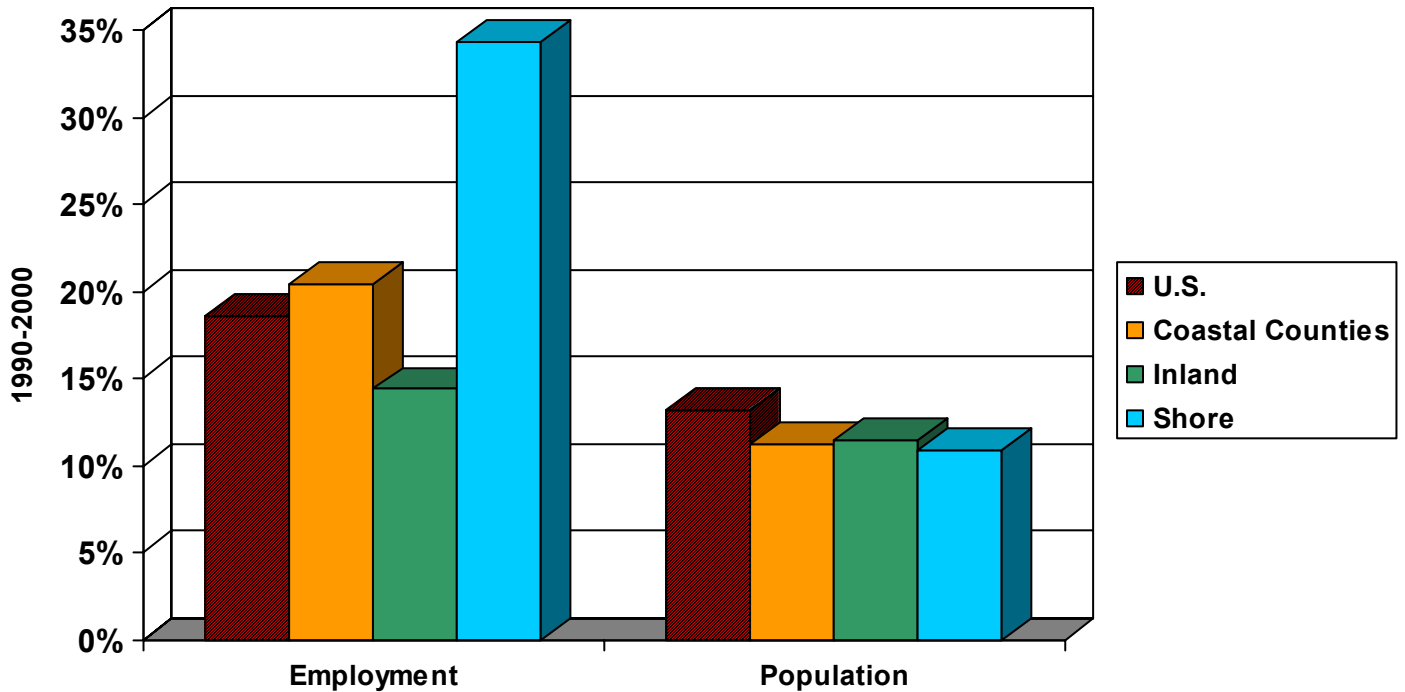


Figure 4: Demonstrates Percentage of Employment in a Coastal Region versus Population

The types of industries that have been growing in the near shore areas enhances the stress on the resources of the region. Growth has primarily been concentrated in nonmanufacturing industries which generally require more employees per unit of output. Major industries in these sectors, such as retail, also pay less meaning that employees often cannot afford to live in the more expensive near shore regions and, therefore, must commute in and out of the region daily.

4. Coastal Economy v. Ocean Economy

The terms “ocean” and “coastal” economy are often applied in a way that implies they are synonymous, but they are not.

The *ocean economy* is that portion of the economy which relies on the ocean as an input to the production process or which, by virtue of geographic location, takes place on or under the ocean.

The *coastal economy* is that portion of economic activity which takes place on or near the coast (whether defined as coastal watershed, coastal zone, or near shore areas).

The reason for this distinction stems from the fact that the “ocean” and “coast” are two different resources. The “ocean” provides a variety of products and services such as food, recreation, and transportation. The “coast”, on the other hand, is a region which provides access to the services of the ocean as well as being a specific economy within larger regions. The coast contains both ocean and many non-ocean related economic activities, and is much larger than the ocean economy. The coast economy describes the category of economic activity that creates much of the impact on coastal resources, while the ocean economy is the direct connection between the sea, the Great Lakes, and the nation’s overall economic growth.

This size of the coastal economy is impressive.

Three quarters of the American economy is generated coastal states. Nearly half comes from the 25% of the land that is the coastal watershed counties, and more than 11% of the economy comes from the 4% of the land in the near shore area. Regardless of the definition of coast being used, the coastal economy has grown faster than the national economy.

The ocean economy- the economic activity directly associated with using ocean resources - is considerably smaller than the coastal economy, but important nonetheless.

In 2000, the ocean economy is estimated to have employed over 2.2 million people and contributed more than \$117 billion to the national economy.

The ocean economy is generally proportionate to the size of each state’s economy, but it is more important in some states than others. Ocean economy employment is

DEFINING THE OCEAN ECONOMY

The ocean economy can be divided into the following broad sectors and industries:¹

- *Living resources* (fisheries harvesting and processing, aquaculture, seaweed harvesting)
- *Marine construction* (construction of piers and wharves, dredging, beach reconstruction)
- *Ship and boat building*
- *Marine transportation* (transportation of both freight and passengers plus manufacturing of equipment used in marine transportation)
- *Minerals* (oil and gas, sand and gravel, miscellaneous other mineral resources)
- *Tourism and recreation* (restaurants, lodging, recreation services, marinas, boat dealers)

Two sectors are also important, but are not included because of data limitations.

- *Scientific Research* (oceanographic, biological, ecological)
- *Government* (Federal, state, and local agencies that use or manage ocean resources).

Some of these industries are related to the ocean by what they do, such as marine transportation of goods and people. Other industries are ocean-related because of where they are. Tourism and recreation industries such as hotels or recreation services are ocean related when located in the near shore area

The data used in this analysis is based on the ES-202 data employment and wage data series collected by the U.S. Department of Labor Bureau of Labor Statistics. It is based on establishment level monthly reports of employment and wages. Estimates of gross output are based on the gross state product estimates from the U.S. Department of Commerce Bureau of Economic Analysis. Data for ocean-related government employment is not currently available. For more information see (Colgan 2003)

largest in Hawaii (18%) and Alaska (11%), as might be expected given their geography. The ocean economy as a proportion of gross state product is largest in Alaska (19%) and Hawaii (10%).

Among the continental states, ocean employment comprises the largest proportion of the economy in Washington State (6%) and the largest proportion of gross state product in Louisiana (11%)

5. Changes in the Ocean Economy

The ocean economy has undergone dramatic changes in the past decade.

Employment in the ocean economy remained proportionate to U.S. employment over the decade, but the share of national wages paid and share of national gross state product has declined. (Figures 6 and 7) These changes have occurred despite the addition of nearly 300,000 jobs over the decade. To understand why the ocean economy has not fared well, it is necessary to examine the composition of that economy.

The Ocean Economy in the National Economy: 1990 and 2000

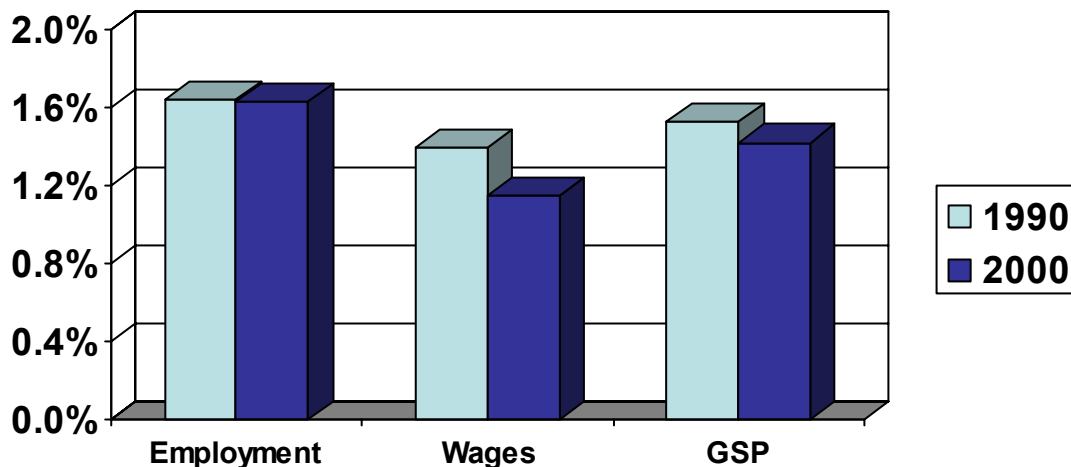


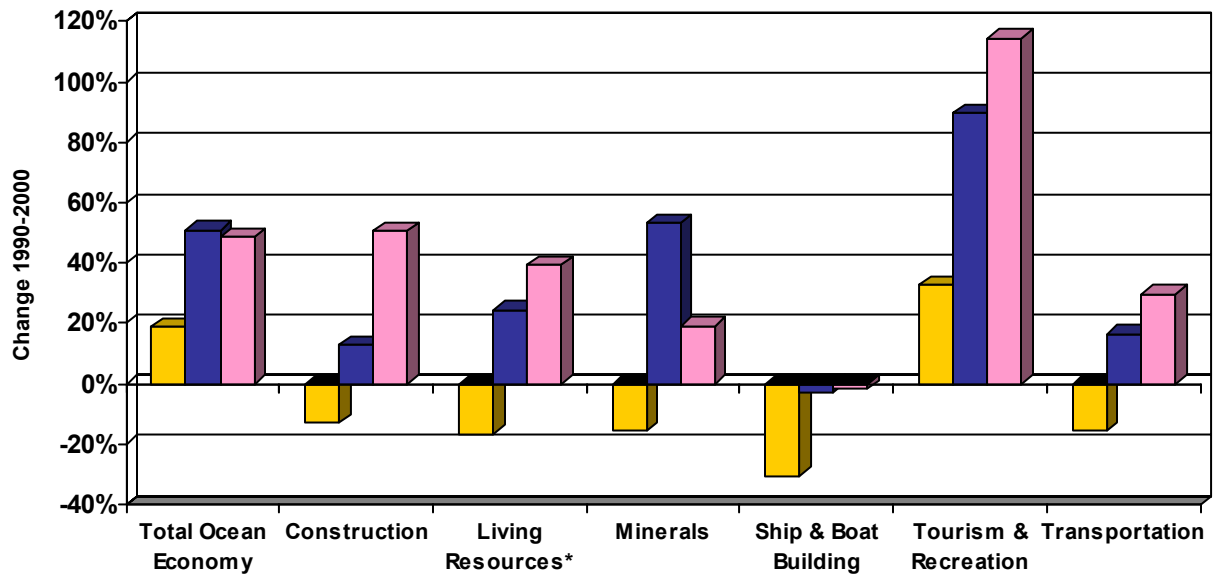
Figure 6; Illustrates the Growth in the Ocean versus National Economy

Figure 7 shows the changes in employment, wages paid, and gross state product for the six major sectors of the ocean economy for which measurement is currently available. Tourism and Recreation related activity is the only sector of the ocean economy sectors to show growth in employment, wages, and output that is even close to the national economic growth over the period. All other sectors grew more slowly than the U.S. in output

measured in current dollars. There was slight growth in marine construction employment, but every other sector saw dramatic declines in employment.

A number of factors have resulted in these changes. Growth in tourism and recreation reflects both the unique attractions of the oceans and coasts for these purposes and rising affluence. Declines in fisheries from over-fishing and government-mandated reductions in effort have resulted in sharp declines in the seafood industry.

Changes in the Ocean Economy



* Does not include employment in fisheries harvesting

■ Employment ■ Wages ■ GSP

Figure 7: Illustrates Changes in the Ocean Economy by Sector

The end of the Cold War resulted in a dramatic drop in ship building for the Navy, which was not offset by a rise in the boat building industry for the recreational market. The offshore oil and gas industry declined in output and became more productive. The end of the Cold War also resulted in a sharp decline in demand for search and navigation equipment, the “high tech” end of the ocean economy. Finally, despite a significant increase in the demand for marine transportation services for handling the increasing volume of international trade (90% of which by volume is carried by sea) freight and passengers, employment in deep sea freight handling industry has declined because of improved productivity.

Ocean economy growth trends are moving away from the sectors that are most valuable to state economies.

The changes in the ocean economy away from sectors like minerals production, ship building and offshore oil and gas production should not obscure the importance of these

industries in state economies. These industries, along with fishing and transportation, continue to provide high wages and make major contributions to the state and national economy.

Figure 8 compares the distribution of establishments, employment, wages, and contribution to gross state product. Tourism and recreation firms dominate the number of establishments and employment, comprising about 80% of the ocean economy on these measures. But the minerals and transportation sectors show much higher proportions of wages paid and gross state product. Their contribution to output is two times or more their share of employment.

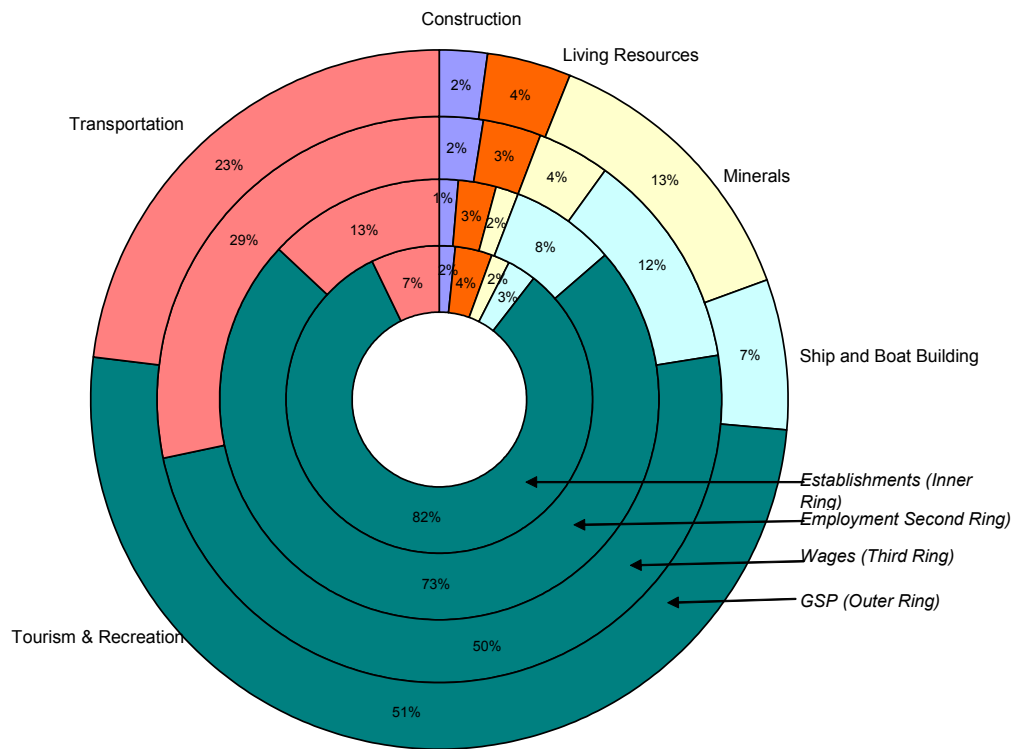


Figure 8: Illustrates the differing proportions of employment, wages, and gross state product that ocean economy sectors comprise.

This economic pattern presents states with a particular economic development challenge. The industries in the ocean economy that have been growing most rapidly are those that pay the lowest average wages (Figure 9). The average wage in 2000 in the tourism and recreation sector was \$16,321, compared with over \$60,000 in the minerals sector. Employment in the tourism and recreation sector is often highly seasonal, which distorts annual average figures to some extent. In fact, employment in ocean tourism is, on average, 10% higher in the summer than the annual average employment (except for Florida, which

peaks in March). Maine leads the nation in the seasonal peak, with employment 35% higher in the summer.

The ocean economy has seen the most growth in the sectors and industries paying the least, and subject to a high degree of seasonality, while losing employment in the higher productivity, higher paying jobs. State economic development efforts will have to develop means to take advantage of tourism and recreation growth. As part of the larger shift towards a service economy, tourism and recreation industry growth is part of larger trends, including its tendency to use substantial amounts of increasingly scarce coastal lands. States will have to take advantage of the growth of ocean tourism while minimizing its impacts. At the same time, state economic development will have find ways to keep other ocean industries vibrant wherever possible, while transitioning people out of ocean industries experiencing resource scarcity, such as fisheries. [or improved productivity out of traditional ocean industries like fishing or oil and gas

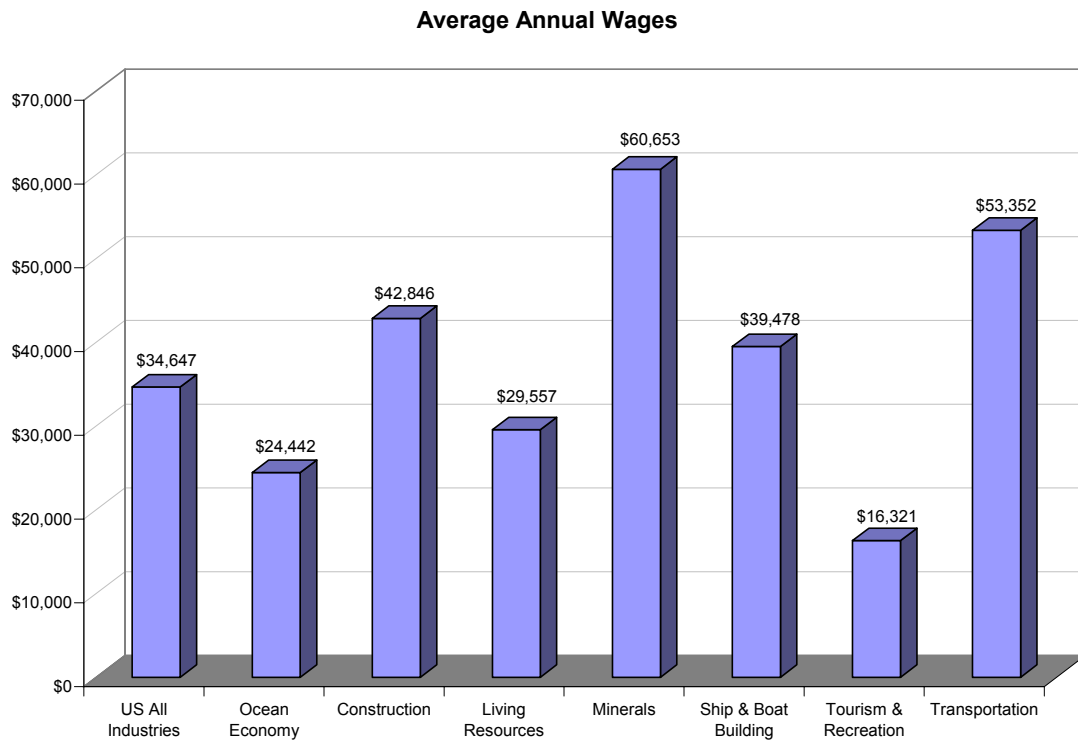


Figure 9: Illustrates the variation in average annual wage by sector of the ocean economy.

6. The Urban and Rural Distribution of the Ocean Economy

The ocean economy is overwhelmingly urban in location, but it is more important in rural areas.

Ninety-three percent of employment in the ocean economy is located in metropolitan areas. This is not surprising, since industries such as marine transportation,

tourism and recreation, and even fishing tend to be found in the cities, where they are intimately connected to other industries and consumers in the region.

Urban and Rural Character of the Ocean Economy

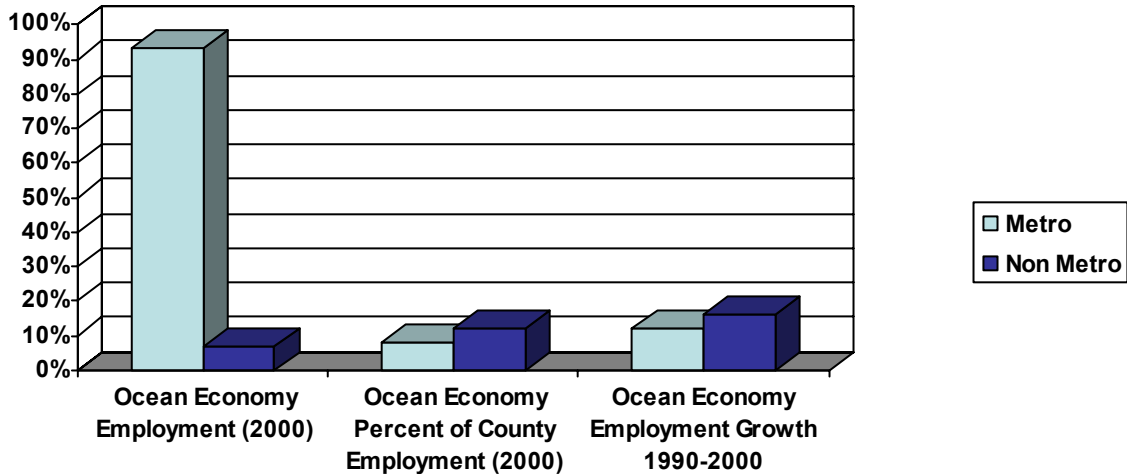


Figure 10: Illustrates the urban and rural (metro and non-metro) distribution of the ocean economy.

But, as Figure 10 shows, employment in the ocean economy is twice the share employment in non-metropolitan counties, and that ocean economy employment in the rural counties grew faster than in the urban counties. Recalling the growth trends in the ocean economy discussed above, it is likely that the changes in the ocean economy will have caused much greater stresses in rural economies, even while those economies showed growth, primarily related to tourism and recreation development. This stress arises from the declines of traditional- and often well paying- industries involved in natural resource use.

7. Measuring the Ocean and Coastal Economies

Less is known about the economy associated with the ocean than about any of the other major natural resources of the American economy (agriculture, forests, and minerals).

The information about the ocean and coastal economy presented here is the result of a research project which has only begun to develop the data and information needed to better understand how the economies of our coastal region and ocean industries are changing.

Currently, neither state nor federal governments invest resources to consistently measure the ocean economy. For example, there is no nationally consistent measure of employment in the fisheries harvesting industry, and most states, even those where commercial fishing is a major industry, do not regularly count those employed in commercial fishing. All of the changes over the past decade in commercial fishing have taken place without any systematic documentation of the number of people affected. The enormous contribution of the ocean to real estate values- and the tax base dependent on those values- is only sporadically measured. And the economic value of the states' investment in increasing access to the shore for recreation is not measured any where.

The collection and analysis of economic data is a cooperative endeavor of the state and federal governments. Much of the nation's key economic data is collected by the states with funding and guidelines provided by the federal government. The development of new and expanded data to better understand the ocean and coastal economies will have to follow this model, though the federal government will have to take the lead by setting national standards and providing funding. But state agencies, such as those with responsibilities for employment data, fisheries, and recreation will have to play their parts in developing the means to better measure and understand the coastal and ocean economy.

Notes

ⁱ The definition excludes the Mississippi-Missouri-Ohio river system.

ⁱⁱ Boundaries of coastal zone are provided by the Office of Coastal Resource Management, NOAA.

ⁱⁱⁱ The four states which define the entire state as the coastal zone are Florida, Rhode Island, Delaware, and Hawaii.

^{iv} Examples of states using county boundaries include Washington, South Carolina, Mississippi, and North Carolina. States using municipal boundaries include Maine and Connecticut. In New York, the coastal zone includes counties along the Hudson River as far north as Albany, as well as counties along both the Atlantic and Great Lakes coasts. Pennsylvania defines its coastal zone only along Lake Erie and not along the Delaware River. In this analysis, Cook County Illinois is included in the coastal zone county definition although Illinois does not participate in the CZM program to provide complete coverage of the nation.