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CALIFORNIA'S OCEAN ECONOMY

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CALIFORNIA'S OCEAN ECONOMY

Abstract

California's Ocean Economy is the most expansive study of its kind in the nation and provides an update to the 1994 economic study conducted by the California Research Bureau and later released as part of the Resources Agency ocean strategy titled, *California's Ocean Resources: An Agenda for the Future*. This report from the National Ocean Economics Program (NOEP) provides a more comprehensive understanding of the economic role of California's ocean resources than has been available to date. It also provides California with strong evidence that its unique ocean and coastal resources are important to sustaining California's economy. This information highlights the economic importance of the ocean and coast to California and the nation and underscores the need for continued leadership in balancing resource protection and economic development.

CALIFORNIA'S OCEAN ECONOMY

Report to the Resources Agency, State of California

Prepared by The National Ocean Economics Program

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Executive Summary

California's Ocean Economy is the most expansive study of its kind in the nation and provides an update to the 1994 economic study conducted by the California Research Bureau and later released as part of the Resources Agency ocean strategy titled, *California's Ocean Resources: An Agenda for the Future*. This report from the National Ocean Economics Program (NOEP) provides a more comprehensive understanding of the economic role of California's ocean resources than has been available to date. It also provides California with strong evidence that its unique ocean and coastal resources are important to sustaining California's economy. This information highlights the economic importance of the ocean and coast to California and the nation and underscores the need for continued leadership in balancing resource protection and economic development.

Summary of Findings

California - Largest Ocean Economy in the Nation

California has the largest Ocean Economy in the United States, ranking number one overall for both employment and gross state product (GSP), an impressive position, because California was the 5th largest economy in the world in 2000.¹ The sectors of the Ocean Economy studied include: (1) coastal construction, (2) living resources, (3) offshore minerals, (4) ship and boat building and repair, (5) maritime transportation and ports, and (6) coastal tourism and recreation. The total GSP of California's Ocean Economy in 2000 was approximately \$42.9 billion. California's Ocean Economy directly provided approximately 408,000 jobs in 2000, and almost 700,000 jobs when multiplier effects are included. It provided more than \$11.4 billion in wages and salaries in 2000, and more than \$24 billion when multiplier effects are included. The NOEP also evaluated the total value of all economic transactions within 19 coastal counties (mainland coast and four additional counties added within San Francisco Bay and the Sacramento River Delta) and identified approximately \$ 1.15 trillion of economic activity,² (86% of total state economic activity), that is referred to as the "Coastal Economy." The natural resources of the coast and coastal ocean are a solid foundation for California's economy and these resources must be sustained to maintain the strength in the six sectors evaluated within the Ocean Economy and the much larger Coastal Economy.

California's Ocean Economy: Comparisons with the Nation

California provides a larger share of the national Ocean Economy than any other state. Overall, California made up nearly 19% of the US Ocean Economy in 2000 in both employment and GSP. A major reason for this was the increase in the Tourism & Recreation sector and the strength of the Transportation sector. California's Marine Transportation sector is more than a quarter of the national Marine Transportation sector with the Ports of Long Beach and Los Angeles among the largest in the nation.

¹ 2001 California Society of Certified Public Accountants, Gale Group.

² County shares of GSP computed as county share of wages from the BLS Quarterly Census of Employment and Wages applied to the estimate of GSP from the Bureau of Economic Analysis.

Coastal Tourism and Recreation – More Growth/Lower Wages

Coastal Tourism & Recreation dominated job growth with lower wages, while higher wage jobs in ocean-related sectors declined. This trend, which also took place nationally, represents a shift from goods-related economic activity towards services. It points to the need for California to continue to address housing and transportation issues to accommodate this workforce. In addition, California must continue its leadership efforts to protect and enhance the natural resources, which draw visitors from all over the world.

Coastal Population Density Is High – More Growth Inland

Not only are the oceans important economically to the state, they are much loved by the residents. In 2000, 77% of California's population lived in coastal counties, which represent 25% of the land. In fact, population density along the coast increased markedly over the decade to 671 people per square mile compared to population density for the entire state of 217 people per square mile. However, between 1990 and 2000, California's coastal population grew more slowly than the overall state population; 11.3% compared to the total state population growth of 13.7%, a difference of 2.4%. Areas of highest population growth were the inland areas immediately adjacent to the coast, where land was more available and less expensive at the time.

Coastal Economy: Employment and Gross State Product

Total Coastal County GSP in 2000 represented approximately 86% of California's GSP, estimated at \$1.15 Trillion. Coastal employment in California increased by 13.2% from 1990 to 2000 compared to the state's overall employment growth of approximately 12%. In 2000, total employment in coastal counties represented 81% of the state's total employment or 11,994,814 salaried workers.

Regional Growth

Regionally, the largest growth occurred in the central region of California, which includes Monterey, San Mateo, and Santa Cruz counties. The growth rates on all three measures, employment, wages and GSP, were larger than any other region, and were driven primarily by growth in Tourism & Recreation. The largest Ocean Economy is in the Southern, most populous region. Rural areas indicated a higher proportion of jobs relating to the coastal and ocean economy than in urban areas. The Ocean Economy represented 2.7% of employment in the highly populated Southern California economy and nearly 10% of the jobs in the northern rural region of Humboldt, Del Norte, and Mendocino counties.

National Ocean Economics Program

This report was funded by a Coastal Impact Assistance Program (CIAP) Grant awarded by the California Resources Agency to the National Ocean Economics Program. The NOEP team, conducting a national investigation into the ocean based economy of the United States, has carried out this work using the most reliable available sources of information to prepare this report. The information and views expressed in this report are those of the authors and do not reflect any official views or position of the State of California. Professors Judith T. Kildow of California State University at Monterey Bay and Charles S. Colgan from the University of Southern Maine led the team.

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PART I BACKGROUND AND SUMMARY OF FINDINGS

Chapter 1 Introduction

1.1 California and the Sea

California has always been influenced by the sea. Unlike other western states, California was founded from the sea inward, first by the Spanish and then by the Americans. California retains close links to the Pacific and by utilizing its resources, was the fifth largest industrial economy in 2000.³ Its connections to the ocean are evidenced by the economic activity of thousands of businesses, its burgeoning ports, and in the behavior of millions of people who flock to the shore.

Besides attracting millions of people, California is a fascinating place to examine and an important place to understand. California's coast has unique physical qualities. Geographically and geologically, California's coast is a mixture of broad sand beaches, enormous estuaries turned ports, and rocky cliff formations that make it conducive to differing economies and lifestyles. The varied climate along its coast contributes to differing patterns of living. Demographically, it is heavily urban in the Bay area and Southern Coastal areas, mixed rural and semi-urban along the Central Coast, and mostly rural along the Northern coast. In the past, it has been difficult to fully appreciate the magnitude of the connections to the ocean. Now, it is possible to measure the economic and demographic relationships as they change over time throughout the state as a whole, and in the different coastal regions of California.

Between 1990 and 2000, California's population grew from 29.8 million to approximately 33.9 million, an estimated annual growth rate of 13.7%. Seventy-seven percent of the population lives in or near the coast, and a faster growing population inhabits the inland areas immediately adjacent to the coast. Another important indicator of change, employment, is growing faster along the coast than inland, indicating a strong growth in the economy along the shore.

California holds a prominent political leadership position with respect to coastal zone and ocean management. For many years it has initiated innovative programs and policies to meet the challenges of balancing protection of its resources and development for its growing population and economy. As the first state to pass coastal management legislation in 1976⁴, it continues as a model for other states by its responses to coastal issues. California's growing population and historic popularity as a tourist destination have brought it both economic wealth and the accompanying challenges of enormous pressure on all of its natural resources, particularly those along its more populated coastal areas.

Beaches are the top destination for its tourists and one of California's greatest assets. Its beaches stretch the length of the state, and are sought particularly in Southern California due

³ 2001 California Society of Certified Public Accountants, Gale Group.

⁴ Coastal Act of 1976, Coastal Resources Planning & Management Policies.

<<http://www.coastal.ca.gov/fedca/cach3.pdf>>. The Act created policies for public access, recreation, marine environment, land resources, and development.

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to its warmer climate. For this study the value of beaches and coastal areas has been calculated to demonstrate their importance to the California economy, and the significance of maintaining both. Protecting the beaches from pollution is only part of the challenge; they also are eroding because California, like other places, has dammed up most of its coastal watersheds, thus preventing the fresh-running waters carrying essential nourishing sediments to the coast. As a result, California conducts some artificial beach nourishment to ensure its revenues from tourism continue, and to protect this unique and desirable asset.

Californians can boast a long list of challenges and activities that dominate the California coastal landscape. These activities require monitoring and management to ensure that the shores of California can sustain the pressures and deliver the amenities and goods the public seeks. To date, however, there has been little information about the value of the coast and ocean to the state of California, and even less information about how these values have changed over time. Likewise, there continues to be little understanding of the state's economic dependence on these natural resources. Uncovering California's relationships to the ocean and its economy is the purpose of this report.

1.2 About this Study

This report is an update of a study of California's Ocean Economy that was undertaken in 1994 by staff of the California Research Bureau,⁵ and later published as part of a larger report in 1997 by the California Resources Agency.⁶ A research team from the National Ocean Economics Program (NOEP), headquartered at the University of Southern California (1999-2003) and California State University at Monterey Bay (2003-present), has conducted a national investigation into the ocean-based economy of the United States.

The general outline and scope of the 1994 study were followed, but there are some differences. This report incorporates the latest data and analytic techniques developed by the NOEP to measure the Ocean Economy of all states, and thus yields somewhat different estimates. Data from the years 1990 and 2000 shows changes in the California Ocean Economy over time utilizing a single methodology in order to provide a nationally consistent approach to measuring the ocean and coastal economy of the US. The NOEP methodology permits greater precision in estimates, particularly in tourism and recreation, and also provides data that permits measurement over time. Appendix A contains a brief discussion of the methodological issues involved in preparing this report. More detailed information can be found in *Measurement of the Ocean and Coastal Economy: Theory and Methods* (Colgan 2003).⁷

NOEP developed its methodology because the data available to measure the Ocean Economy were imperfect for the following reasons: (1) standard economic data series available for this study were not designed to measure in detail the relationship between the

⁵ R. Moeller and J. Fitz, 1994. *An Economic Assessment of Ocean Dependent Activities*, Sacramento: California Research Bureau.

⁶ The Resources Agency, California, 1997. California's Ocean Resources: *An Agenda for the Future*.

⁷ C. Colgan, 2003. *Measurement of the Ocean and Coastal Economy: Theory and Methods* working paper, NOEP, <www.OceanEconomics.org/Download/NOEPMethodv8.pdf>.

ocean and economic activity, so a methodology has been devised that allows the data sets to be as compatible as possible with the realities of this particular slice of the economy; (2) other essential data are missing or irregularly available. Particularly, sector data at the county, and even regional level, in many cases cannot be publicly revealed because of federal rules of disclosure that protect proprietary information on firms; (3) standard economic data do not fully capture all of the economic value of the ocean. Recreational uses such as a day at the beach, or just enjoying a view of the sea do not appear in market data sets, but rather, are found in studies using a range of methodologies, and are thus not included in our estimates.

1.3 Definitions and Terminology

To avoid repetition and for clarification purposes, the following terms and definitions regarding economic indicators and valuation categories are found in the beginning of this report, so that the reader can fully understand what is intended.

Coastal Economy: the sum of all economic activity occurring in counties defined as part of a state's coastal zone management program, including four additional counties that are part of San Francisco Bay and the Sacramento River Delta areas. Most, but not all of the Ocean Economy is part of the Coastal Economy.

Ocean Economy: those activities that create goods and services, a portion of whose value is affected by the ocean and its resources. Economic statistics are grouped by a classification system known as the Standard Industrial Classification (SIC), which imperfectly reflects the relationship between economic activity and the ocean.⁸ Only part of the Coastal Economy is part of the Ocean Economy.

Dollar Values: expressed in constant 2000 dollars (adjusted by the Consumer Price Index).

- Dollar values are estimated as direct and indirect values. Indirect values include induced values.
- Direct values: those activities associated only with the designated ocean industries such as travel and tourism and living resources (examples include labor and capital costs associated with hotel accommodations or labor and capital costs for fish processing).
- Multipliers: indirect and induced values. Multipliers affect the estimates of employment, wages, and output within the region. Indirect effects include both the change in economic activity in industries within the region that buy or sell from ocean industries (examples include sales of food to restaurants and hotels and the activities of travel agents booking trips) and the change in economic activity resulting from the spending of the wages earned by those employed by the ocean industries within the region. All indirect values or multiplier effects are based on IMPLAN, a standard and widely used economic impact model.

⁸ After 2000, all industries are classified using the North American Industry Classification System (NAICS) rather than the Standard Industrial Classification (SIC by BLS). Both SIC and NAICS codes have been provided for 2001 as a benchmark leaving further calculations to the user. NAICS focuses on how products and services are created, as opposed to SIC which focuses on what is produced. Using NAICS yields significantly different industry groupings from those produced using SIC. These differences in NAICS and SIC structures, preclude direct comparison between NAICS data and SIC-based data for earlier years for historical series.

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- Unless otherwise indicated, all measures are stated as direct values.

Employment: annual average wage and salary private employment excluding self-employment.

Gross State Product (GSP): measure of the contribution of the sector to the value of goods and services in the economy. The value-added, or net sales of a sector, minus the cost of inputs, e.g. the net output of a sector. Using this measure eliminates “double counting,” among sectors.

Housing Patterns and Trends: include housing units both single and multi-family including seasonal and year round, owner occupied and rental.

National Ocean Economics Program (NOEP): federally funded program to understand and estimate the value of the ocean-based economy of the US.

Standard Industrial Classification System (SIC): The NOEP adopted the SIC system and identified eight major sections for its national study on the Ocean Economy. Six of these, selected for this study, are listed in alphabetical order (Table 1-1).

Table 1-1: The Sectors and Industries of the Ocean Economy

Construction Marine	Tourism & Recreation - Coastal
	<i>Amusement and Recreation Services</i>
Living Resources - Marine	<i>Boat Dealers</i>
Fish Harvesting	<i>Eating and Drinking Places</i>
Fish Hatcheries and Aquaculture	<i>Hotels and Motels</i>
Seafood Processing	<i>Marinas</i>
	<i>Recreational Vehicle Parks and Campgrounds</i>
Minerals - Offshore	<i>Sporting Goods Retailers</i>
<i>Limestone, Sand, and Gravel</i>	<i>Zoos and Aquaria</i>
<i>Oil and Gas Exploration</i>	Transportation - Marine
<i>Oil and Gas Production</i>	Deep Sea Freight Transportation
	Marine Passenger Transportation
	Marine Transportation Services
Ship & Boat Building	<i>Petroleum and Natural Gas Pipelines</i>
Boat Building and Repair	Search and Navigation Equipment
Ship Building and Repair	<i>Warehousing</i>

The sectors Construction, Living Resources, Minerals, Ship & Boat Building, Tourism & Recreation, and Transportation include specific industries that contribute to the Ocean Economy. Some industries, shown in *italics*, are considered ocean-related only when they are located in near-shore regions, and defined by location in a coast-adjacent zip code, which is the smallest unit of geography currently available for employment statistics.⁹

⁹ The data source for the analysis is the Quarterly Census of Employment and Wages of the US Department of Labor, Bureau of Labor Statistics, which is derived from the ES-202 unemployment insurance data series supplied by the California Employment Development Department.

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The use of SIC codes and geography provides the best means of measuring the Ocean Economy. This methodology is based on available data consistent across all states and can provide information from the national to the local level.

Wages and Salaries: the wages and salaries paid; all wages are shown in year 2000 dollars.

1.4 Limitations and Omissions

Although this report covers all categories found in the earlier California report, it does not capture the full value of the California Ocean Economy. This study omits some important segments of the California Ocean Economy:

- Ocean Economy is measured only in coastal counties at this time, although Ocean Economy activities extend throughout the country.
- The government sector is excluded; the SIC codes do not distinguish between coast and ocean-related sectors and non-ocean related activities of the federal, state, and local government agencies.
- Fisheries harvesting employment values are omitted because they are not included in the nation's employment database, and are not accurately and consistently available from any other source.
- Marine science and education are not included since data related to this field cannot be separated easily within larger organizations such as colleges and universities that undertake most marine scientific research. However, a list of California's marine science research and education institutions can be found in the Appendix. C.
- Real estate is not included because such information requires a different approach to valuation.
- Corporate investment estimates as well as consumptive values are missing because they require a different approach to valuation.

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Chapter 2 Summary of Findings

2.1 Introduction

This chapter has been separated into four categories highlighting the more interesting findings. The first two categories are (1) California's Coastal Economy, which includes the demographic patterns that define and drive it;¹⁰ and (2) comparison of California's Ocean Economy with the nation that also includes other coastal states. These are added solely to provide context and a fuller understanding of the data generated for this report, yet are not analyzed or elaborated further. The second two categories, (3) comparison of California's Regional Ocean Economies with each other and with the state over time;¹¹ and (4) comparison of California's Ocean Economy by sectors, over time are further elaborated in the following chapters.

2.2 California's Coastal Economy

As explained in Chapter 1, California's Coastal Economy reflects all activities within either coastal zip codes or coastal counties, which are part of the California Coastal Zone Management Program. This includes all counties with ports and harbors in watersheds that host important maritime activities. Population and housing estimates are added to show important trends.

California's coastal population did not increase as rapidly as the state's population during the decade between 1990 and 2000, (11.3% compared to the total state population growth of 13.7%, a difference of 2.4%). However, density of California's coastal population continues to far exceed that of the state. In the year 2000, density along the coast was more than 623 people per square mile vs. 217 people per square mile for the state.

- In 2000, 77% of California's population lived in coastal counties, which represent 25% of the land.
- According to US Census reports, the areas of highest population growth, however, were those found immediately adjacent to the coastal areas, inland along coastal watersheds, where property was less expensive and more available at the time.¹² While population density in coastal areas clearly exceeds these areas for now, inland areas merit close monitoring, because they are vulnerable to overexploitation of the natural landscape and the filling in of valuable and limited green space that could affect the quality of watersheds and ultimately the shoreline. See Table 2-1, Coastal County densities.

¹⁰ California State Summary of Coastal and Ocean Social and Economic Trends, December 2004.

¹¹ The State has been divided into 5 regions, as was done in the previous CA study. However, due to changes in marine-based activities in watersheds, we have added the counties of Yolo, San Joaquin, and Sacramento to ensure that all significant activities were included.

¹² Examples would be the "inland empire" in LA County, the Salinas Valley in Monterey County, the Inland areas of Sonoma county, the Sacramento Delta areas.

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Table 2-1: Population and Housing Densities 1990-2000

Region	Near-Shore	Coastal Counties	California
Area (Square Miles)	7,747.3	39,094.0	155,959.3
Population 1990	4,481,996	23,546,687	29,785,857
Population 2000	4,828,228	26,215,856	33,871,648
Population Density 1990	578.5	602.3	191.0
Population Density 2000	623.2	670.6	217.2
Population Increase	7.7%	11.3%	13.7%
Housing 1990	1,858,485	8,750,629	11,182,882
Housing 2000	1,969,411	9,389,257	12,214,549
Housing Density 1990	239.9	223.8	71.7
Housing Density 2000	254.2	240.2	78.3
Housing Increase	6.0%	7.3%	9.2%

- Population across California coastal counties ranged in growth from 6.2% to 20% during the decade 1990 – 2000 (Table 2-2).
- Yolo County, adjacent to Sacramento, had the highest growth rate. Humboldt and San Francisco counties had the slowest growth rate.

Table 2-2: Regional Population and Housing Growth Rates

Region	2000 Population	Population 1990-2000 Growth Rate	2000 Housing	Housing 1990-2000 Growth Rate
North				
Del Norte	27,507	17.3%	10,434	14.8%
Humboldt	126,518	6.2%	55,912	9.3%
Mendocino	86,265	7.4%	36,937	9.8%
North Region Total	240,290	7.8%	103,283	10.0%
North Central				
Sonoma	458,614	18.1%	183,153	13.7%
Marin	247,289	7.5%	104,990	5.3%
Napa	124,279	12.2%	48,554	9.9%
Solano	394,542	16.2%	134,513	12.5%
Yolo	168,660	19.4%	61,587	16.2%
Sacramento	1,223,499	17.5%	474,814	13.7%
San Joaquin	563,598	17.3%	189,160	13.8%
San Francisco	776,733	7.3%	346,527	5.5%
Alameda	1,443,741	10.7%	540,183	7.2%
Contra Costa	948,816	18.1%	354,577	12.2%
Santa Clara	1,682,585	12.4%	579,329	7.2%
North Central Total	8,032,356	13.8%	3,017,387	9.7%
Central				
San Mateo	707,161	8.9%	260,576	3.5%
Santa Cruz	255,602	11.3%	98,873	7.6%
Monterey	401,762	13.0%	131,708	8.7%
Central Region Total	1,364,525	10.5%	491,157	5.7%
South Central				
San Luis Obispo	246,681	13.6%	102,275	13.4%
Santa Barbara	399,347	8.1%	142,901	3.4%
Ventura	753,197	12.6%	251,712	10.2%
South Central Total	1,399,225	11.4%	496,888	8.8%
South				
Los Angeles	9,519,338	7.4%	3,270,909	3.4%
Orange	2,846,289	18.1%	969,484	10.8%
San Diego	2,813,833	12.6%	1,040,149	9.9%
South Region Total	15,179,460	10.2%	5,280,542	5.9%
Total Coastal	26,215,856	11.3%	9,389,257	7.3%
California Total	33,871,648	13.7%	12,214,549	9.2%

The relative rate of increase over a decade for housing units in the three geographic areas of interest for this study: (1) total state housing; (2) coastal housing; and (3) near-shore¹³ housing are reflected in Table 2-3. The near-shore’s lower rate of increase in population compared to coastal zone counties and the state as a whole, suggests that limitations on building near the shore are having an influence. Regulatory limits, price, and land availability are the likely primary constraints. Although near-shore housing has the lowest rate of increase, it also represents a very narrow strip of land, so the lower rate can be misleading as a result. Density along the shore continues to increase far beyond either of the other two areas, indicating the need to monitor the development carefully.

Table 2-3: California Housing Comparisons

Year	Total State Housing	Coastal Housing	Near-shore Housing
1990	11,182,882	8,750,629	1,858,485
2000	12,214,549	9,389,257	1,969,411
Change	9.23%	7.30%	5.97%

- In 2000, total coastal county employment represented 80.7% of the state’s total employment (Table 2-4).
- Coastal employment in California increased by 13.2% from 1990 to 2000.

Coastal counties in California, as well as the rest of the nation, represent a disproportionate size of the overall economy. While many of the nation’s largest cities are located along the coast and account for some of this value, coastal location draws increasing numbers of people and a broad range of activities that represent vast sums of revenue, which no state can afford to overlook. The natural resources of the coast and coastal ocean are a solid foundation for California’s economy and must be sustained to sustain the growth in the Coastal Economy.

Table 2-4: Comparison of California Coastal County Employment Growth with California Total Employment

Year	Total State Employment	Coastal County Employment	Coastal County % of State Employment
1990	13,262,696	10,497,161	79.2%
2000	14,867,006	11,994,814	80.7%
Change	12.1%	13.2%	1.5%

Coastal county population and employment in California are growing faster than housing (Table 2-5). This trend has several implications. Affordable housing for those working in the area may not be available. This is particularly true in the lower paying tourism and recreation jobs. This trend has far reaching implications for social and physical infrastructure, such as adequate transportation and highways to carry those who must live far away from their employment.

¹³ Near-shore housing consists of zip codes adjacent to the coastline.

Table 2-5: Growth Rates for Coastal County Housing, Population, and Employment

1990 - 2000 Housing Growth Rate	1990 - 2000 Population Growth Rate	1990 - 2000 Employment Growth Rate
7.30%	11.30%	13.2%

2.3 California’s Ocean Economy: Comparisons with the Nation

- California’s share of the national Ocean Economy is substantially larger than its share of the total US economy.

The nationally consistent measurements of the Ocean Economy, which have been developed by the NOEP, allow comparisons of California’s Ocean Economy with other states and the nation.¹⁴ Overall California made up nearly 19% of the US Ocean Economy in 2000 in both employment and GSP (Table 2-6). During that same year, California had 11.4% of total US employment and 13.4% of US GSP. California provided a larger portion of the national Ocean Economy than its contribution to the total economy. Major reasons for this were the increase in the Tourism & Recreation sector and the strength of the Transportation sector. California’s Marine Transportation sector is more than a quarter of the national Marine Transportation sector with the Ports of Long Beach and Los Angeles being among the largest in the nation.

Table 2-6: California’s Share in the US Ocean Economy 2000

California’s share in the US Ocean Economy 2000		
	Employment	Gross State Product
Total Ocean Economy	18.7%	18.9%
Construction	9.6%	13.1%
Living Resources	10.6%	7.4%
Minerals	9.2%	6.7%
Ship & Boat Building	10.2%	9.6%
Tourism & Recreation	20.1%	22.1%
Transportation	26.1%	28.1%

Figures 2-1 and 2-2 compare the distribution of employment and GSP between the two areas in 2000. For employment, California has a larger proportion of its Ocean Economy in Ship & Boat Building, Living Resources, and Minerals than the US has as part of its economy. However, the value of GSP in the US is larger in Ship & Boat Building and Minerals, while the value of the Transportation sector’s GSP is much larger in California. The value of Tourism & Recreation also is larger in California.

¹⁴ All values reported in this part of the study are direct values, unless otherwise noted.

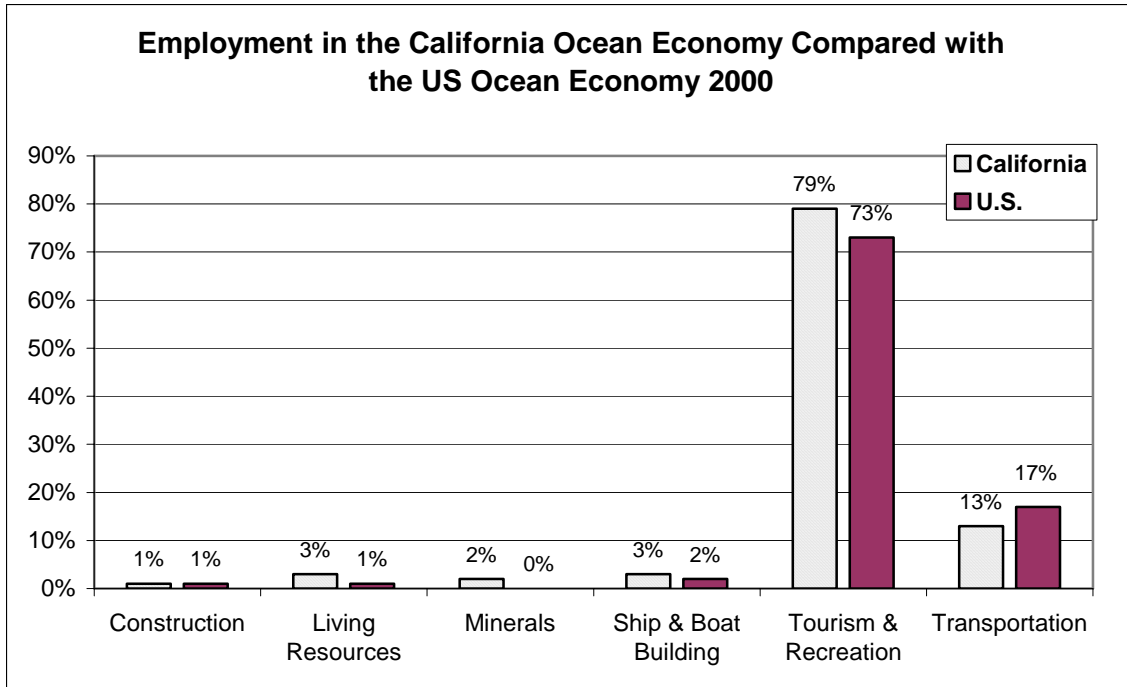


Figure 2-1: 2000 Employment, California vs. US Economy

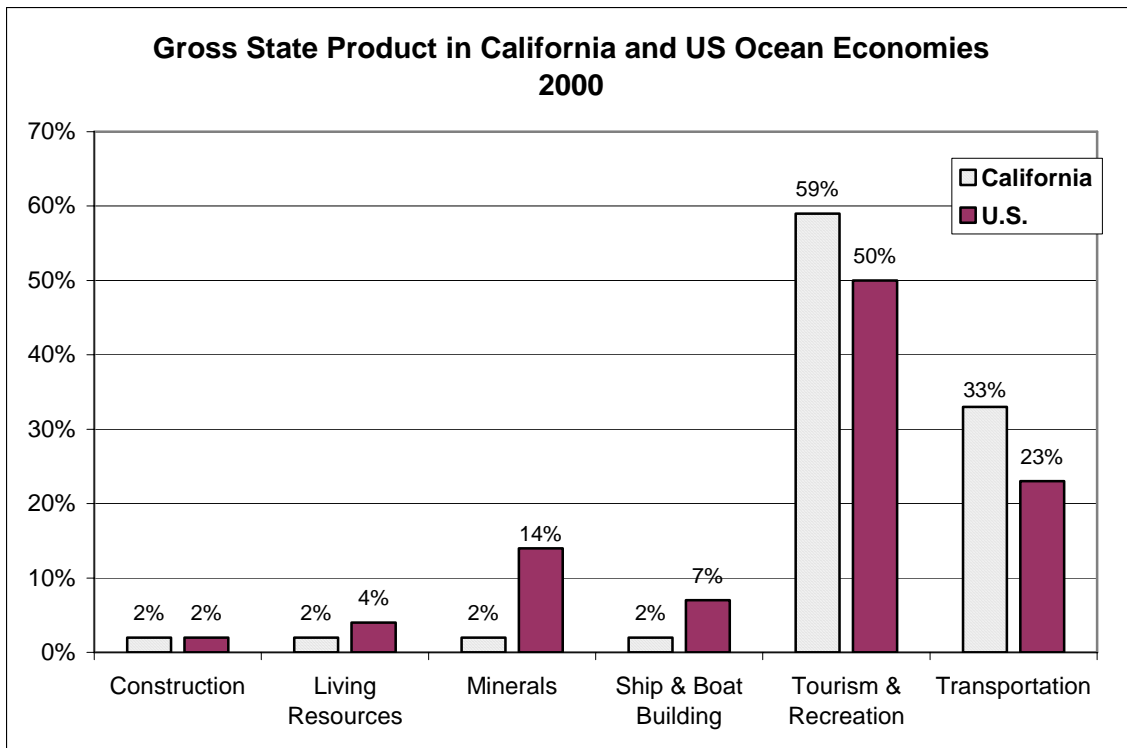


Figure 2-2: 2000 Ocean GSP, California vs. US Economy

2.4 California’s Ocean Economy: Comparisons with Other States

- California has the largest Ocean Economy in the US, ranking number one overall in both employment and GSP from the ocean.

Table 2-7 shows California’s ranking by sector among the 30 coastal and Great Lakes states. It is not surprising that California has the largest Ocean Economy among the coastal states, as well as in Tourism & Recreation and Transportation. It also ranks in the top five of all sectors except Ship & Boat Building, where it ranks sixth. It is noteworthy that in Construction, Living Resources, and Minerals, California’s GSP ranks higher than in employment.

Table 2-7: California Rank by Sector Among Coastal States 2000

California Rank Among Coastal States 2000		
	Employment	Gross State Product
Total Ocean Economy	1	1
Construction	3	2
Living Resources	4	3
Minerals	4	3
Ship & Boat Building	6	6
Tourism & Recreation	1	1
Transportation	1	1

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Table 2-8 shows California maintained its first place rank among all coastal and Great Lakes states in Ocean Economy GSP from 1990 to 2000.

Table 2-8: Ocean Economy GSP Rankings of Coastal States 1990 and 2000

Rank	State	1990	2000	State	Rank
1	California	14,703,784,251	21,434,428,141	California	1
2	Louisiana	14,599,213,346	15,248,432,508	Louisiana	2
3	New York	6,603,086,278	11,676,830,383	Florida	3
4	Florida	6,321,459,167	7,683,892,713	Washington	4
5	Alaska	5,296,007,820	6,848,544,553	New Jersey	5
6	Washington	5,260,776,080	6,446,339,764	Texas	6
7	New Jersey	4,885,639,675	5,239,162,298	Alaska	7
8	Texas	3,039,803,670	5,092,727,554	New York	8
9	Virginia	2,556,648,972	4,030,681,483	Hawaii	9
10	Hawaii	2,546,093,848	3,565,652,519	Virginia	10
11	Maryland	2,201,909,490	3,324,045,497	Illinois	11
12	Illinois	2,085,041,271	2,867,222,029	Pennsylvania	12
13	Connecticut	2,068,303,837	2,454,068,194	Connecticut	13
14	Michigan	1,210,080,844	2,363,494,739	Maryland	14
15	Maine	1,061,506,497	2,002,302,949	Michigan	15
16	Wisconsin	1,030,262,706	1,785,750,627	Mississippi	16
17	Mississippi	916,079,810	1,519,896,601	Maine	17
18	South Carolina	815,872,218	1,422,939,938	South Carolina	18
19	Rhode Island	711,994,326	1,241,080,165	Wisconsin	19
20	North Carolina	662,450,171	1,167,788,146	Georgia	20
21	Pennsylvania	622,336,827	1,097,149,561	North Carolina	21
22	Ohio	577,922,814	994,142,073	Indiana	22
23	New Hampshire	573,964,731	942,681,414	Ohio	23
24	Georgia	570,192,354	862,983,177	Rhode Island	24
25	Oregon	490,307,531	766,574,374	Alabama	25
26	Indiana	484,263,909	710,837,378	Oregon	26
27	Alabama	424,109,254	519,075,829	New Hampshire	27
28	Minnesota	281,665,137	454,283,828	Minnesota	28
29	Delaware	217,172,151	362,687,784	Delaware	29

2.5 California’s Ocean Economy: Regional Comparisons

The size of the California economy necessitates that a regional perspective be used to investigate the Ocean Economy in greater detail. Five regions are defined in Table 2-9 and include the coastal counties following the categories used in the 1994 study (except for the caveat indicated in the Table).

Table 2-9: Ocean Economy Coastal Regions¹⁵

Region	County	Region	County
North	Del Norte	Central	Monterey
	Humboldt		San Mateo
	Mendocino		Santa Cruz
North Central	Alameda	South Central	San Luis Obispo
	Contra Costa		Santa Barbara
	Marin		Ventura
	Napa	South	Los Angeles
	Sacramento *		Orange
	San Francisco		San Diego
	San Joaquin *		* <i>Sacramento, San Joaquin, and Yolo counties are included in this report for consistency with state level data and for their economic importance.</i>
	Santa Clara		
	Solano		
	Sonoma		
	Yolo *		

The changes by region were significant. The fastest growth in regional Ocean Economy occurred in the Central region that includes Monterey, San Mateo, and Santa Cruz counties. The growth rates on all three measures, employment, wages and GSP, were larger than any other region, driven primarily by growth in Tourism & Recreation (see Figure 2-3).

¹⁵ Watershed regions determined by the original California study.

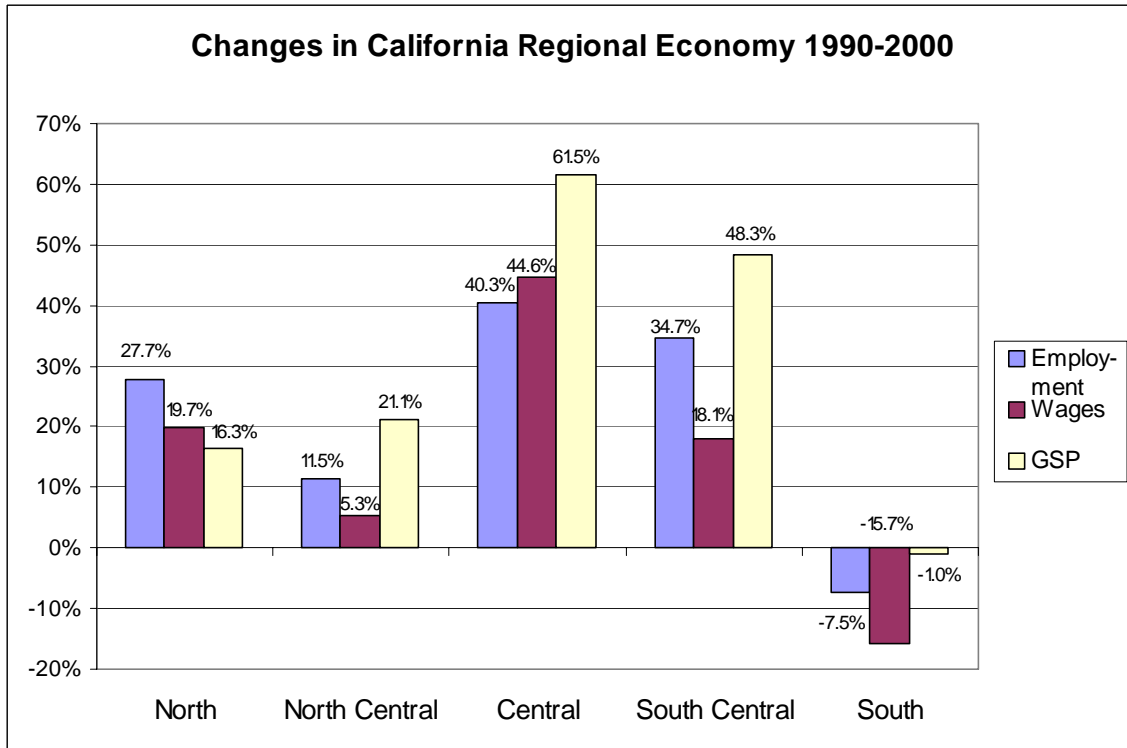


Figure 2-3: Changes in California’s Regional Ocean Economy, 1990-2000

The North region’s losses in the Marine Living Resources sector offset in part the growth in Tourism & Recreation, while the South Central region saw its GSP value climb faster than employment or wages, probably due to the increased value of the minerals sector, and the rise in the price of oil as discussed in Chapter 4 (see Table 4-9).

Slow growth in Southern California was probably caused by changes in the high-income sectors of Transportation and Ship Building that reduced the size of the Ocean Economy. In addition, the sharp drop in the high-value Search and Navigation Equipment industry overwhelmed modest growth in Tourism & Recreation (see Table 5-3 and Table 8-3).

Jobs in the California Ocean Economy are located primarily in the urban regions of the state. Eighty-five percent of the jobs are in Southern California coastal counties and Bay area counties (see Table 2-10).

- California’s Ocean Economy reflects a higher proportion of jobs in the rural areas compared to other regions. The Ocean Economy represents 2.7% of employment in the highly populated Southern California economy and nearly 10% of the jobs in the northern rural region of Humboldt, Del Norte, and Mendocino counties.

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Table 2-10: California Ocean Economy 2000 by Region with Multipliers

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	7,691	2,307	9,998	1.3
North Central	131,834	52,734	184,568	1.4
Central	46,874	14,062	60,936	1.3
South Central	29,774	14,887	44,661	1.5
South	187,045	187,045	374,090	2.0
Coastal Total *	408,127	285,689	693,816	1.7
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	\$95,569,934	\$57,341,960	\$152,911,894	1.6
North Central	\$3,322,308,195	\$2,990,077,376	\$6,312,385,571	1.9
Central	\$897,345,053	\$628,141,537	\$1,525,486,590	1.7
South Central	\$540,692,752	\$540,692,752	\$1,081,385,504	2.0
South	\$6,405,298,440	\$7,686,358,128	\$14,091,656,568	2.2
Coastal Total *	\$11,441,454,062	\$12,585,599,468	\$24,027,053,530	2.1
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	\$214,950,623	\$128,970,374	\$343,920,997	1.6
North Central	\$6,668,923,435	\$6,002,031,092	\$12,670,954,527	1.9
Central	\$1,991,938,702	\$1,394,357,091	\$3,386,295,793	1.7
South Central	\$1,242,271,083	\$1,118,043,975	\$2,360,315,058	1.9
South	\$11,013,715,716	\$13,216,458,859	\$24,230,174,575	2.2
Coastal Total *	\$21,434,428,141	\$21,434,428,141	\$42,868,856,282	2.0

* Coastal Totals are greater than the sum of the regional values due to data suppression at the county and regional levels.

Table 2-11 shows direct employment, wages, and GSP for the Ocean Economy in each of the coastal regions. The size of the Ocean Economy is proportionate to the size of the overall economy in each region.

Table 2-11: Changes in the Ocean Economy by Region 1990 - 2000

Region	Employment	Wages (millions)	GSP (millions)
North	1,670	\$15.7	\$30.2
North Central	13,579	\$168.1	\$1,160.3
Central	13,476	\$276.7	\$758.7
South Central	7,663	\$82.9	\$404.5
South	-15,078	-\$1,190.5	-\$116.9

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The proportion of the Ocean Economy in each region's total economy changes from South to North. It remains unknown whether the size of the Ocean Economy is a cause or a result of the size of the rest of the economy in each region. Figure 2-4 compares the proportion of the California economy accounted for by employment in each of the regions. For example, the Southern region, with the largest and most urban population, provides 45.8% of California's ocean sector employment, while it represents 45% of California's total employment. The Northern region, far more rural with many fewer people, has only 2% of California's Ocean Economy jobs and less than 1% of California's total employment.

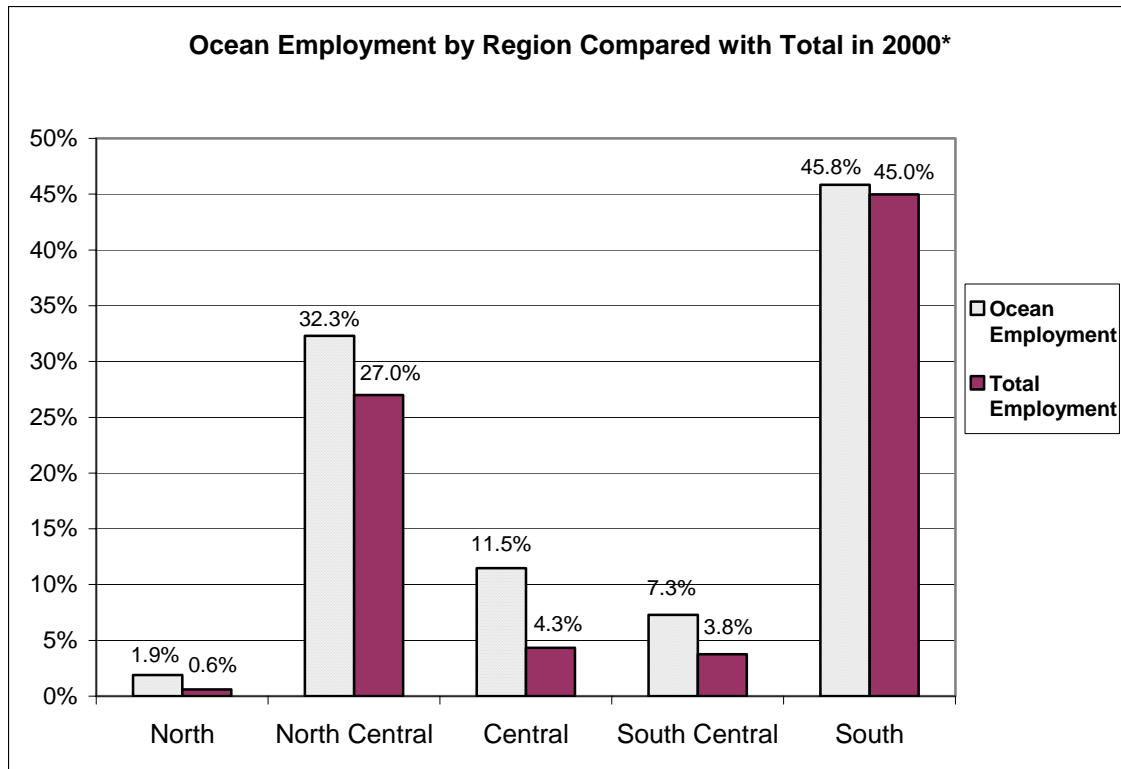


Figure 2-4: California Ocean Employment, Region vs. State

*Total employment represents all California employment and ocean employment represents ocean sectors.

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Figure 2-5 shows that the proportion of Ocean Economy employment in each region is higher outside the major metropolitan areas. While the Ocean Economy is about 2.5% of the total California economy, and 2.6% of the Southern California economy, it is nearly 7.5% of the northern region. This mirrors a general pattern in the US Ocean Economy, in which employment is concentrated in urban areas, but the Ocean Economy plays a larger role in more rural areas.

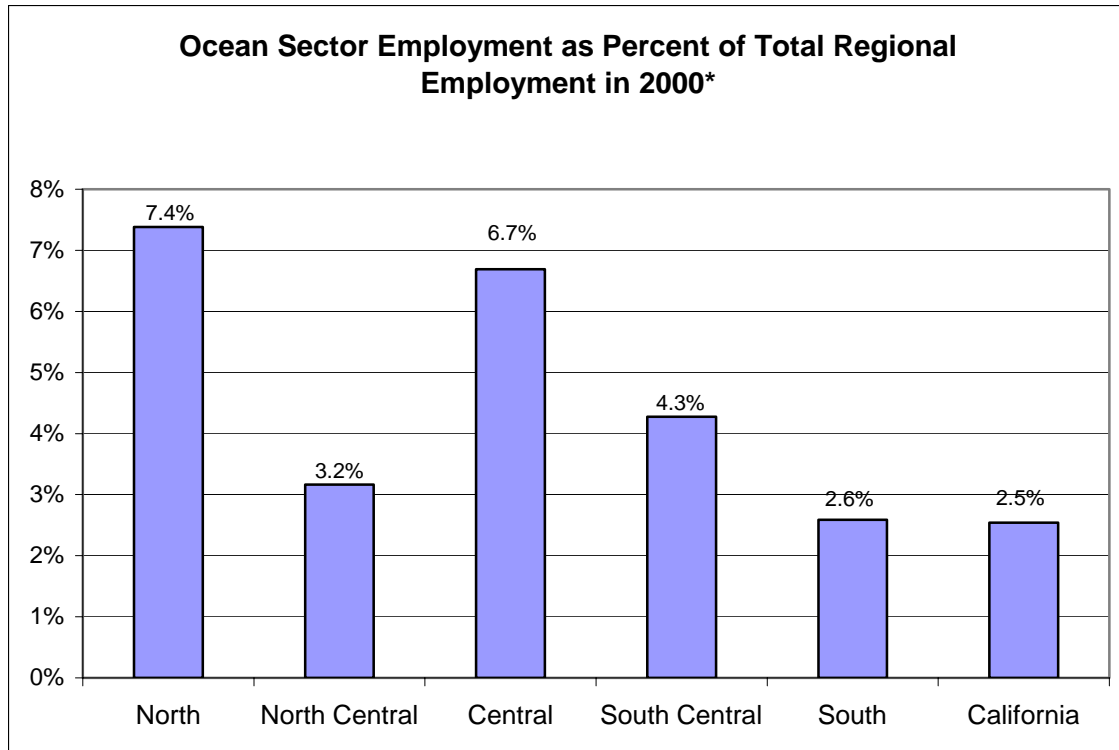


Figure 2-5: Regional Percentage of Ocean Employment

**The regions represent coastal counties only; California represents the entire state.*

2.6 California’s Ocean Economy: Statewide Summaries by Sector

- The direct market value, or GSP, of California’s Ocean Economy was \$21.4 billion in 2000. Total market value, or GSP in 2000 was \$42.9 billion.

The ocean-related GSP grew by 10.64% in constant 2000 dollars between 1990 and 2000. This lagged behind California’s overall economic growth. This lagging trend in growth was similar to the nation.

- The Marine Minerals and Coastal Recreation & Tourism sectors increased in GSP.
- California’s Ocean Economy directly provided over 400,000 jobs in 2000, and more than 690,000 jobs when multiplier effects are considered.
- Employment in California’s Ocean Economy grew more slowly than the state’s overall economy. Wage and salary jobs in the Ocean Economy grew approximately 4.9%, compared with 13.8% overall growth in California. The increase was almost entirely due to growth in Tourism & Recreation jobs in the coastal regions.
- The coastal-related Tourism & Recreation sector dominated job growth in the Ocean Economy, during the past decade, while jobs in other ocean-related sectors declined. This trend, which also took place nationally, represents a profound shift in how the ocean relates to the economy, towards services and away from goods-related economic activity (see Figures 2-6 and 2-7).

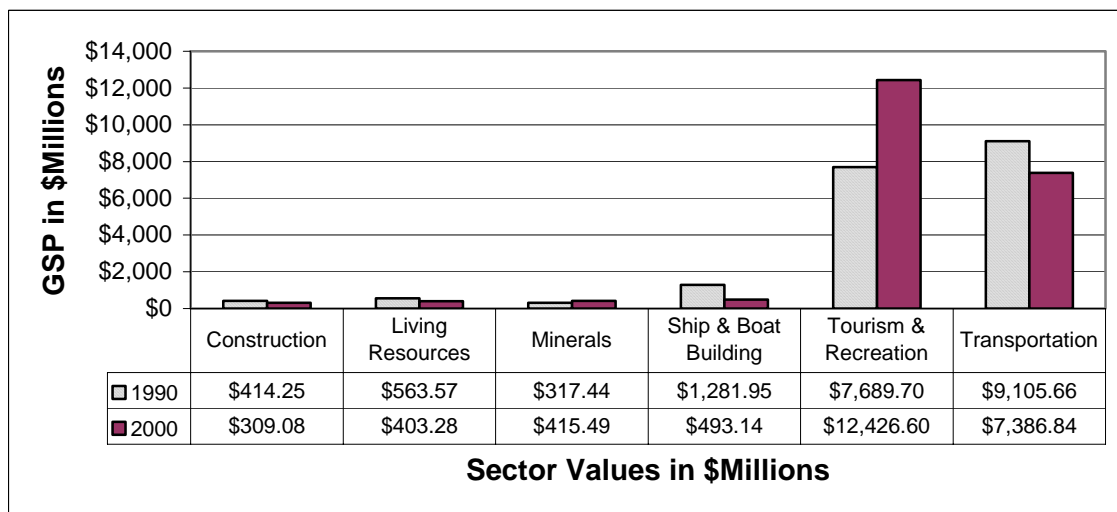


Figure 2-6: California Sectoral Comparisons by GSP

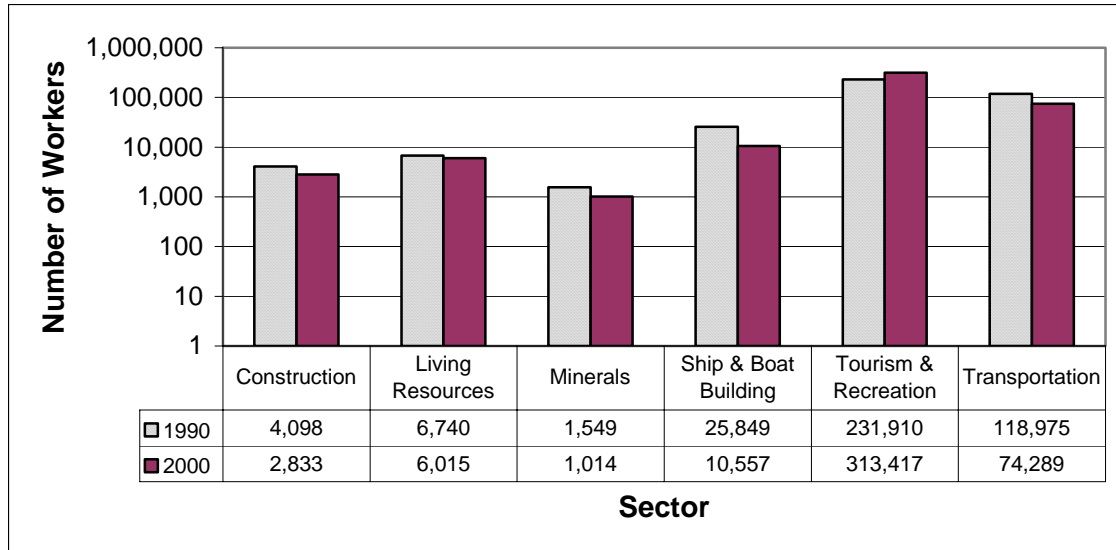


Figure 2-7: California Sectoral Comparisons by Employment

Table 2-12: The Direct California Ocean Economy in 1990 and 2000

2000					
Sector	Employment	Wages (millions)	GSP (millions)	Average Wages	GSP/Employee
Construction	2,833	\$164.4	\$309.1	\$58,035	\$109,100
Living Resources	6,015	\$165.9	\$403.3	\$27,587	\$67,046
Minerals	1,014	\$67.1	\$415.5	\$66,165	\$409,751
Ship & Boat Building	10,557	\$377.6	\$493.1	\$35,772	\$46,712
Tourism & Recreation	313,417	\$5,545.0	\$12,426.6	\$17,692	\$39,649
Transportation	74,289	\$5,121.4	\$7,386.8	\$68,939	\$99,434
TOTAL	408,127	\$11,441.5	\$21,434.4	\$28,034	\$52,519
1990					
Sector	Employment	Wages (millions)	GSP (millions)	Average Wage	GSP/Employee
Construction	4,098	\$219.3	\$414.3	\$53,522	\$101,086
Living Resources	6,740	\$206.4	\$563.6	\$30,626	\$83,616
Minerals	1,549	\$83.4	\$317.4	\$53,809	\$204,932
Ship & Boat Building	25,849	\$1,073.4	\$1,282.0	\$41,527	\$49,594
Tourism & Recreation	231,910	\$3,601.1	\$7,689.7	\$15,528	\$33,158
Transportation	118,975	\$6,988.2	\$9,105.7	\$58,737	\$76,534
TOTAL	389,123	\$12,171.8	\$19,372.6	\$31,280	\$49,785

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The Tourism & Recreation sector accounted for the largest proportion of employment and GSP with 76.8% of the former and 58% of the latter (Figure 2-8). However, it represented the lowest average wages and GSP per employee. The Transportation sector is the second largest in terms of employment and GSP, accounting for 18.2% of employment, but almost a third of GSP. And, the Transportation sector as well as the Minerals sector represented much higher average wages and GSP per employee. The Tourism & Recreation sector pays significantly lower wages and has significantly lower GSP per employee than all other sectors. These other sectors are the reason that the California Ocean Economy pays higher wages than the average wage for the state economy. The implication here is that the slower growth sectors contribute significantly to the California economy through higher wages, making up a critical element of the economy. More detailed discussions of these sectors, and the industries they include, are found in Part II The Sectors of the California Ocean Economy.

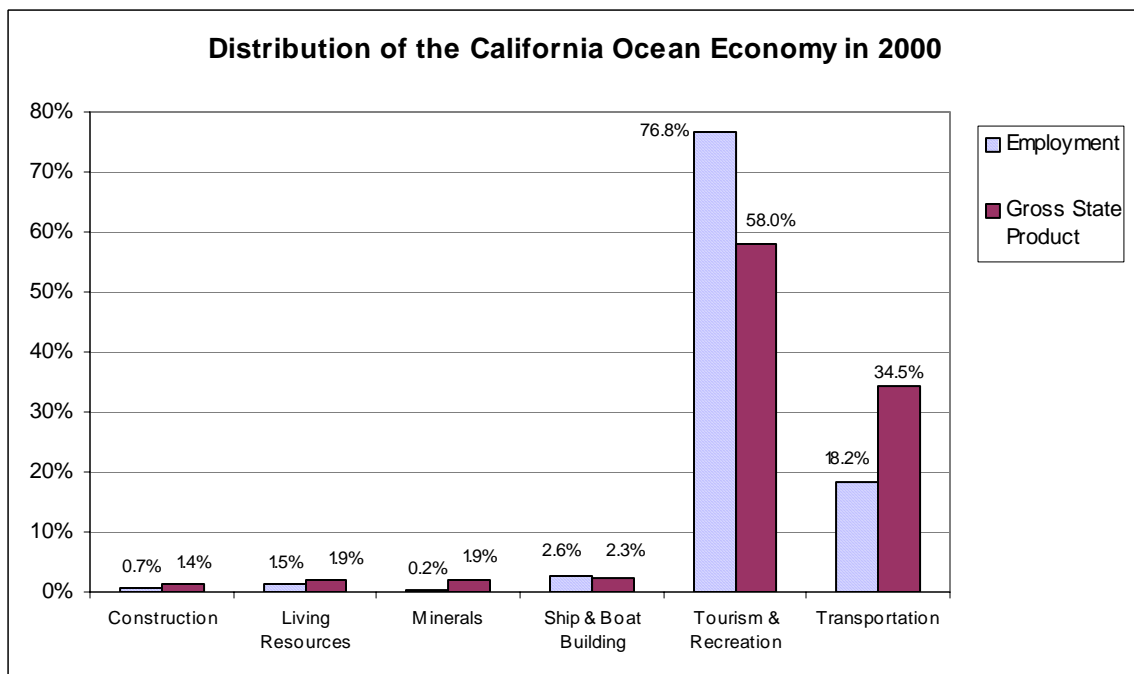


Figure 2-8: 2000 Distribution of the California Ocean Economy

2.7 Indirect and Induced Estimates of California's Ocean Economy

The data presented so far tells only part of the story of the Ocean Economy – the results of economic activity directly related to the ocean. This direct economic activity generates additional economic activity, which occurs in part because ocean-related industries purchase goods and services from other industries (indirect effects), and partly because the income earned in the ocean industries is spent by employees to purchase goods and services from other industries (induced). The multiplier estimates provide a measure of the total economic activity generated within California from the use of ocean and coastal resources. Estimates of these effects are shown in Table 2-13. The estimates were derived from a detailed analysis of the Ocean Economy industries in each of the coastal regions using IMPLAN, a standard and widely used economic impact model.

Table 2-13: Multiplier Effects of The California Ocean Economy 2000

Sector	Direct Employment	Indirect and Induced Employment	Total Employment	Multipliers
Construction	2,833	2,550	5,383	1.9
Living Resources	6,015	2,406	8,421	1.4
Minerals	1,014	2,028	3,042	3.0
Ship & Boat Building	10,557	8,446	19,003	1.8
Tourism & Recreation	313,417	94,025	407,442	1.3
Transportation	74,289	163,436	237,725	3.2
Total California	408,127	285,689	693,816	1.7
Sector	Direct Wages	Indirect and Induced Wages	Total Wages	Multipliers
Construction	\$164,413,562	\$164,413,562	\$328,827,124	2.0
Living Resources	\$165,933,760	\$132,747,008	\$298,680,768	1.8
Minerals	\$67,091,107	\$46,963,775	\$114,054,882	1.7
Ship & Boat Building	\$377,642,817	\$302,114,254	\$679,757,071	1.8
Tourism & Recreation	\$5,544,976,307	\$4,435,981,046	\$9,980,957,353	1.8
Transportation	\$5,121,396,509	\$7,169,955,113	\$12,291,351,622	2.4
Total California	\$11,441,454,062	\$12,585,599,468	\$24,027,053,530	2.1
Sector	Direct GSP	Indirect and Induced GSP	Total GSP	Multi-plier
Construction	\$309,081,043	\$309,081,043	\$618,162,086	2.0
Living Resources	\$403,284,093	\$322,627,274	\$725,911,367	1.8
Minerals	\$415,487,797	\$290,841,458	\$706,329,255	1.7
Ship & Boat Building	\$493,135,966	\$394,508,773	\$887,644,739	1.8
Tourism & Recreation	\$12,426,599,613	\$9,941,279,690	\$22,367,879,303	1.8
Transportation	\$7,386,839,629	\$10,341,575,481	\$17,728,415,110	2.4
Total California	\$21,434,428,141	\$21,434,428,141	\$42,868,856,282	2.0

The size of the Ocean Economy approximately doubles when the estimated multiplier effects are included. Employment almost doubles to over 690,000, while wages and the contribution to GSP more than double. With the multiplier effects included, the California Ocean Economy comprises 4.1% of California employment and 3.2% of California GSP.

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The Transportation sector has the largest employment, wage, and GSP multiplier effects, while the Minerals sector also has a substantial employment multiplier.

2.8 Changes in the California Ocean Economy 1990-2000

The California Ocean Economy underwent profound changes during the decade 1990- 2000.

Table 2-14: Changes in the California Ocean Economy, 1990-2000 (Direct)

Sector	Employment		Wages		GSP	
	Change	% Change	Change (millions)	% Change	Change (millions)	% Change
Construction	-1,265	-30.9%	-\$54.9	-25.04%	-\$105.2	-25.39%
Living Resources	-725	-10.8%	-\$40.5	-19.61%	-\$160.3	-28.44%
Minerals	-535	-34.5%	-\$16.3	-19.51%	\$98.0	30.89%
Ship & Boat Building	-15,292	-59.2%	-\$695.8	-64.82%	-\$788.8	-61.53%
Tourism & Recreation	81,507	35.2%	\$1,943.9	53.98%	\$4,736.9	61.60%
Transportation	-44,686	-37.6%	-\$1,866.8	-26.71%	-\$1,718.8	-18.88%
All Ocean Sectors	19,004	4.9%	-\$730.4	-6.00%	\$2,061.9	10.64%

Only the Tourism & Recreation sector exhibited growth in employment, wages, and GSP as shown in Figure 2-9. Every other sector in the Ocean Economy declined in employment and real wages, and all except Minerals declined in direct GSP. This is a significant change toward services-oriented uses and away from goods-related uses related to the ocean.

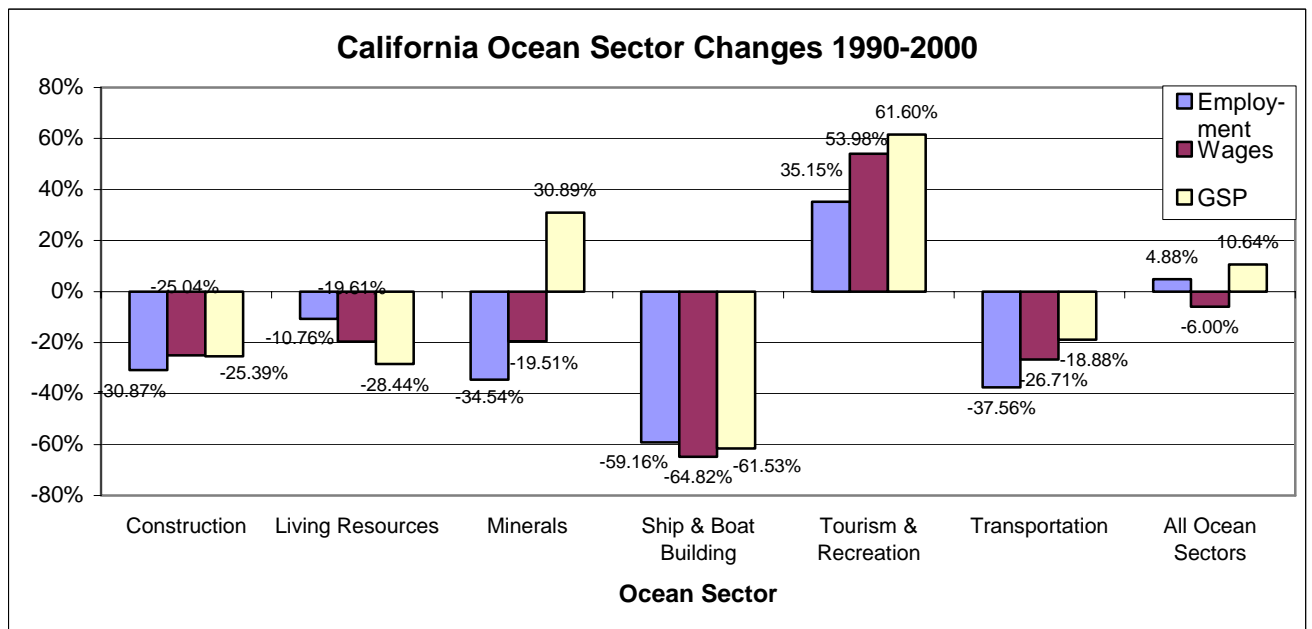


Figure 2-9: Changes in California’s Ocean Economy by Sector, 1990-2000

Possible reasons for these changes follow:

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- Construction trends in marine related Heavy Construction are very difficult to measure, in part because the industry is not measured well in the SIC system, and in part because the industry is highly cyclical and dependent, in particular on government spending for activities such as dredging, pier construction, etc. The declines shown were driven largely by changes in government spending over the decade, but detail on this spending is insufficient to measure accurately what activities have most changed.
- Living Resources declines are entirely related to declines in Fish Harvesting, which are explained in more detail in Part II.
- Minerals (mostly oil and gas) declined in employment and wages, but grew in GSP, reflecting two trends. First, the industry itself became more efficient, requiring fewer workers for output. Second, the real value of the oil increased. A 1989 federal moratorium on leasing additional offshore lands in California, combined with mostly older wells in place, could account for the decrease in oil and gas production volume.¹⁶
- Ship and Boat Building had the largest decline of all the ocean sectors on all three measures, GSP, employment, and wages. The decline is probably related to the end of the Cold War in 1990, and the peak in the Reagan era of seven-years of ship building expansion for the Navy, followed by the steady decline. This pattern occurred in all states where significant shipbuilding took place, and so California's experience reflected this national trend. In addition, "part of this decline could be due to the reduction in offshore minerals leasing over this period and the reduction in exploration and production activity. Offshore service/supply vessels, for example, were built in the San Diego shipyards, as were other service vessels and some production facilities".¹⁷
- Transportation exhibited the largest change in the Search and Navigation Equipment industry, which makes equipment for both military and civilian uses. This industry is the "high tech" segment of the Ocean Economy, in which California has been a national leader. The industry lost nearly 60,000 jobs, more than half of those employed, from 1990 to 2000, reflecting almost entirely the same military spending trends that resulted in the declines in the Ship & Boat Building sector. Also, the Deep-sea Freight Transportation industry lost approximately 40% of its employment (nearly 1,800 jobs)

¹⁶ Paul Kelly, Sr. Vice-President, Rowan Companies, Communiqué 2004. "Another trend reflected in the decline in employment is the departure of pioneering companies from California once their base of operations in the State was impacted by offshore leasing moratoria. Longstanding State moratoria prohibiting new leasing and local opposition to federal leasing was expanded in 1989 with the first of Presidentially imposed new leasing moratoria. With their California bases of operations dealt this... blow to possible future work, most of these companies left the State [Orange and Ventura counties] for other... locations on the Texas and Louisiana Gulf Coast. Such companies included Santa Fe International (contract drilling and construction) to Dallas, Global Marine Drilling (contract drilling) to Houston, Varco International (technologically advanced drilling equipment) to Houston, Smith International (oilfield tubulars and equipment) to Houston, Oceaneering International (diving, underwater specialists and robotics) to Houston.... Also, earlier, in the 1980's, Armco Steel closed a plant in Southern California that manufactured pipe for petroleum operations. In addition, news stories in the Houston newspapers would indicate that California-based production companies such as UNOCAL and Chevron (now ChevronTexaco) have gradually been relocating jobs from California to Texas and Louisiana. In 1989, the National Ocean Industries Association determined in an informal survey that approximately 37,000 jobs had been moved out of California as the result of these relocations."

¹⁷ Paul Kelly, Communiqué 2004.

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despite large growth in the volume of cargo handled at California's ports. This job loss reflected the industry's increasing mechanization.

- Tourism & Recreation increased markedly over the decade consistent with national and local trends. California's beaches are among the most popular in the world.

2.9 References

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PART II THE SECTORS OF THE CALIFORNIA OCEAN ECONOMY

Chapter 3 California Living Resources

Table 3-1: Summary of Direct Value of Living Resources Industry 2000

Industry	Employment	Wages	GSP
Fish Hatcheries & Aquaculture	488	\$13,702,515	\$35,350,869
Fishing *	976	\$38,213,332	\$98,585,880
Seafood Processing	4,551	\$114,017,913	\$269,347,344
Total	6,015	\$165,933,760	\$403,284,093

* Some fishing companies fall under the unemployment insurance laws and report their employment like other companies. Other people employed in fish harvesting, primarily the self-employed, are not counted. So these figures represent only the known portion of the harvesting sector.

Table 3-2: Summary of Living Resources Industry with Multipliers - 2000

	Direct	Indirect & Induced	Total	Multiplier
Employment	6,015	2,490	8,505	1.4
Wages	\$165,933,760	\$125,877,350	\$291,811,110	1.8
GSP	\$403,284,093	\$309,722,183	\$713,006,276	1.8

This chapter gives an overview of California's Living Resources sector. It includes a) a summary of the changes in the industry, b) the recent history of landings and landed value for the major fisheries; c) basic economic information – employment, wages and GSP or net output – about the three industries of the sector: Fish Harvesting, Seafood Processing, and Fish Hatcheries and Aquaculture; d) kelp industry production in California, (the economic indicators are included in the fish-harvesting industry); and e) summary estimates for the Sport and Recreational Fishing Industry in California.

We have tried to show estimated values by state and by region through this report, but this sector presented extra challenges because information at the county and regional levels was either not available at all or was suppressed in so many cases that the total estimates so under-represented the real value of the sector, we could not include them. This means that the industries comprising Fish Processing and Aquaculture and Fish Harvesting were too concentrated in a few companies to allow disclosure of information without violating confidentiality. This could be due in some cases to declines in fish catch and the consequent necessity for consolidation of the supporting industries, or to traditional dominance of particular regions by less than three companies. In addition, the employment and wage values are not available for Fish Harvesting. Hence, this chapter gives industry breakdowns by state only, and even these under-represent the actual value.

As the following tables indicate, the value of each category plummeted between 1990 and 2000. The last column in Table 3-3 indicates the actual changes.

Table 3-3: Direct Changes in California Living Resources 1990-2000

Industry	Employment		Wages		GSP	
	1990	Change in 2000	1990	Change in 2000	1990	Change in 2000
Fish Hatcheries & Aquaculture	567	-79	\$13,142,047	\$560,468	\$38,460,509	-\$3,109,640
Fishing *	1,498	-522	\$61,452,930	-\$23,239,598	\$179,843,437	-\$81,257,557
Seafood Processing	4,674	-123	\$131,824,548	-\$17,806,635	\$345,268,974	-\$75,921,630
Total	6,740	-725	\$206,419,526	-\$40,485,766	\$563,572,921	-\$160,288,828

* Represents only the known portion of the harvesting sector.

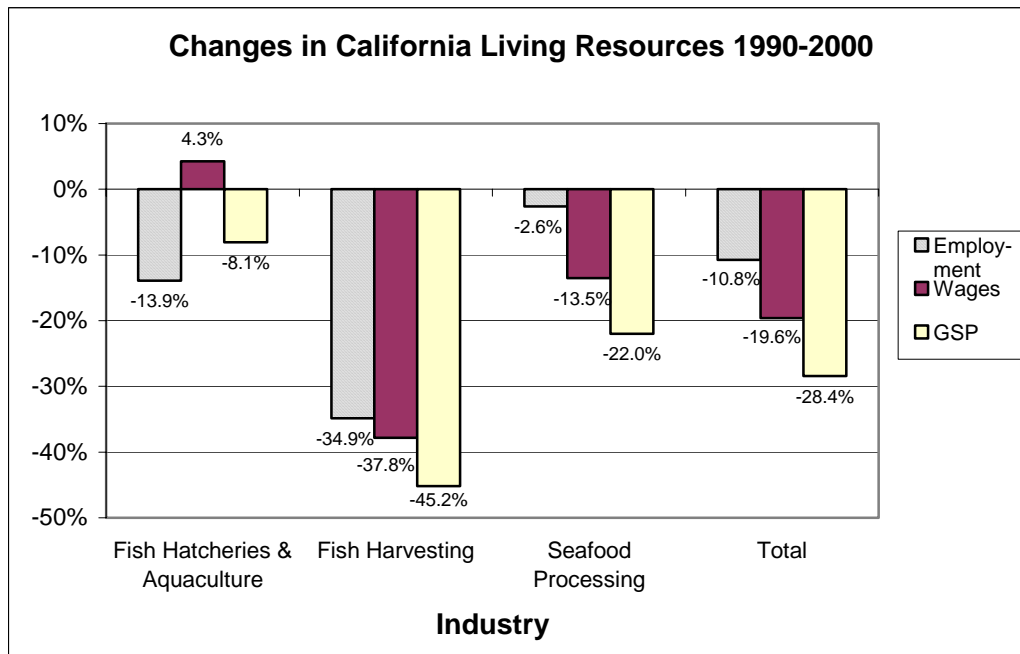


Figure 3-1: Changes in Living Resources Sector from 1990 to 2000

The demand for seafood in the US is large. Consumption of seafood is about 15.6 pounds per capita annually, which represents about \$26.7 billion in revenue. Due to a higher degree of health-consciousness and the large portion of Asian immigrants in the state¹⁸, the per capita demand for seafood in California is thought to be even larger than the national average. This has both national and international implications for California’s economy, since a portion of California’s fisheries is exported to foreign nations, and because the national and California markets are growing. The more California can effectively manage its fisheries for optimal sustainable productivity, the greater the opportunity for foreign trade as well as serving local and national markets. Of all the California Ocean Economy sectors, Living Resources is possibly the least understood and most controversial.

The Living Resources sector data suffers from large disclosure issues, and much uncertainty and presents a challenge to indicate its value. Several variables make this sector difficult to

¹⁸ See <<http://www.epa.gov/r10earth/offices/oea/risk/a&pi.pdf>>.

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assess: a) Landings and landed values have been unstable in the past and continue to be due to large declines in the catch of particular species; b) absence of mandated standardized employment and wage reporting for fish harvesting, preventing accurate accounting of the real value of fish harvesting to the state. Much of the fishing industry is considered “self-employed” and does not fall under the federal mandates for reporting wages and numbers of employees, as is the case in all other sectors with wages paid by companies. Hence, those “self-employed” vessels fall outside the reported data requirements. Only those fishing operations that report as regular private companies can be included in our dataset from the Federal Government. Hence, reporting wages, employment, and GSP for the entire Living Resources sector, when it is aggregated, and for the fish harvesting part of the sector, when that is reported separately, is under-reported. There is no way to accurately know how many fishermen there are in California nor how much they earn. The only amount that can be estimated is that amount of money that the owner of the boat receives for the catch at the dock, because legally, that must be reported by the buyer of the catch. This lack of standard reporting has several implications, not the least of which is that there can be no benchmark for regulators to determine the extent to which regulations or limits will impact the economy of the fishermen.

Only state aggregated estimates for the value of the Living Resources sector can be found in this chapter. Regional estimates have been left out. The evident domination of the Fish Processing and the Hatcheries and Aquaculture industries by only a few companies per region have resulted in the suppression of data at county and regional levels. This industry concentration may reflect the steep decline in catch over the past decades, or they could be the result of traditionally family-owned enterprises who captured the market long ago and have remained successful. In either case, we cannot report the numbers by region.

When compared with the larger Ocean Economy sectors in California such as Tourism & Transportation, the Living Resources market sector is relatively small. However, as a source of food and employment, the commercial fishing industry is very important to California’s coastal economy. Many activities are dependent on this industry, such as boat construction and repair, brokerage, dock handling, trucking and other transportation, gear and rigging stores, fish processing, and commercial seafood trade. In addition, the health of California’s fisheries is integrally related to the health of California’s coastal waters, reflecting the strength of offshore ecosystems. The size of the catch and its contribution to California’s economy is only a part of its value. These other values are not captured in the market place, but have far reaching effects on the sustainability of California’s coastal resources, which fuels its flourishing coastal economy. The long-term sustainability of California’s fisheries has additional values, or future values, because fisheries are a renewable resource that, if well-managed, could sustain a viable industry for years to come. Poor management of California’s fisheries would be an opportunity lost, taking a major source of revenue and food from the citizens of California, costing Californians in future earnings and revenues.

While all Ocean Economy sectors but Tourism & Recreation declined during the decade 1990-2000, the Living Resources sector sustained the deepest cuts in relative terms. The real losses are not calculable from the market values published in this chapter. The additional values mentioned above need to be considered as well.

3.1 Overview of Activities: Fisheries Landings and Values

The US fishing industry has undergone massive changes during the past 25 years, but overall, landings have remained relatively steady at about 10 billion pounds a year and GSP at about \$3.5 billion annually. In 1991 and 1994, the total US landings reached a peak, with more than 10 billion pounds in total landings each year (Figure 3-2). However, the overall national appearance is deceptive. Some states have increased their take with new species and others have seen their fisheries almost collapse. In California, the fisheries landings have shown the largest decline throughout the last 25 years, with the largest dip in the most recent years, showing a decrease from billions to millions in a 20-year time frame.

Each of the five regions in California showed a decrease in landings, with an increase in value. This was not true for the Central Coast, which showed an increase in both landings and value. The Central Coast includes Monterey County, Santa Cruz County, and San Mateo County. In California, there is also concern about other competitive uses of the land and water, other than for fisheries. As tourism continues to grow, it needs space, sometimes out-competing fisheries for limited dock and shoreline space. These changes have had major impacts on California's economy (Figure 3-2).

Although we usually use 2000 as our latest benchmark, we have included figures representing the years after 2000 because these numbers were readily available and told an even more complete story. Figure 3-3 reflects some of these losses.

- Between 1982 and 1999, California's fishing fleet declined by an estimated 4000 vessels, from approximately 6700 to 2700 boats.
- In 1976, California's fleet landed a peak of 1.3 billion pounds of fish and invertebrates, compared to landings of 650 million pounds in 2000.
- In 1980, the California fleet, at a peak since 1970, brought in more than \$300 million in landed value, compared to \$142 million in 2000 and \$91 million in 2002 (NMFS) (See Figure 3-3). California's share of the US total commercial landings fell from approximately 19% in 1970 to about 7.1% of the US total, and 3.9% of total landed value in 2000 (See Figure 3-4).
- 1970 to 1990, total finfish and shellfish landings in California declined by more than half, while total US landings almost doubled. California experienced a dramatic drop in landings of tuna, ground fish, urchin, shark, swordfish, salmon, and abalone.¹⁹

¹⁹ (NMFS site and www.OceanEconomics.org, which uses the data from that site)

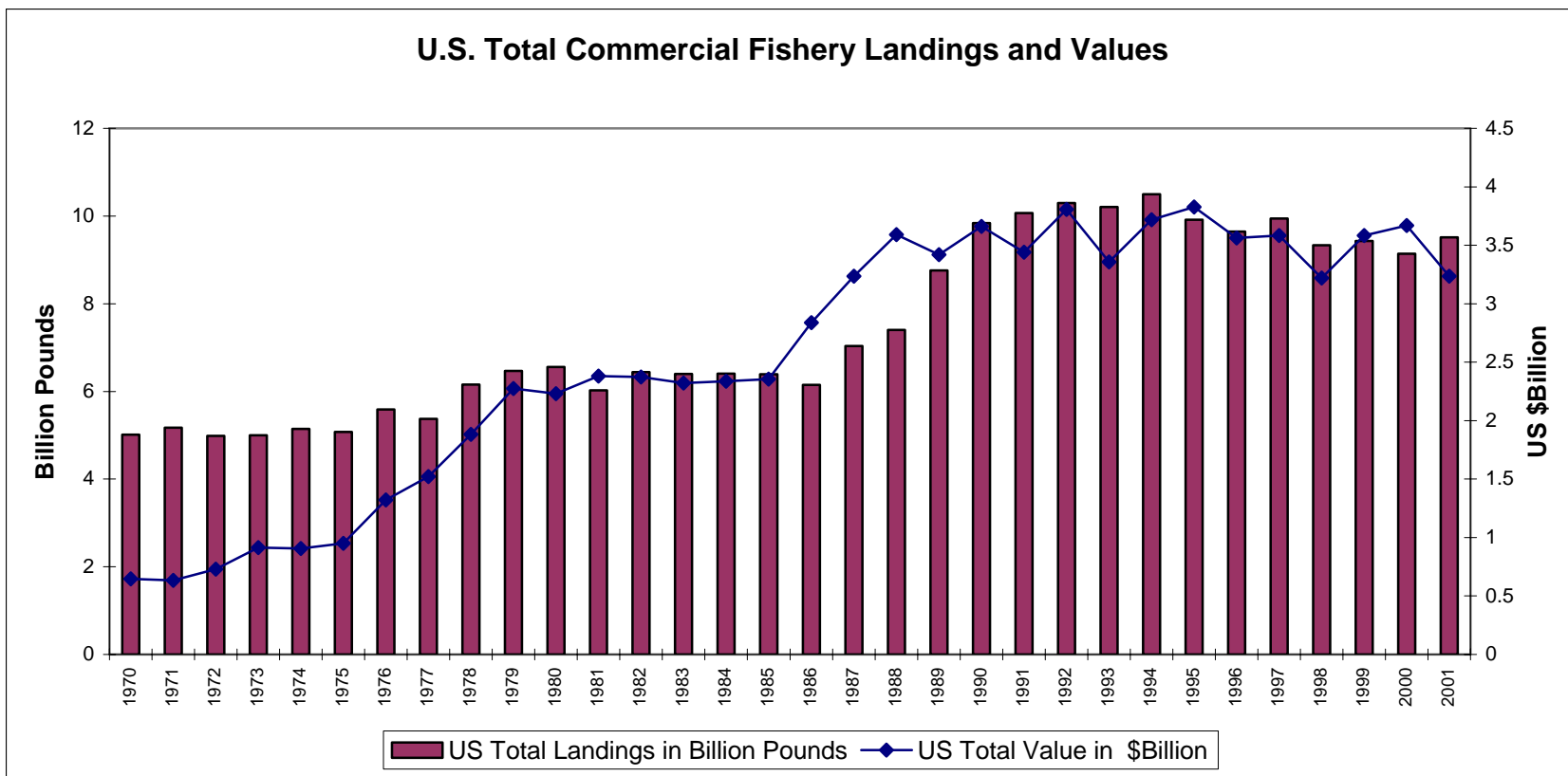


Figure 3-2: US Total Commercial Fishery Landings and Values

Source: Pacific Coast Fisheries Information Network (Pacfin)

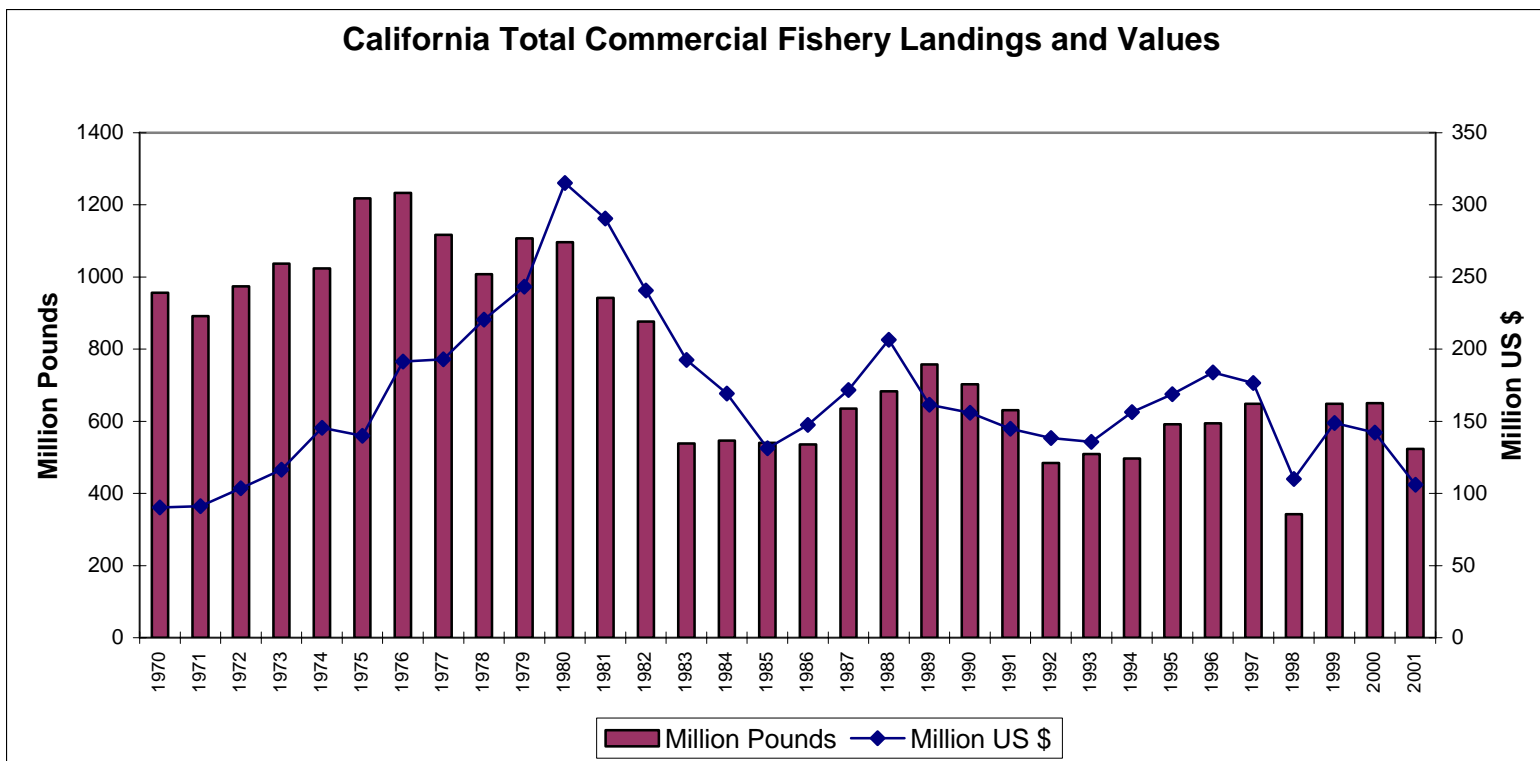


Figure 3-3: California Commercial Fishery Landings and Values

Source: Pacific Coast Fisheries Information Network (Pacfin)

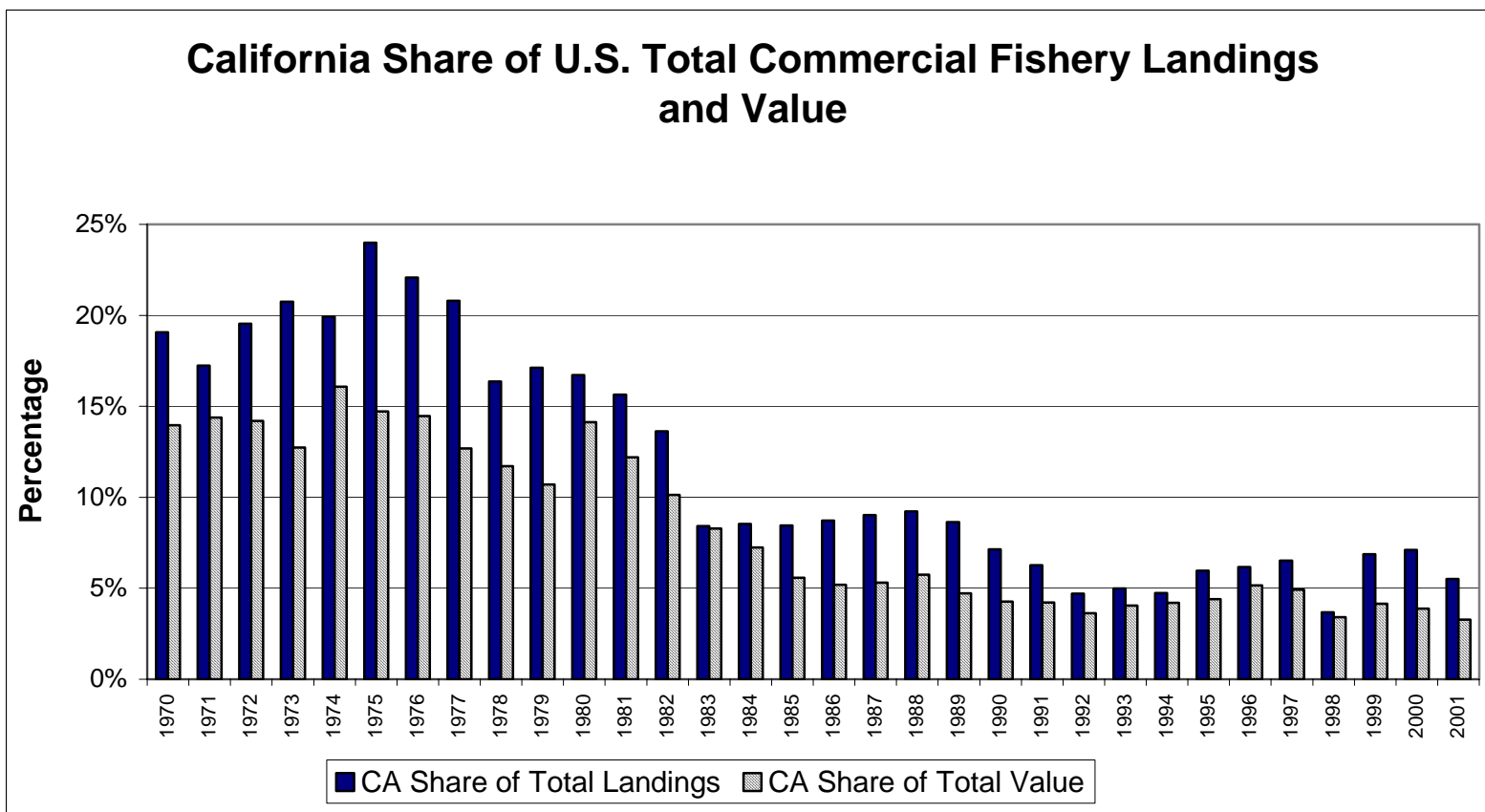


Figure 3-4: California Share of US commercial Fisheries

Source: Pacific Coast Fisheries Information Network (Pacfin)

3.1.1 Influences on California's Fishing Industry

According to *California Living Marine Resources: A Status Report* by the Department of Fish and Game (2001), the state's marine resources and its management have undergone continuous changes in part because of changes in the economics of fisheries and partly because of the need to restrict fishing effort in order to manage commercial fishery populations. The decline in tuna landings was primarily a result of the shift of landing ports from California to less costly cannery operations in Samoa and Puerto Rico. Because of severe decreases in abalone stock and concerns about the extinction of the white abalone, the total commercial fishing of abalone was closed south of San Francisco. Ground fish production was disrupted by seasonal area closures, quota reduction, and long-term stock-building plans. Salmon fishing has raised public concerns since five California salmon populations have been listed under the federal Endangered Species Act (ESA).

Additional regulations also played an important role in the development of California's commercial fishing industry. For example, rockfish and Cabezon were considered lucrative, and a major fishery dedicated to those near-shore species was established during the 1990s. According to the Department of Fish and Game, in 1994, California Constitutional Amendment (Prop. 132) prohibited fishing by gillnet in the near-shore areas of central and southern California. The 1998 Marine Life Management Act (MLMA), led to additional suspension of permits in the near-shore fishery, and a squid management plan is in place, which involves restrictions of access. The 1999 Marine Life Protection Act authorizes new protections for ocean habitats and wildlife. It also will create a new network of marine protected areas along the coast, setting aside zones in some cases, where preservation of certain species will be undertaken to revive some of the more depleted stocks.

Outside the industry, competing uses of waterfront for recreational boating, commercial cargo handling, and tourism, have confronted the California commercial fishing industry, and could limit the availability of shore-side space for support facilities.

Despite the decline of landings for certain species in California, some other species have exhibited growth patterns, and have become the targets of fishery expansion. For example, according to the California Department of Fish and Game, increased international demand for squid resulted in a dramatic increase in landings during non-El Nino years, which has attracted participation from former salmon fishermen in California. Growth of California fisheries also included the development of specialized fisheries for sea urchin, Pacific herring, and rockfish. However, restrictions on rockfish are now affecting these efforts.

3.1.2 Landings and Values by Species

Today, California's fishing industry no longer depends on tuna fisheries; other species have gained importance. Squid and red sea urchin were the top two revenue-generating species in 2002. The revenue from market squid reached 16.5 million tons in 2002. Along with Squid, Chinook salmon, Pacific sardine, and Albacore entered into the top ten commercial species

in terms of revenue, replacing the positions of tuna, Pacific herring, shrimp, and Dover sole in the 1992 list (Figure 3-5).

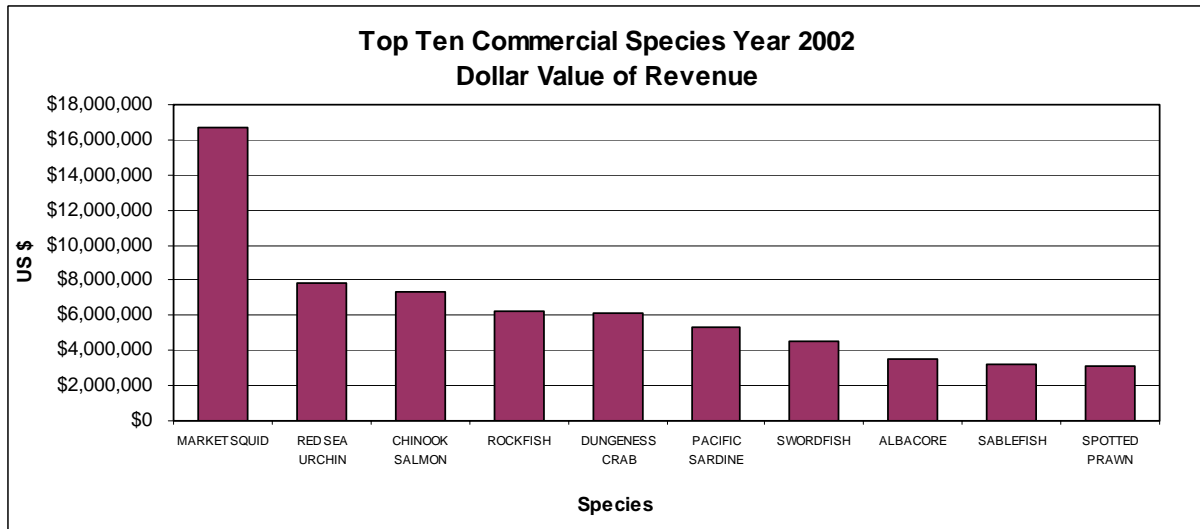


Figure 3-5: 2002 California’s Top 10 Commercial Marine Species

Source: Pacific Coast Fisheries Information Network (Pacfin)

3.1.3 Landings and Values by Region and County 1990 to 2002

The total weight and value of landings have declined in California since 2000 (Table 3-4, Figure 3-6 and 3-7). Except for the Central Coast, all other regions have experienced loss of landings and value. Los Angeles County, accounting for more than 95% of the total landings and 90% of the total value, has experienced the greatest drop during the same period. The only county that experienced steady landing growth was San Diego, while the total value declined simultaneously (see NMFS site and www.OceanEconomics.org for detailed fisheries information on species).

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Table 3-4: Regional Landings and Values 2000-2002

Region	2000		2001		2002	
	Weight of landings (lb)	Landed Value (\$)	Weight of landings (lb)	Landed Value (\$)	Weight of landings (lb)	Landed Value (\$)
North Coast	27,711,244	27,057,783	22,080,412	18,908,402	21,904,644	18,227,627
Del Norte	8,114,071	9,779,518	6,533,578	5,856,040	4,496,855	4,430,281
Humboldt	10,102,830	8,410,836	7,209,487	5,690,285	7,853,514	6,380,523
Mendocino	9,494,343	8,867,429	8,337,347	7,362,084	9,554,275	7,146,823
North Central	15,278,570	13,137,260	12,239,073	11,501,424	12,792,633	11,543,997
Alameda	46,594	108,747	79,576	158,831	162,075	235,909
Contra Costa	10,737	27,564	6,747	19,394	13,138	33,038
Marin	1,919,644	1,672,380	2,986,961	2,137,359	364,236	629,607
San Francisco	10,204,780	7,313,606	6,491,229	5,889,007	8,751,549	6,625,709
Santa Clara	388,429	226,042	647,204	219,922	649,801	133,040
Solano					6,444	14,908
Sonoma	2,708,386	3,788,921	2,027,356	3,076,911	2,845,390	3,871,741
Central Coast	65,054,096	14,809,023	66,674,419	12,041,962	99,208,364	16,571,474
Monterey	61,339,436	9,813,590	63,450,017	8,260,265	94,186,314	12,450,017
San Mateo	3,029,606	3,925,871	2,885,194	3,256,384	4,651,711	3,609,970
Santa Cruz	685,054	1,069,562	339,208	525,313	370,339	553,173
South Central Coast	174,848,867	33,230,847	113,480,611	22,341,361	60,231,135	19,225,417
San Luis Obispo	3,661,918	5,718,773	3,469,567	4,604,807	2,848,307	3,773,916
Santa Barbara	7,005,508	6,728,900	5,263,908	5,382,993	5,658,833	6,125,507
Ventura	164,231,441	20,783,174	104,747,136	12,353,561	51,723,995	9,325,994
South Coast	257,328,091	47,170,193	221,378,721	37,309,889	167,451,195	25,937,566
Los Angeles	254,044,639	39,316,639	217,999,578	29,979,777	163,951,419	19,445,966
Orange	548,667	1,774,456	556,041	1,694,446	529,351	1,646,180
San Diego	2,734,785	6,078,956	2,823,102	5,635,666	2,970,425	4,845,180
All Coastal Counties	540,220,868	135,405,106	435,853,236	102,103,038	361,587,971	91,506,081

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Figure 3-6 shows the landings by weight of commercial fish by coastal region and Figure 3-7 shows the landed value into California by region from 1993 to 2002. The weight and the total landed value in Southern California have greatly exceeded the rest of the state in recent years. This is in contrast to the results of the 1990s, when the highest total value of the landings was in the north coast.

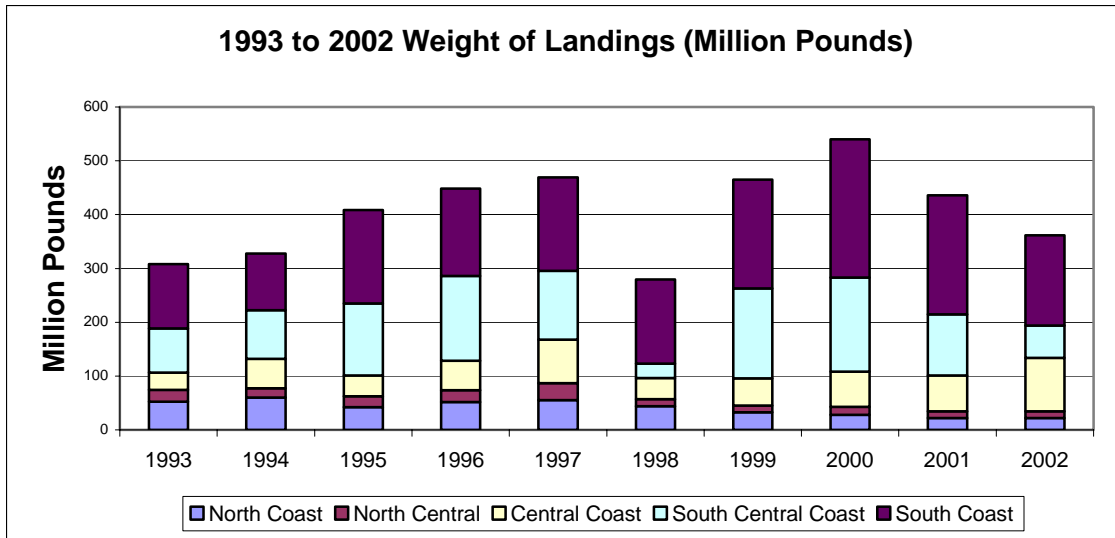


Figure 3-6: 1993 to 2002 Weight of Landings by Region

Source: Pacific Coast Fisheries Information Network (Pacfin)

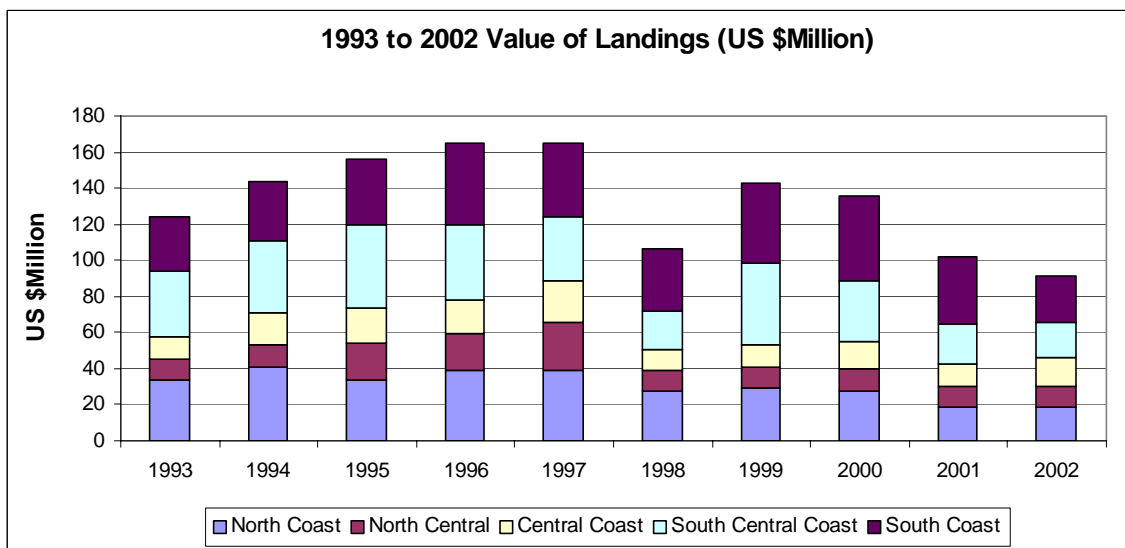


Figure 3-7: 1993 to 2002 Value of Landings by Region

Source: Pacific Coast Fisheries Information Network (Pacfin)

More recent information on California’s Living Resources industry can be found in Appendix B to this report. The information reported in the body of this report reflects data from 1990 to 2000 and uses the SIC codes as the basis for classification of values, for

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consistency and comparability purposes. Appendix B contains estimates after 2000 done according to the newer NAICs codes, which give a more detailed accounting of the industry values. The charts found in the Appendix, however were taken from California state sources instead of the Federal Bureau of Labor Statistics source and so may represent a slightly different set of estimates.

3.3 Kelp and Sea Vegetable Harvesting

In addition to fisheries, California's Living Resources sector includes kelp farming offshore. Algin, an extract from kelp, is widely used in binding, stabilizing, and modeling pharmaceuticals, and in the cosmetics, hygiene, and food industries. Figure 3-8 presents the historical kelp production in wet tons in California. From 1970 to 1980, kelp harvest produced about 150,000 wet tons. As of 1980, the harvest of kelp was below 100,000 wet tons until 1989. The main reason for the low average was the 1982 to 1984 El Nino, which disturbed the environmental and climatic conditions of the Pacific Ocean. In 1990, kelp harvest reached its peak for the past 20 years with more than 150,000 wet tons. In 1998, 25,000 wet tons were harvested. From 1999 to 2001, the harvest was only around 40,000 tons annually. No separate data for employment and payroll in kelp and sea vegetable harvesting are available. They are included under the commercial fishing industry previously shown in Tables 3-1 and 3-2.

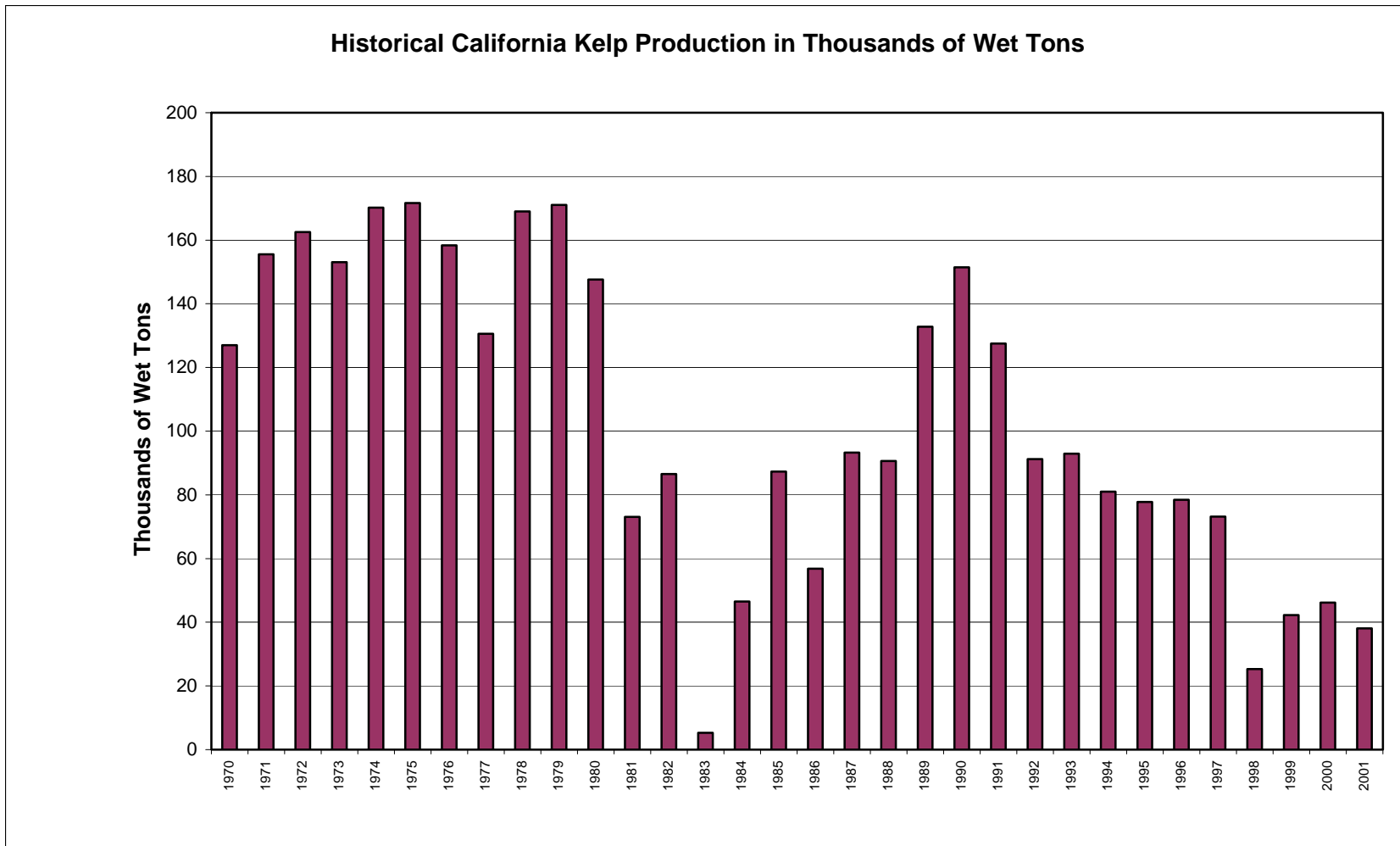


Figure 3-8: Historical California Kelp Production
Source: California Department of Fish and Game 2001

3.4 Recreational and Sport fishing

Recreational and Sport fishing in California is normally found in our Tourism and Recreation and Boat Building sectors, but it is included in this chapter because of the competitive nature of sport and commercial fishing for popularly sought after species. Since both industries are supported by California’s fisheries, both parts of this sector often make claims of their value to the California economy to get a greater share of the limits. Sport and Recreational Fishing is an important part of the Living Resources sector and merits a separate consideration for readers to understand the contribution of this part of the fishing industry to the California economy. A major study of this sector was not undertaken for purposes of this report, because it was not part of the previous report. However, we sought official federal government numbers to provide an indication of the scale and scope of this enterprise. It must be noted that the two sets of data, ours for the commercial sector and those we used from NOAA, for the sport-fishing sector, are not comparable. Income and employment estimates are comparable to the wage and employment data for commercial fishing, and so can be compared. The Sales estimates for the sport-fishing industry found in Table 3-5 are gross values for the industry, and do not subtract the cost of doing business. The estimates used for commercial fishing, (GSP) are **net** output values and do deduct the cost of doing business. a very different set of values. Hence the sales data for the sport and recreational fishing industry found in Table 3-5, are a much-inflated estimate for sport fishing, when compared with our estimates for the GSP for the commercial fishing industry. Therefore, comparison of 2 billion dollars of sales from the Sport and Recreational Fishing industry has no relationship to the almost 800 million dollar estimate for the Commercial Fishing industry. Without a net estimate from the Sport and Recreational fishing industry, there is no basis for comparison.

Table 3-5: Total Economic Impacts Generated From Marine Recreational And Sport Fishing Expenditures in California - 2000

Total economic impacts from California marine recreational fishing in 2000*				
	Economic Impact			
	Direct	Indirect	Induced	Total
Sales (\$1000)	\$1,170,862	\$288,216	\$476,146	\$1,935,224
Income (\$1000)	\$551,683	\$125,383	\$189,380	\$866,446
Employment (jobs)	14,084	2,750	5,508	22,342

Source NOAA, "The Economic Importance of Marine Angler Expenditures in the United States", 2004

* Table 3-5 includes sport fishing related activities of the Tourism & Recreation, and Boat Building and Repair sectors, so they have already been counted in this report. We have merely separated them out for informational purposes. They should not be added to the commercial sector to get totals.

3.4 Conclusion

Living Resources contribute to the California economy through a range of activities. Commercial Fish Harvesting, including Kelp, Seafood Processing, Fish Hatcheries and Aquaculture, and Sport and Recreational Fishing represent a major source of revenue to the California economy. Fish Harvesting has suffered major declines over the past several decades. While there is not the evidence to indicate the loss in number of fishermen, nor in wages, the steep decline in catch, limitations on fishing, and loss of species has probably affected both the social and economic fabric of the coastal towns traditionally dependent on fishing. Estimates of the real value of the commercial sector are incomplete and underestimated because of the lack of fishermen employment and wage data, and will not be able to become part of the record until the government requires regular and standard reporting of such information from the fishing industry. With escalating demand for fish throughout the world, California has much to gain from improving its circumstances. Future losses from mismanagement of this renewable resource have not been estimated here, because only reported market values have been considered. However, incalculable losses from over fishing and depletion of stocks have already occurred and will continue to occur into the future until California's fisheries have recovered. As of 2000, the fishing industry directly contributed a little more than \$400 million to the California economy. That compares with a contribution of more than \$560 million in 1990. The differences in landings is even more striking. Between 1980 and 2000, landings dropped from a value of \$300 million to \$142 million.

3.5 References

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Chapter 4 California Ocean Minerals

Table 4-1: Summary of Ocean Minerals with Multipliers in 2000

Indicator	Direct	Indirect & Induced	Total	Multiplier
Employment	1,014	2,052	3,066	3.0
Wages	\$67,091,107	\$46,963,775	\$114,054,882	1.7
GSP	\$415,487,797	\$290,841,458	\$706,329,255	1.7

Includes Limestone Sand & Gravel, Oil & Gas Exploration and Production, and Oil & Gas Exploration Services industries.

Table 4-2: Direct Changes in Ocean Minerals Sector 1990-2000

	Employment		Wages		GSP	
	1990	Change in 2000	1990	Change in 2000	1990	Change in 2000
Total Minerals *	1,549	-535	\$83,350,066	-\$16,258,959	\$317,439,215	\$98,048,582

* Separate industries are not shown due to data suppressions in 2000

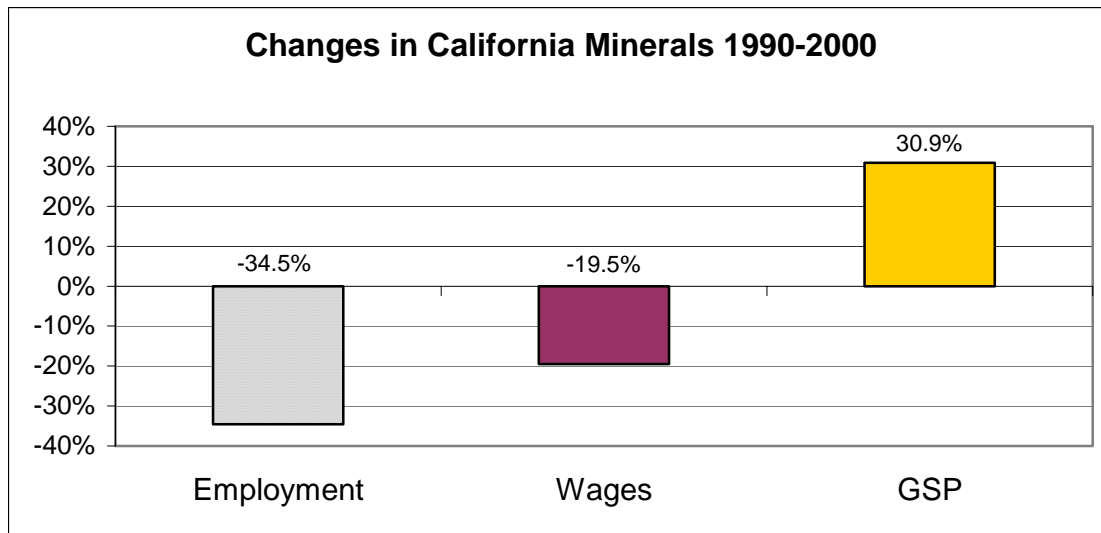


Figure 4-1: Changes in Ocean Minerals Industries from 1990 to 2000

4.1 Marine Minerals

The Offshore Ocean Minerals sector primarily includes oil and gas production from offshore and onshore wells that tap pools of oil and gas that extend under the ocean out to three miles, over which California has direct jurisdiction and thus derives state revenues. The NOEP has estimated the contribution of this industry to California, but has not estimated the revenues from Federal Outer Continental Shelf (OCS) lands, which lie beyond three miles, since those revenues go to federal coffers. However, the NOEP has included federal activities in our employment, wage and GSP data that generate revenue inside of California. Since this offshore part of the industry is found in four counties in California: Orange, Los Angeles, Ventura and Santa Barbara, most of the revenue generated from these activities come from the South Central and Southern part of the state. Also included in the

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Offshore Minerals sector is a small hard minerals industry producing sand and gravel primarily for construction aggregate. However, offshore sand and gravel estimates are not separated from onshore, following the official federal economic statistics model.

The oil and gas industry has a deep-rooted history in California. With the first commercial oil production on land in 1876, California established itself as an integral part of the national petroleum industry. Petroleum is an important industry of the offshore minerals sector for both California's local and global economy.

4.1.1 Production and Revenue from Offshore Oil and Gas Production

In 2001, among the six US states²⁰ that produce offshore oil and gas on Federal lands, California ranked third behind Texas and Louisiana. California was the third largest manufacturer of petroleum products with the value of shipments just under \$26 billion per year as of 2000.²¹

Offshore oil production has remained an important part of the overall oil industry for the state. Table 4-3 gives offshore oil production and Table 4-4 provides the proportion of offshore-onshore production of crude oil in California from 1992 to 2001.

Offshore oil and gas production is further segmented into state and federal offshore categories:²² production facilities that are within 3 miles of the coast are taken as state offshore production and production beyond 3 miles is defined as the federal offshore. Federal oil production accounted for roughly two thirds of the total offshore production in recent years. Tables 4-4 and 4-5 give the composition of state and federal offshore oil production from 1992-2001.

²⁰ Alabama, Mississippi, Louisiana, Texas, California, and Alaska. Onshore production occurs in additional states.

²¹ 2001 Annual Report of the State Oil and Gas Supervisor, California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

²² In the US, the legal offshore boundary for state jurisdiction is 3 miles; land beyond 3 miles is under federal jurisdiction.

Table 4-3: California Offshore Oil Production in bbl *

Year	State Offshore Lands	State % of Total	Federal Offshore Lands	Federal % of Total	Total Offshore
1992	21,943,784	33.9	42,693,040	66.1	64,636,824
1993	20,843,516	29.2	50,642,865	70.8	71,486,381
1994	20,494,879	26.0	58,233,217	74.0	78,728,096
1995	19,825,993	21.5	72,421,115	78.5	92,247,108
1996	20,033,212	23.8	64,291,594	76.2	84,324,806
1997	21,515,445	28.2	54,685,468	71.8	76,200,913
1998	21,107,423	31.3	46,275,703	68.7	67,383,126
1999	18,137,762	31.6	39,271,068	68.4	57,408,830
2000	18,323,992	33.8	35,918,425	66.2	54,242,417
2001	16,972,359	33.8	33,190,678	66.2	50,163,037

Source: 2001 Annual Report of the State Oil & Gas Supervisor, California Department of Conservation, Division of Oil, Gas, and Geothermal Resources

* bbl or barrel of oil equals 42 gallons.

** OCS means Outer Continental Shelf, beyond the 3-mile state boundary.

Table 4-4: California Onshore and Offshore Oil Production in bbl

Year	Onshore	Onshore % of Total	Offshore	Offshore % of Total	Total Oil Production
1992	283,546,328	81.4	64,636,824	18.6	348,183,152
1993	272,173,413	79.2	71,486,381	20.8	343,659,794
1994	265,804,705	77.1	78,728,096	22.9	344,532,801
1995	259,072,589	73.7	92,247,108	26.3	351,319,697
1996	262,939,496	75.7	84,324,806	24.3	347,264,302
1997	264,161,530	77.6	76,200,913	22.4	340,362,443
1998	263,851,140	79.7	67,383,126	20.3	331,234,266
1999	254,125,730	81.6	57,408,830	18.4	311,534,560
2000	253,187,072	82.4	54,242,417	17.6	307,429,489
2001	243,582,065	82.9	50,163,037	17.1	293,745,102

Source: 2001 Annual Report of the State Oil & Gas Supervisor, California Department of Conservation, Division of Oil, Gas, and Geothermal Resources

Table 4-5: Share of Offshore Oil Production

Year	State Offshore % of Total	Federal Offshore % of Total	Total Offshore % of Total
1992	6.3	12.3	18.6
1993	6.1	14.7	20.8
1994	5.9	16.9	22.9
1995	5.6	20.6	26.3
1996	5.8	18.5	24.3
1997	6.3	16.1	22.4
1998	6.4	14.0	20.3
1999	5.8	12.6	18.4
2000	6.0	11.7	17.6
2001	5.8	11.3	17.1

Offshore oil production was highest in 1995 accounting for 92.3 million barrels and 26.3% of total oil production. Since 1995, oil production in general and offshore oil production in

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particular, has declined steadily. The offshore oil production on state and federal leases dropped 7.5%, a decline from 54.2 million barrels produced in 2000 to 50.2 million barrels. In 2001, offshore production accounted for 17.1% of the total state oil production.

In 2000, California, with 23 million registered automobiles, only produced one-half of the crude oil that it consumed; the other half was imported from other states or countries.

4.1.2 Geographic Location of Offshore Production

There are eleven sedimentary basins along the coast of California with favorable geologic structures for accumulation of oil and gas deposits. These basins are the Southern California Shelf; the San Diego Offshore Area; the Los Angeles Basin; the Santa Barbara-Ventura Basin; the Santa Maria, the Salinas, the Santa Cruz, the Bodega, the Point Arena, and the Eel River Basin; and Bear-Mattole Offshore Area. Of these eleven basins, only the Los Angeles, Santa Barbara-Ventura, and Santa Maria basins have been commercially exploited up to now.

Table 4-6 gives onshore and offshore oil production for all coastal counties of California in 2001. All of the coastal counties produced 30.9 million barrels of onshore oil and 17.0 million barrels of offshore oil. Offshore oil production is confined to Ventura, Santa Barbara, Los Angeles, and Orange counties. This production represents only state-owned lands. Los Angeles County alone accounts for approximately 50 percent of total onshore oil production of coastal counties and approximately 75 percent of the total offshore oil production for California. While Ventura County is a major onshore oil producer, its offshore oil production is only about 2 percent of California's offshore oil production. For further analysis only Santa Barbara, Ventura, Los Angeles, and Orange counties will be examined.

Table 4-6: Coastal Counties Onshore and Offshore Oil Production 2001

County	Number of Wells		Oil and Condensate (bbl)		Daily Production/Well(bbl)		Estimated Oil Reserve(Mbbl)	
	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore
Del Norte	.....	.....	.....	.....	.....	.....	.....	.....
Humboldt	31	.....	.....	.....	.....	.....	.....	.....
Mendocino	.....	.....	.....	.....	.....	.....	.....	.....
Yolo	74	.....	.....	.....	.....	.....	.....	.....
Sonoma	.....	.....	.....	.....	.....	.....	.....	.....
Napa	.....	.....	.....	.....	.....	.....	.....	.....
Sacramento	70	.....	7,273	.....	0	.....	.....	.....
Solano	185	.....	36,931	.....	1	.....	35,873	.....
San Joaquin	153	.....	.....	.....	.....	.....	.....	.....
Marin	.....	.....	.....	.....	.....	.....	.....	.....
Contra Costa	46	.....	489	.....	0	.....	.....	.....
Alameda	5	.....	11,179	.....	6	.....	7	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Mateo	14	.....	898	.....	0	.....	3	.....
Santa Clara	7	.....	28,880	.....	11	.....	114	.....
Santa Cruz	.....	.....	.....	.....	.....	.....	.....	.....
Monterey	332	.....	462,643	.....	39	.....	65,935	.....
San Luis Obispo	154	.....	717,190	.....	13	.....	6,433	.....
Santa Barbara	677	27	2,521,649	1,203,743	10	122	36,873	10,340
Ventura	1,855	32	8,322,478	301,591	12	26	91,416	6,228
Los Angeles	2,586	835	15,700,887	12,488,554	18	41	304,890	111,269
Orange	1,150	160	3,084,371	2,978,471	7	51	22	47
San Deigo	.....	.....	.....	.....	.....	.....	.....	.....
Total	7,339	1,054	30,894,868	16,972,359	117	240	541,566	127,884

Table 4-7 gives the value of offshore oil production in California in 2001 dollars. The value of all offshore oil production in California was estimated at \$1.4 billion in 2001, and state offshore oil production were valued at approximately \$474 million.

Table 4-7: Value of Offshore Oil Production in 2001²³

County	Oil & Condensate Production	Offshore Oil & Condensate Production(bbl)	% of Offshore Production	Price of Oil (\$/bbl)	Gross Value of Offshore Oil (\$)
Santa Barbara	3,725,392	1,203,743	32.31	\$28	\$33,620,542
Ventura	8,624,069	301,591	3.50	\$28	\$8,423,437
Los Angeles	28,189,441	12,488,554	44.30	\$28	\$348,805,313
Orange	6,062,842	2,978,471	49.13	\$28	\$83,188,695
All Coastal Counties	46,601,744	16,972,359	36.42	\$28	\$474,037,987
Federal		33,190,678		\$28	\$927,015,637
Total		50,163,037		\$28	\$1,401,053,623

²³ In order to estimate the value of offshore crude oil production, the average price of crude oil was estimated using Cushing, OKWTI spot price FOB(\$/bbl) from the Department of Energy.
Source: http://www.eia.doe.gov/oil_gas/petroleum/info_glance/prices.html

4.2 Offshore Natural Gas Production in California

Table 4-8 gives the physical production (in thousands of cubic feet, or Mcf) and value of offshore natural gas in California in 2001. The value of natural gas was estimated to be \$277 million in 2001 dollars, while federal offshore natural gas production accounted for approximately 88 percent of total offshore gas production. Offshore natural gas production is relatively small in coastal counties.

Table 4-8: Offshore Natural Gas Production - 2001

County	Net Natural Gas (Mcf)		Total Natural Gas (Mcf)	% Offshore Production	AverPrice (\$)/MCF	Total Value of Production (\$)
	Onshore	Offshore				
Santa Barbara	...	...	...	...	6.4	\$0
Ventura	8,839,190	203,790	9,042,980	2.3	6.4	\$1,304,256
Los Angeles	0	3,384,455	3,384,455	100.0	6.4	\$21,660,512
Orange	1,402,301	1,436,749	2,839,050	50.6	6.4	\$9,195,194
All Coastal Counties		5,024,994				\$32,159,962
Federal		38,310,447			6.4	\$245,186,861
Total		43,335,441				\$277,346,822

Source: Average gas price: http://www.eia.doe.gov/emeu/states/ngprices/ngprices_ca.html, in \$per thousand cubic feet.

4.3 Estimate of the Economic Contribution of Ocean Minerals

Moller and Fitz (1994) used SIC codes 131, 132, 138 and 291 to estimate the total income and employment effect of the offshore oil and gas industry in the state. These SIC codes do not classify the industry in terms of onshore and offshore, but rather provide data for the industry including both. However, the authors of that study adjusted the SIC data taking into account that offshore production was just one part of these totals. They addressed this issue by multiplying total employment as reported in these SIC codes by the share of offshore oil production in total production. They multiplied the total employment in each region by the percentage of offshore oil production in total production in that region.

In this study the Quarterly Census of Employment and Wages of the US Department of Labor's Bureau of Labor Statistics was used, which is derived from the ES-202 unemployment insurance data series, supplied by the California Employment Development Department. This method uses both SIC codes and geography to measure the income and employment effects of the offshore oil and gas industry. Geography included the four counties where offshore minerals are produced, those areas onshore where oil is retrieved from under the ocean floor laterally, and those sites where oil and gas company offices are located. However, while this method allows more refined estimates for production, it does not separate offshore from onshore sources for refining. Thus, the following industry estimates do not include the petroleum refining industry in California, because there was no legitimate or accurate way to estimate offshore oil and gas inputs or even in-state and out-of-state oil refining. Hence, the industry totals with multipliers are underestimates.

In addition, detailed data on the offshore Oil and Gas, and offshore Sand and Gravel industries is not available, because federal rules dictate suppression of data when activities

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are concentrated in less than three companies per measured geographic unit. Hence we have consolidated the two into offshore minerals to provide our estimates.

Table 4-9: Employment, Wages and GSP of Ocean Mineral Industries - 2000²⁴

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	D	D	D	D
North Central	382	764	1,146	3.0
Central	D	D	D	D
South Central	382	764	1,147	3.0
South	228	478	706	3.1
Total	992	2,007	2,999	3.2
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	D	D	D	D
North Central	\$20,484,304	\$14,339,013	\$34,823,317	1.7
Central	D	D	D	D
South Central	\$30,512,821	\$21,358,975	\$51,871,796	1.7
South	\$15,512,982	\$10,859,087	\$26,372,069	1.7
Total	\$66,510,107	\$46,557,075	\$113,067,182	1.7
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	D	D	D	D
North Central	\$109,163,335	\$76,414,334	\$185,577,669	1.7
Central	D	D	D	D
South Central	\$197,124,933	\$137,987,453	\$335,112,386	1.7
South	\$106,385,984	\$74,470,188	\$180,856,172	1.7
Total	\$412,674,251	\$288,871,976	\$701,546,227	1.7

While the Oil and Gas industry forms a relatively small part of the California Ocean Economy in terms of employment, its contribution in terms of wages and GSP was substantial, contributing approximately \$66 million in direct wages (\$113 million with multipliers) and \$412 million in direct GSP (\$701 million with multipliers) to California's economy in 2000.²⁵ However the number of jobs declined by an estimated 34.5% during the 1990-2000 period, and total wages declined by an estimated 19.5%. GSP, on the other hand, increased by approximately 30.9% in constant 2000 dollars, possibly due to the increase in the price of oil and gas. Although California experienced a total decline in employment for this sector, the South Central region employment grew.²⁶

²⁴ The industries in the oil and gas industry do not include petroleum refining, as was done in the 1994 CRB report. The refining industry was excluded for lack of key data. The offshore/coastal component of oil refined in California comprises only a portion of the oil refined in California. Onshore production from California, Alaskan oil, and foreign oil also is refined. The precise mix of offshore/coastal supply to the refining industry is not known, and can vary substantially over time.

²⁵ Because refining is not included in these estimates, the estimates are low.

²⁶ See footnote 20, chapter 2 of this report

4.4 References

2001 Annual Report of the State Oil and Gas Supervisor, California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

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Chapter 5 California Marine Transportation

Table 5-1: Summary of Direct Values for Marine Transportation 2000

Industry	Employment	Wages	GSP
Deep Sea Freight	3,521	\$305,661,201	\$503,856,683
Marine Passenger Transportation	2,449	\$68,840,957	\$113,478,506
Marine Transportation Services	17,251	\$1,082,763,879	\$1,784,844,839
Petroleum and Natural Gas Pipelines	21	\$1,270,234	\$3,865,805
Search and Navigation Equipment	48,116	\$3,580,391,768	\$4,788,474,162
Warehousing	2,928	\$82,468,470	\$192,319,634
Total	74,289	\$5,121,396,509	\$7,386,839,629

Source: BLS/IMPLAN

Table 5-2: Summary of Marine Transportation with Multipliers - 2000

Indicator	Direct	Indirect & Induced	Total	Multiplier
Employment	74,289	160,986	235,275	3.2
Wages	\$5,121,396,509	\$7,322,744,342	\$12,444,140,851	2.4
GSP	\$7,386,839,629	\$10,566,697,930	\$17,953,537,559	2.4

Table 5-3: Direct Changes in California Marine Transportation 1990-2000

Industry	Employment		Wages		GSP	
	1990	Change in 2000	1990 (millions)	Change in 2000 (millions)	1990 (millions)	Change in 2000 (millions)
Deep Sea Freight	5,421	-1,900	\$418.56	-\$112.89	\$686.69	-\$182.84
Marine Passenger Transportation	1,429	1,020	\$42.57	\$26.27	\$69.85	\$43.63
Marine Transportation Services	12,549	4,702	\$766.89	\$315.87	\$1,258.18	\$526.66
Petroleum and Natural Gas Pipelines	D	D	---	---	D	---
Search and Navigation Equipment	97,604	-49,488	\$5,696.33	-\$2,115.94	\$6,962.74	-\$2,174.27
Warehousing	D	D	---	---	D	---
Total	118,975	-44,686	\$6,988.20	-\$1,866.80	\$9,105.66	-\$1,718.82

D = Disclosure, 1990 values not available

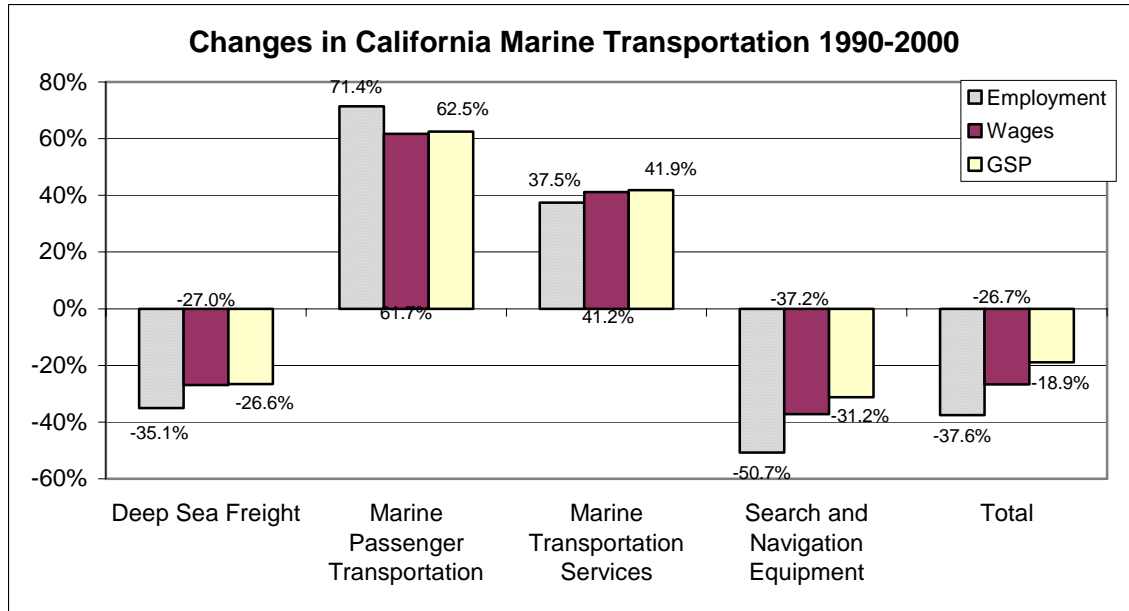


Figure 5-1: Changes in California Marine Transportation 1990-2000

5.1 Marine Transportation

California is the largest single gateway services state in the US. In 2000, the value of trade through the Los Angeles, Long Beach, and Oakland Customs Districts was \$392 billion. Ideally situated in the global trading network, waterborne commerce through California’s ports accounted for 40% of the national total in 2000.²⁷

Located on the central West Coast of North America, California ports provide direct access to the entire continent and Asia. In the state, there are 20 ports, including seven major commercial seaports covering 98 percent of the state’s total waterborne cargo value in 2000. They are: Los Angeles, Long Beach, Oakland, Richmond, Port Hueneme, San Diego, and San Francisco. Among them, Los Angeles, Long Beach, and Oakland were three of the four largest container ports in the country in terms of cargo volume in 2000.

5.1.1 Overview of Activities

California’s seaports and the cargo handled are of great economic significance. They support industrial, retail and agricultural sectors throughout the nation.

The following two figures present the composition of waterborne tonnages for major California ports in 2001 and 2000. In 2001, the eight major ports carried approximately 161.7 million tons of cargo, of which 36 million metric tons were domestic, and 125.7 million tons were foreign.(see figure 5-3.) In 2000, 36.3 million tons of domestic and 124.9

²⁷ US Army Corps of Engineers, Waterborne Commerce Statistics Center, State to State and Region to Region Commodity Tonnage, Public Domain database, available at <http://www.Usacoe.amry.mil>. As of Oct.30, 2001.

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million tons of foreign cargo went through nine major ports in California. In both years, about 90% of the foreign cargos were imports, and only 10% were exports.

After Long Beach and Los Angeles, in 2000, Richmond was the third largest port in California in terms of cargo volume and about half of that volume was domestic in 2000. In comparison, more than half of the cargo volume through Long Beach and Los Angeles was imports, while more than half of the volume through the Port of Oakland was exports.

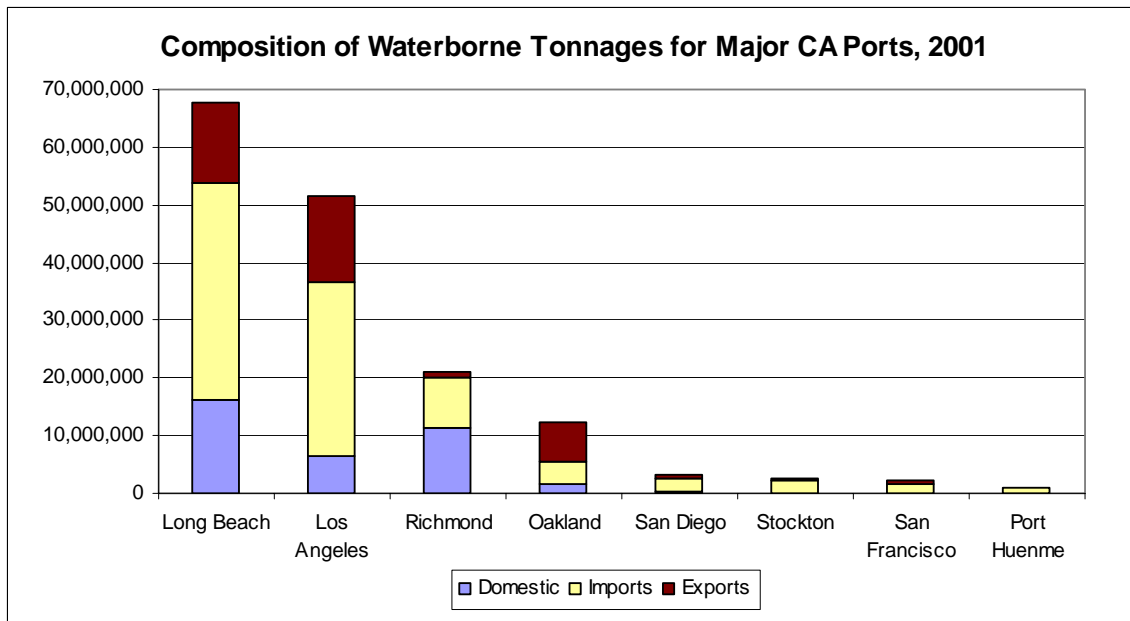


Figure 5-2: 2001 Major California Ports, Composition of Tonnage

Source: US Army Corps of Engineers

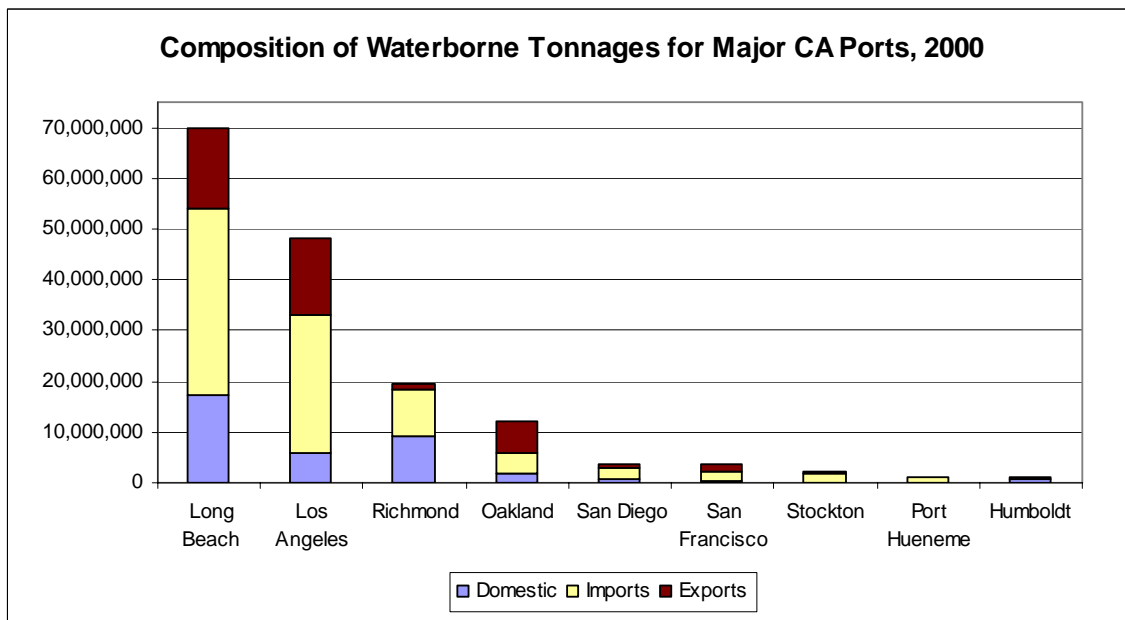


Figure 5-3: 2000 Major California Ports, Composition of Tonnage

Source: US Army Corps of Engineers

In recent years, California ports have become more and more significant as service providers to promote international commerce. Figure 5-4 shows the composition of waterborne tonnage for combined California ports from 1997 to 2001. The total volume of cargo through all ports grew 8.5% from 1997 to 2001. The most significant growth occurred from 1999-2000, with a 7.7% increase. From 1997 to 2001, total imports increased 85.8%.

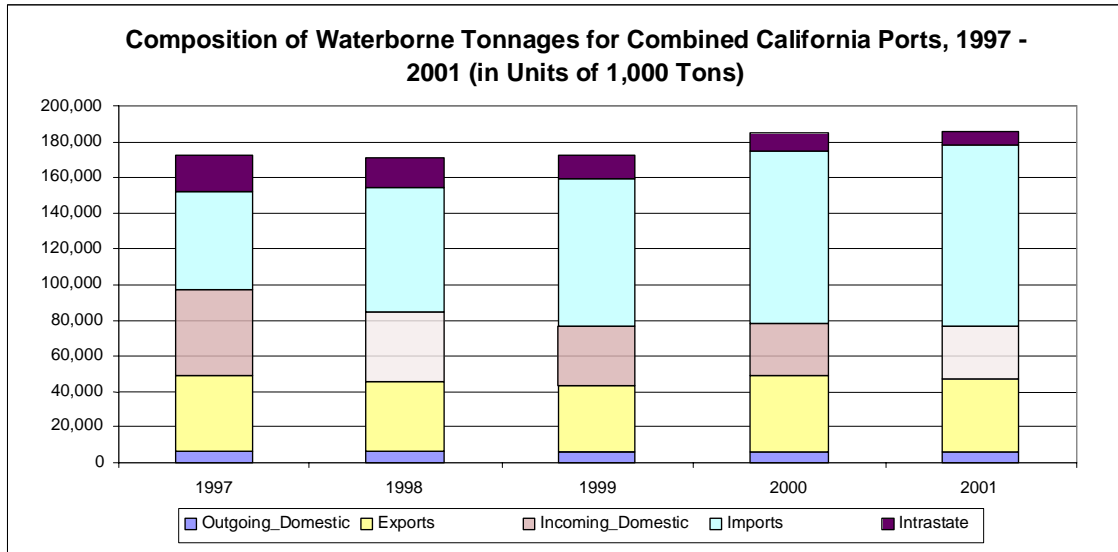


Figure 5-4: 1997-2001 Combined California Ports, Composition of Tonnage

Source: US Army Corps of Engineers

Figure 5-5 presents the composition of waterborne tonnage for combined Long Beach and Los Angeles Ports from 1997 to 2001. The Ports of Los Angeles and Long Beach, the two most active container ports in the nation. Combined, they represented the third largest container port in the world, only after Hong Kong and Singapore. In 2000, more than one third of all US waterborne containers moved through the Los Angeles and Long Beach ports. Approximately two millions jobs nationwide were linked to the activities of the Ports of Los Angeles and Long Beach at that time.

According to the California Marine and Inter-modal Transportation System Advisory Council, containerized cargo through the Ports of Los Angeles and Long Beach is expected to grow three times its current size between 2001 and 2020. The economic benefits of trade through the ports will be accompanied by major challenges of congestion and growth management.²⁸

²⁸ For additional information on expected growth for California ports, see Jon Haveman, *California Seaports, California Global Gateways: Trends and Issues*.

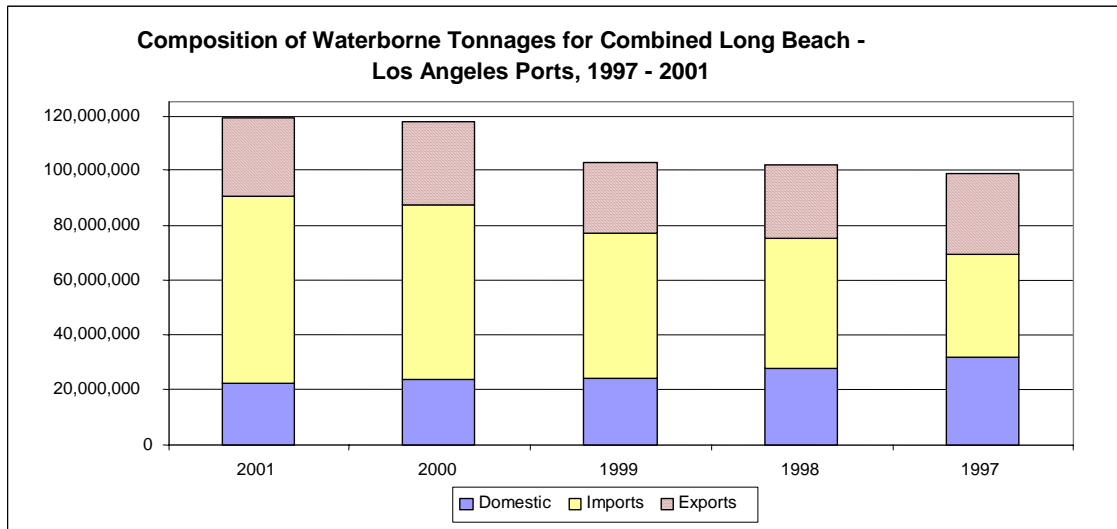


Figure 5-5: 1997-2001 Long Beach – Los Angeles Ports, Composition of Tonnage

Source: US Army Corps of Engineers

5.1.2 Composition of Cargo for all California Ports by Commodity

The highest-value cargo through California ports includes a large portion of the nation’s imported consumer goods. By value, California is the nation’s largest freight destination. By tonnage, it is the second highest in freight movements.

The following two graphs show the waterborne tonnage from and to major California ports by types of commodity respectively. In 2000, approximately 59.7 million tons of shipments originated from California ports. Petroleum exceeds all other commodities by tonnage. Food products exports are the second largest commodity by weight.²⁹ California appears to import more than double what it exports in petroleum. About 136.9 million tons of cargo entered California through its ports in 2000. The major cargoes were petroleum, manufactured goods, and petroleum products, which constituted about 70% of the total cargo volume.

²⁹ Of interest relative to the chapter on Offshore Minerals in this report,

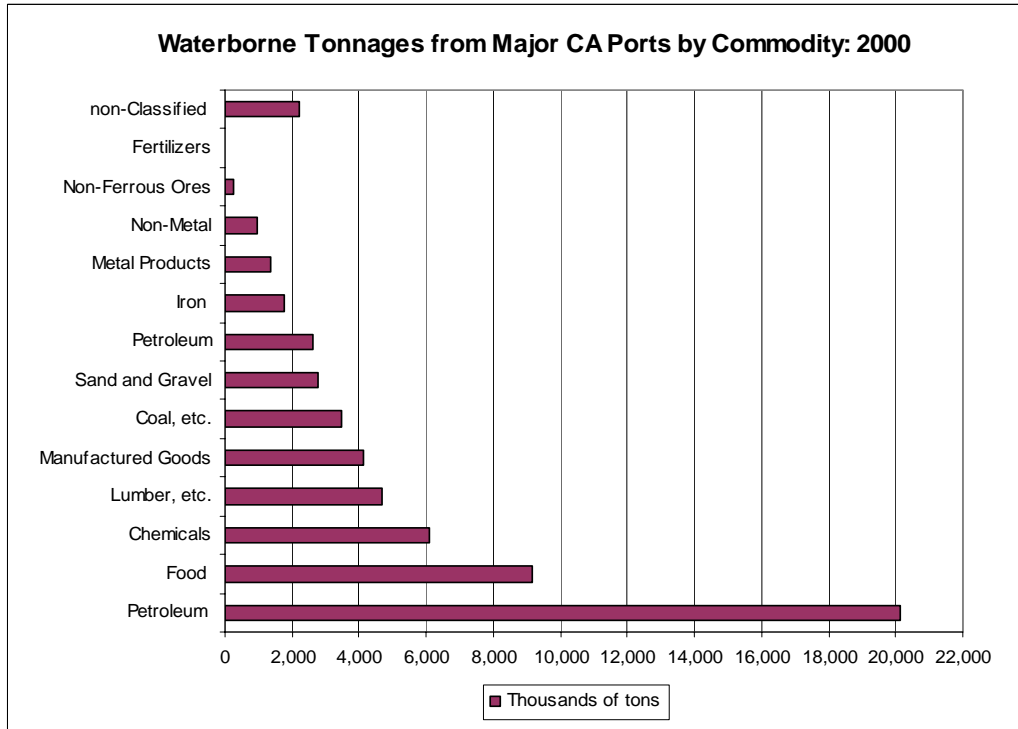


Figure 5-6: 2000 Major California Ports, Tonnage by Commodity

Source: US Army Corps of Engineers

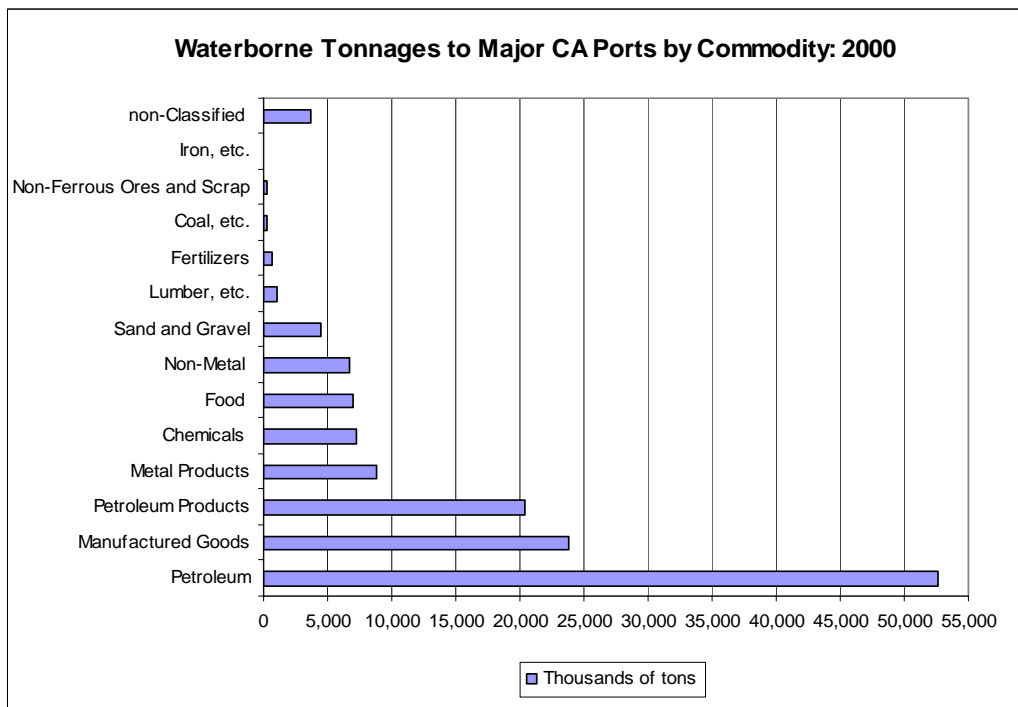


Figure 5-7: 2000 Combined California Ports, Tonnage by Commodity

Source for data on the above pages: US Army Corps of Engineers, Waterborne Commerce Statistics Center, State to State and Region to Region Commodity Tonnages, Public Domain database, available at <http://www.invr.usace.army.mil> as of Oct. 30, 2001.

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From 1992 to 2001, total value of imports and exports from major California ports increased by 74.6% and 17.3% respectively. In 2001, total imports were worth more than \$195 billion, and total exports reached \$44.6 billion. The Figure 5-8 shows the estimated value of imports and exports for major California ports from 1992 to 2001.

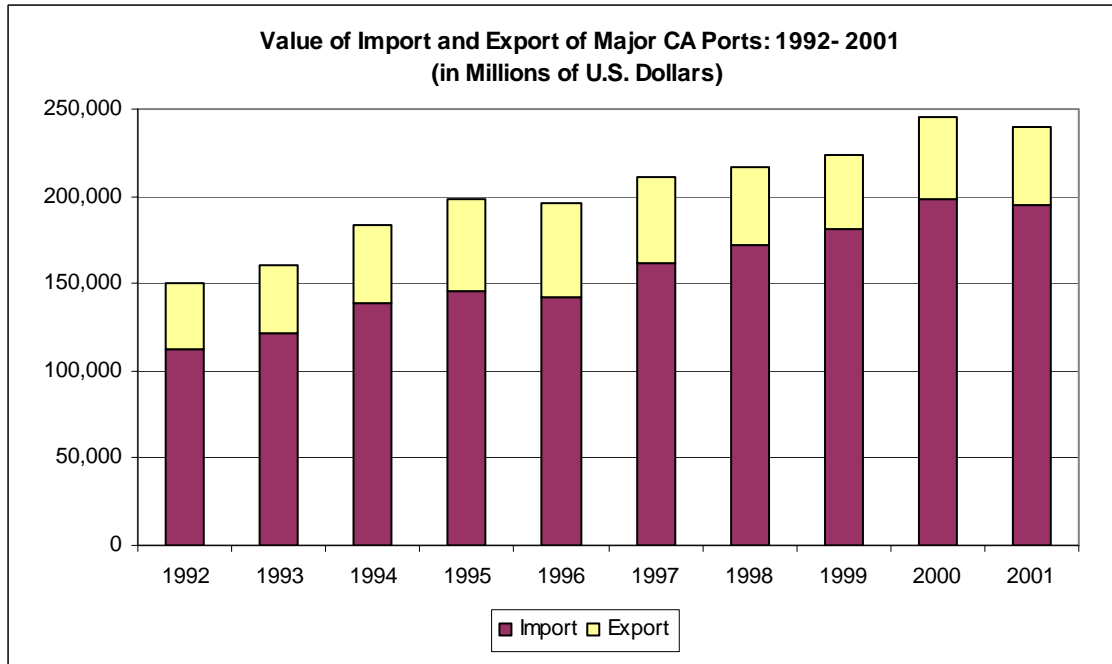


Figure 5-8: Major California Ports, 1992-2001 Values of Imports and Exports

Source: US Maritime Administration and US Army Corps of Engineers

From the Ports of Los Angeles and Long Beach, cargo is distributed to and from all other locations in the US and major ports all over the world, with an estimated cargo value of \$200 billion in 2001. The estimated value of imports and exports of combined Los Angeles and Long Beach ports from 1992 to 2001 is shown in Figure 5-9.

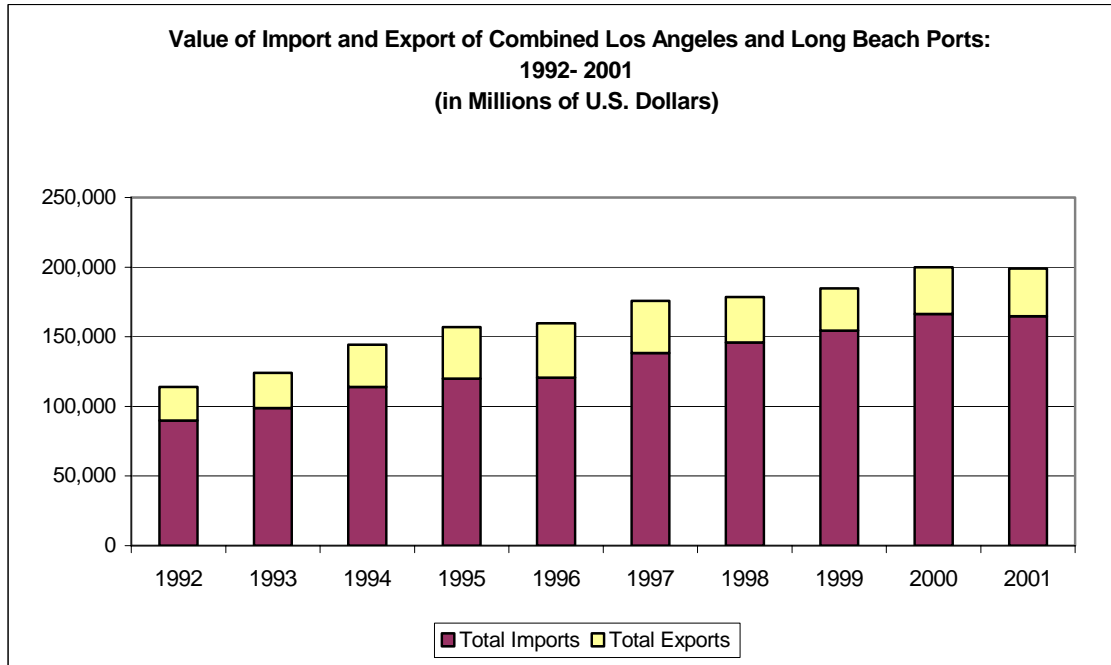


Figure 5-9: Los Angeles and Long Beach Ports, 1992-2001 Import and Export Values

Source: US Maritime Administration and US Army Corps of Engineers

5.1.3 Estimated Value of Imports and Exports for Major California Ports

Table 5-4 presents historical ranking of California ports by total, imports, and exports of cargo value for 2001. Besides Long Beach and Los Angeles, other ports have also experienced significant growth during the past decade. Situated in the center of the San Francisco area, the Port of Oakland is the primary deepwater port in Northern California and the gateway to the Silicon Valley, although much of the goods from Silicon Valley travels by air through Los Angeles and San Francisco Airports, making these airports among the two largest export terminals by value in the country.³⁰ Connected with high-capacity rail, freeway, and aviation services, the Port of Oakland is the hub of Northern California’s transportation network and the center of trade across the coast to the Rocky Mountains. Oakland is the fourth busiest marine port in the US, and the cargo volume through it is expected to triple from 2001 to 2020.

³⁰ Review comment by H. Schatz

Table 5-4: Port Rankings 2001 by Total, Import and Export Cargo Value (in Millions of US dollars)

Ranking	Ports	Total	Ranking	Ports	Imports	Ranking	Ports	Exports
1	Los Angeles, CA	\$104,193	1	Los Angeles, CA	\$86,757	1	Los Angeles, CA	\$17,436
2	Long Beach, CA	\$94,699	2	Long Beach, CA	\$77,984	2	Long Beach, CA	\$16,716
3	Oakland, CA	\$24,985	3	Oakland, CA	\$17,245	3	Oakland, CA	\$7,739
4	Port Hueneme, CA	\$4,822	4	Port Hueneme, CA	\$4,691	4	San Francisco, CA	\$1,723
5	San Diego, CA	\$4,257	5	San Diego, CA	\$4,008	5	San Diego, CA	\$249
6	San Francisco, CA	\$3,044	6	El Segundo, CA	\$1,458	6	Richmond, CA	\$167
7	El Segundo, CA	\$1,459	7	San Francisco, CA	\$1,321	7	Port Hueneme	\$132
8	Richmond, CA	\$760	8	Carquinez Strait	\$675	8	Martinez, CA	\$118
9	Carquinez Strait, CA	\$730	9	Richmond, CA	\$593	9	Sacramento, CA	\$89
10	Martinez, CA	\$314	10	Martinez, CA	\$196	10	Eureka, CA	\$73
11	Stockton, CA	\$173	11	Stockton, CA	\$124	11	Carquinez Strait	\$54
12	San Pablo Bay, CA	\$151	12	San Pablo Bay, CA	\$106	12	Stockton, CA	\$49
13	Sacramento, CA	\$115	13	San Joaquin River	\$90	13	San Pablo Bay	\$45
14	San Joaquin River	\$106	14	Crockett, CA	\$57	14	San Joaquin River	\$15
15	Eureka, CA	\$93	15	Suisan Bay, CA	\$34	15	Redwood City	\$15
16	Crockett, CA	\$57	16	Selby, CA	\$29	16	Suisan Bay, CA	\$4
17	Suisan Bay, CA	\$39	17	Sacramento, CA	\$27			
18	Selby, CA	\$29	18	Eureka, CA	\$21			
19	Redwood City, CA	\$24	19	Alameda, CA	\$13			
20	Alameda, CA	\$13	20	Redwood City, CA	\$9			

Source: US Maritime Administration and US Army Corps of Engineers

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Figure 5-10 presents the top ten California ports in terms of combined cargo value from 1992 to 2001.

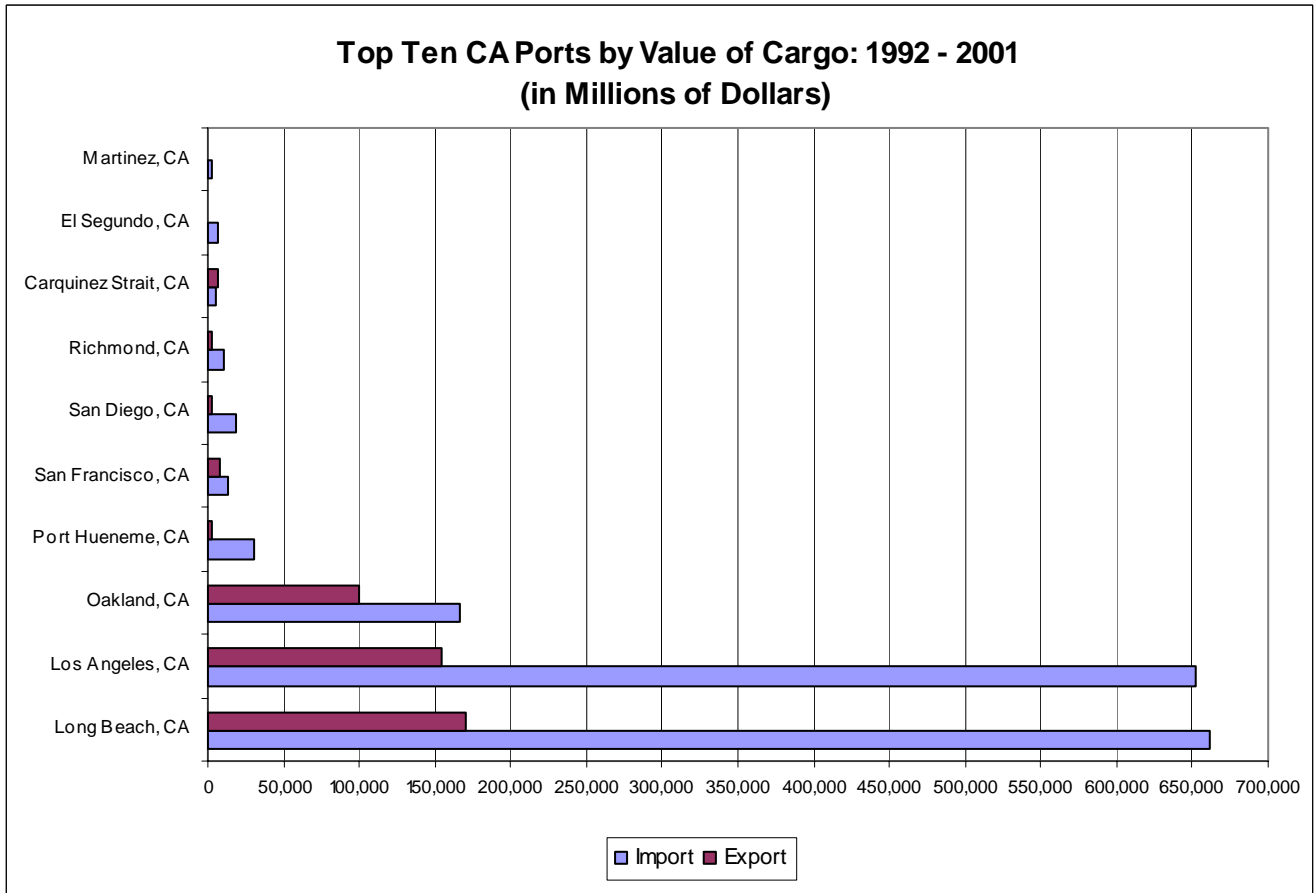


Figure 5-10: Top Ten California Ports by Cargo Value, 1992-2001

Source: US Maritime Administration and US Army Corps of Engineers

5.2 CA Water Transportation: Regional and State Employment and Income

Direct Economic Impact ³¹

The following tables show 1990 and 2000 direct employment, wages and GSP for selected SIC codes of water transportation by region.

Table 5-5: Deep Sea Foreign Freight (SIC code 4412, 4424)

Region	1990				2000			
	Number of Establishments	Employment	Wages (millions)	GSP (millions)	Number of Establishments	Employment	Wages (millions)	GSP (millions)
North	D	D	D	D	D	D	D	D
North Central	24	3,243	\$175.24	\$287.50	25	1,747	\$171.23	\$282.25
Central	D	D	D	D	D	D	D	D
South Central	D	D	D	D	D	D	D	D
South	D	D	D	D	D	941	\$61.43	101.3
Total	24	3,343	\$175.24	\$287.50	25	2,688	\$232.66	\$383.52

Source: BLS

Note: For data disclosure reasons, numbers in cells with "D"s are not presented.

Employment dropped almost 20% over the decade, yet wages and GSP increased 32.8% and 33.4%, respectively for Deep Sea Foreign Freight.

Table 5-6: Water Transportation for Passengers (SIC code 4481, 4482, and 4489)

Region	1990				2000			
	Number of Establishments	Employment	Wages (millions)	GSP (millions)	Number of Establishments	Employment	Wages (millions)	GSP (millions)
North	D	D	D	D	D	D	D	D
North Central	D	D	D	D	D	D	D	D
Central	D	D	D	D	D	D	D	D
South Central	D	D	D	D	D	D	D	D
South	D	D	D	D	36	1,394	\$39.18	\$64.59
Total	36	1,310	\$30.45	\$49.96	36	1,394	\$39.18	\$64.59

Source: BLS

For Water Transportation for Passengers, wages increased 28.7% and GSP increased 29.3%.

³¹ The estimated totals found in this section on regional economies differ from the summary totals at the beginning of the chapter due to the suppressions of data at this level that do not get included in the totals. The state summary totals at the beginning of the chapter include all relevant data because suppressions are not an issue at that level of aggregate.

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Table 5-7: Marine Transportation Services (SIC code 4491, 4492, and 4499)

Region	1990				2000			
	Number of Establishments	Employment	Wages (millions)	GSP (millions)	Number of Establishments	Employment	Wages (millions)	GSP (millions)
North	D	D	D	D	16	38	\$1.85	\$3.06
North Central	79	4,130	\$183.95	\$301.79	89	3,557	\$224.97	\$370.85
Central	D	D	D	D	4	25	\$.85	\$1.40
South Central	17	496	\$11.62	\$19.07	25	646	\$24.81	\$40.90
South	139	7,027	\$361.98	\$593.86	128	12,539	\$809.69	\$1,334.71
Total	235	11,653	\$557.55	\$914.72	262	16,804	\$1,062.18	\$1,750.91

Source: BLS

For Marine Transportation Services all estimated values increased significantly.

Table 5-8: Search and Navigation Equipment (SIC code 3812)³²

Region	1990				2000			
	Number of Establishments	Employment	Wages (millions)	GSP (millions)	Number of Establishments	Employment	Wages (millions)	GSP (millions)
North	D	D	D	D	D	D	D	D
North Central	D	D	D	D	15	951	\$47.31	\$63.28
Central	D	D	D	D	5	41	\$2.62	\$3.51
South Central	17	3,110	\$129.84	\$158.71	21	1,612	\$90.99	\$4,121.68
South	89	82,267	\$3,651.64	\$4,463.47	173	38,835	\$2,921.57	\$43,907.36
Total	106	85,377	\$3,781.48	\$4,622.18	214	41,440	\$3,062.49	\$4,095.83

Source: BLS

Note: For data disclosure reasons, numbers in cells with "D"s are not presented.

Search and Navigation Equipment fell in all categories, probably as a result of the large decline in the Ship Building sector.

³² The search and navigation equipment industry produces primarily electronic equipment such as radar, sonar, geographic positioning systems, etc. These products all have applications in marine transportation (and increasingly in recreational boating) but also in aviation. No information exists to separate the applications to which the products of this industry may be put. All of the output is counted in marine transportation, which probably overstates the actual marine component of the output.

Table 5-9: Warehousing (SIC code 4222 and 4225)

Region	1990				2000			
	Number of Establishments	Employment	Wages (millions)	GSP (millions)	Number of Establishments	Employment	Wages (millions)	GSP (millions)
North	6	22	\$.30	\$.54	12	32	\$.41	\$.94
North Central	76	795	\$16.08	\$28.79	152	1,940	\$56.61	\$132.02
Central	D	D	D	D	D	245	\$6.14	\$20.35
South Central	14	131	\$2.27	\$4.06	D	227	\$7.00	\$16.31
South	45	449	\$10.32	\$18.48	D	D	D	D
Total	141	1,397	\$28.97	\$51.87	164	2,444	\$70.15	\$169.62

Source: BLS

Note: For data disclosure reasons, numbers in cells with "D"s are not presented.

The Warehousing industry grew significantly in every category of measurement during the decade, reflecting the large increase in trade volume.

5.2.1 Regional and State Indirect Employment and Income from IMPLAN Model³³

The above data show the results of economic activity directly related to the ocean, but this direct economic activity generates additional economic activity as employees spend their salaries and ocean-related firms purchase inputs from other California firms. These indirect and induced, or multiplier effects, must also be accounted for. Estimates of these effects are shown in the following Tables³⁴.

³³ These estimates do not include the values that are suppressed, so they are underestimates and don't match the state summary totals at the beginning of the chapter.

³⁴ The estimates were derived by a detailed analysis of the Ocean Economy industries in each of the coastal regions using IMPLAN, a standard and widely used economic impact model

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The following tables show direct and indirect income, employment and GSP effects by region, derived from the deep-sea freight, marine passenger transportation, marine transportation services, search and navigation equipment, and warehousing industries.

Table 5-10: Deep Sea Freight

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	D	D	D	D
North Central	1,747	3,302	5049	2.9
Central	D	D	D	D
South Central	D	D	D	D
South	941	1,779	2720	2.9
Total	2,688	5,081	7,769	3.2
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	D	D	D	D
North Central	\$171,225,591	\$226,017,780	\$397,243,371	2.3
Central	D	D	D	D
South Central	D	D	D	D
South	\$61,434,989	\$88,466,384	\$149,901,373	2.4
Total	\$232,660,580	\$314,484,164	\$547,144,744	2.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	D	D	D	D
North Central	\$282,250,931	\$373,969,445	\$656,220,376	2.3
Central	D	D	D	D
South Central	D	D	D	D
South	\$101,270,393	\$145,829,365	\$247,099,758	2.4
Total	\$383,521,324	\$519,798,810	\$903,320,134	2.8

Note: For data disclosure reasons, numbers in cells with "D"s are not presented.

Table 5-11: Marine Passenger Transportation

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	D	D	D	D
North Central	D	D	D	D
Central	D	D	D	D
South Central	D	D	D	D
South	1394	3178	4572	3.3
Total	1,394	3,178	4,572	3.3
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	D	D	D	D
North Central	D	D	D	D
Central	D	D	D	D
South Central	D	D	D	D
South	\$39,181,979	\$56,422,050	\$95,604,029	2.4
Total	\$39,181,979	\$56,422,050	\$95,604,029	2.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	D	D	D	D
North Central	D	D	D	D
Central	D	D	D	D
South Central	D	D	D	D
South	\$64,588,184	\$93,266,191	\$157,854,376	2.4
Total	\$64,588,184	\$93,266,191	\$157,854,376	2.4

Table 5-12: Marine Transportation Services

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	38	51	89	2.3
North Central	3,557	6,723	10,280	2.9
Central	25	22	47	1.9
South Central	646	1,201	1,847	2.9
South	12,539	28,588	41,126	3.3
Total	16,804	36,584	53,388	3.2
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	\$1,853,537	\$1,668,183	\$3,521,720	1.9
North Central	\$224,971,658	\$296,962,589	\$521,934,247	2.3
Central	\$848,899	\$993,212	\$1,842,111	2.2
South Central	\$24,808,763	\$39,445,933	\$64,254,696	2.6
South	\$809,694,290	\$1,165,959,778	\$1,975,654,068	2.4
Total	\$1,062,177,147	\$1,505,029,694	\$2,567,206,841	2.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	\$3,055,399	\$2,753,939	\$5,809,339	1.9
North Central	\$370,846,784	\$491,354,859	\$862,201,643	2.3
Central	\$1,399,338	\$1,637,367	\$3,036,706	2.2
South Central	\$40,895,151	\$65,108,710	\$106,003,862	2.6
South	\$1,334,712,676	\$1,927,342,736	\$3,262,055,412	2.4
Total	\$1,750,909,348	\$2,488,197,611	\$4,239,106,962	2.8

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Table 5-13: Search and Navigation Equipment

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	D	D	D	2.3
North Central	951	1,797	2,748	2.9
Central	41	37	78	1.9
South Central	1,612	2,994	4,607	2.9
South	38,835	88,637	127,472	3.3
Total	41,440	91,168	132,607	3.2
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	D	D	D	D
North Central	\$47,311,908	\$62,451,719	\$109,763,627	2.3
Central	\$2,624,164	\$3,070,272	\$5,694,436	2.2
South Central	\$90,983,119	\$144,663,159	\$235,646,278	2.6
South	\$2,921,571,678	\$4,207,063,216	\$7,128,634,894	2.4
Total	\$3,062,490,869	\$4,417,248,366	\$7,479,739,235	2.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	D	D	D	D
North Central	\$63,275,715	\$83,837,400	\$147,113,114	2.3
Central	\$3,509,600	\$4,106,586	\$7,616,186	2.2
South Central	\$121,682,303	\$193,729,025	\$315,411,328	2.6
South	\$3,907,357,462	\$5,642,275,792	\$9,549,633,254	2.4
Total	\$4,095,825,080	\$5,923,948,803	\$10,019,773,882	2.8

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Table 5-14: Warehousing

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	32	42	73	2.3
North Central	1,940	3,664	5,604	2.9
Central	245	221	466	1.9
South Central	227	422	649	2.9
South	D	D	D	3.3
Total	2,444	4,349	6,792	3.2
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	\$405,138	\$364,624	\$769,762	1.9
North Central	\$56,610,049	\$74,725,265	\$131,335,314	2.3
Central	\$6,135,788	\$7,178,872	\$13,314,660	2.2
South Central	\$6,995,772	\$11,123,277	\$18,119,049	2.6
South	D	D	D	2.4
Total	\$70,146,747	\$93,392,038	\$163,538,785	2.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	\$944,797	\$851,579	\$1,796,377	1.9
North Central	\$132,016,805	\$174,916,168	\$306,932,973	2.3
Central	\$20,347,633	\$20,347,633	\$40,695,266	2.0
South Central	\$16,314,409	\$25,939,910	\$42,254,319	2.6
South	D	D	D	D
Total	\$169,623,644	\$222,055,291	\$391,678,936	2.8

Note. ³⁵

The total effect on California income from water transportation was estimated at \$17,953,537,559 for 2000. These industries provided employment (direct and indirect) to approximately 235,275 workers with total wages of \$12,444,140,851. (See summary Table 5-2 at the beginning of the chapter.)

³⁵ : The data source for table 5-10 through table 5-14 is BLS. For data disclosure reasons, numbers in cells with "D"s are not presented but are included in the state summaries in Table 5-1 and 5-2.

5.2 References

California Marine and Inter-modal Transportation System Advisory Council, 2001.

US Maritime Administration, Department of Transportation, and Army Corps of Engineers, Waterborne Commerce Statistics Center, State to State and Region to Region Commodity Tonnage, Public Domain database. Available at <<http://www.USacoe.army.mil>>.

Bureau of Labor Statistics, US Department of Labor.

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Chapter 6 California Marine Construction

Table 6-1: Sum Of 2000 Marine Construction With Multipliers

Indicator	Direct	Indirect & Induced	Total	Multiplier
Employment	2,833	2,662	5,495	1.9
Wages	\$164,413,562	\$162,336,362	\$326,749,924	2.0
GSP	\$309,081,043	\$304,298,814	\$613,379,857	2.0

Table 6-2: Changes in Marine Construction 1990-2000

Employment		Wages		GSP	
1990	Change in 2000	1990	Change in 2000	1990	Change in 2000
4,098	-1,265	\$219,334,254	-\$54,920,692	\$414,250,590	-\$105,169,547

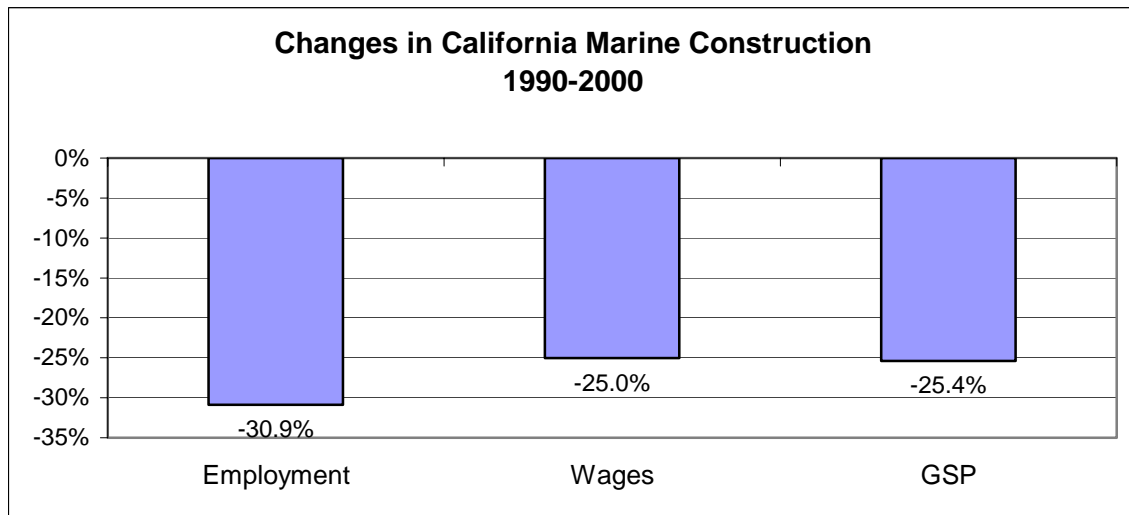


Figure 6-1: Changes in Marine Construction from 1990 to 2000

6.1 Marine Construction (maintenance, repair and restoration)

The category “marine construction” was created by the NOEP research team as one of its ocean sector categories. It was not derived from the standard government set of industry categories, and it was not included in the former California study. For purposes of the full national study, the NOEP will include a broad range of economic activities under this category. They include all of the marine construction categories found in the SIC and NAICs federal datasets such as port construction and dredging.³⁶ In its final version, it will also include beach nourishment, coastal armoring activities such as jetties and seawalls; environmental restoration and maintenance activities for wetlands and estuaries, and other large construction activities that relate to the shore and coastal ocean.

³⁶ Some sand and gravel mining activity is probably also reported under this category, since most of the companies that do that mining are dredging companies.

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For purposes of this study we include only those categories found in the federal datasets for SIC and NAICs codes, primarily connected to port construction and maintenance. We have also included data from other sources to estimate the values associated with beach nourishment, a significant economic activity in California. Beach nourishment represents a large expenditure by federal, state, and local authorities, which could be interpreted to be a negative payment to compensate for the external costs of beach loss resulting from diversion of water from coastal watersheds or offshore mining of sand and gravel for example. Yet, beach nourishment expenditures also have a positive face. They provide jobs and revenue for local and state entities, in addition to stabilizing California's valuable beaches, which are themselves a source of much revenue to the state. In most instances the benefits derived from enhancing an eroding beach are far greater than the costs of the enhancement.

As for the other activities, which should be included here, but are not because of lack of reliable and consistent data, California has a number of important wetland and estuarine restoration projects underway, which contribute markedly to California's economy, both through market and non-market values.

The data on port developments and beach nourishment follow.

6.2 Port Development

Port development includes construction of new facilities, modernization of existing ones, and rehabilitation of old ones. According to the US Port Development Expenditure Report, from 1946 to 2001, a total of more than \$23.6 billion were spent in capital improvements to port facilities and related infrastructure across the nation.

6.2.1 Historical Capital Expenditures for California Public Port Development

From 1946 to 2001, approximately \$7.6 billion were invested in port construction in California (South Pacific region), which ranked first in the nation for individual expenditures.

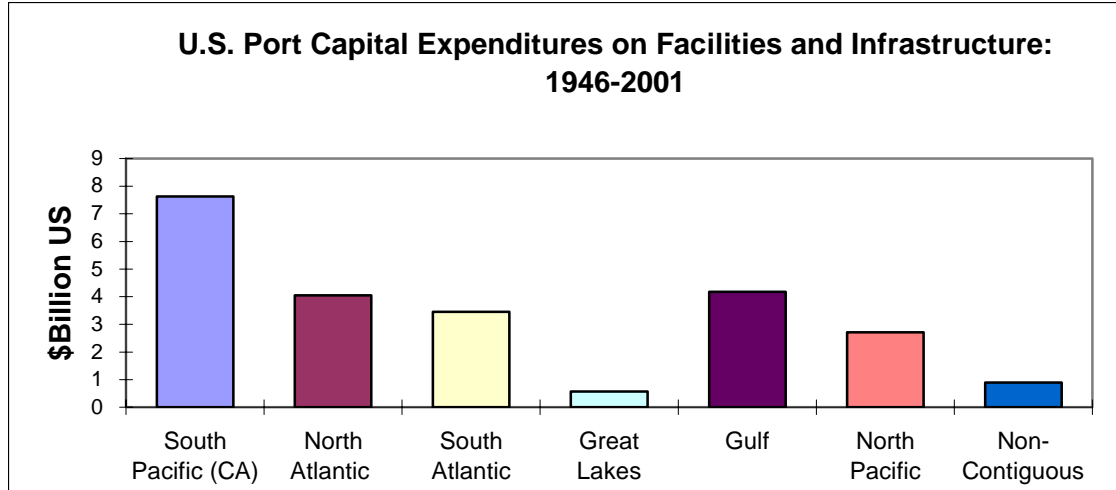


Figure 6-2: Port Development Expenditure Overview³⁷

Source: *US Port Development Expenditure Report*

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

In 2001, California continued as the leading region spending \$981.5 million on port development, which was 56.4% of all port expenditures across the nation. The following graph shows the actual port spending on facilities and infrastructure by region from 1997 to 2001.

³⁷ Regions: South Pacific in California; North Atlantic is Maine to Virginia; South Atlantic is from Virginia to the tip of Florida; Great Lakes are all those states bordering on a Great Lake, Gulf are states from the tip of Florida to Texas, N. Pacific is Oregon and Washington. The rest are self-explanatory.

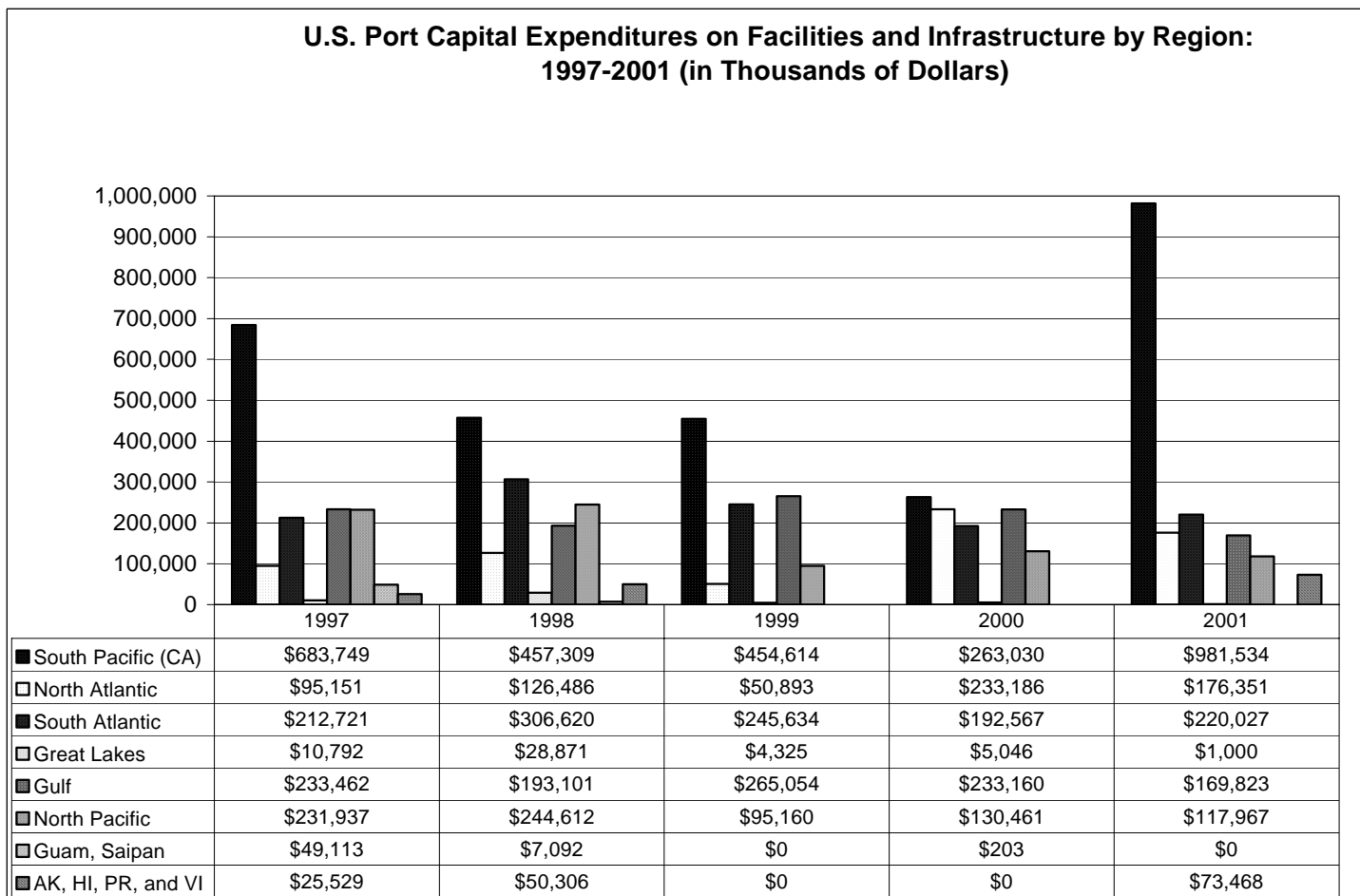


Figure 6-3: Capital Expenditures for US Port Facilities and Infrastructure by Region

Source: US Port Development Expenditure Report <http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

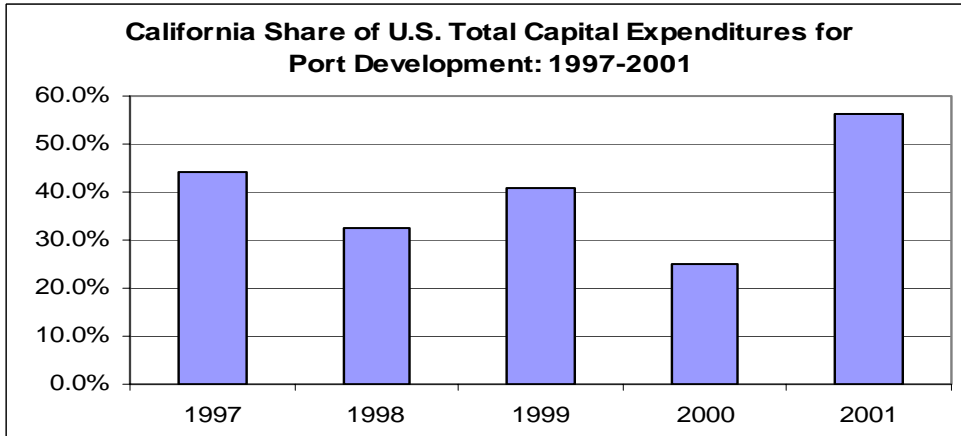


Figure 6-4: California’ Share of Port Development Expenditures, 1997-2001

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

California has lead in total capital expenditure for port development across the nation. In 2001, the capital expenditure for the Port of Los Angeles alone reached \$550 million. Besides Los Angeles, the Port of Long Beach and Port of Oakland invested an estimated \$200 million each, which made the three California ports the three leading port authorities in terms of capital expenditure in 2001. Expansion of facilities to accommodate increasing trade with Asia, and advancing technologies to make ports more efficient have been primary drivers for these investments.

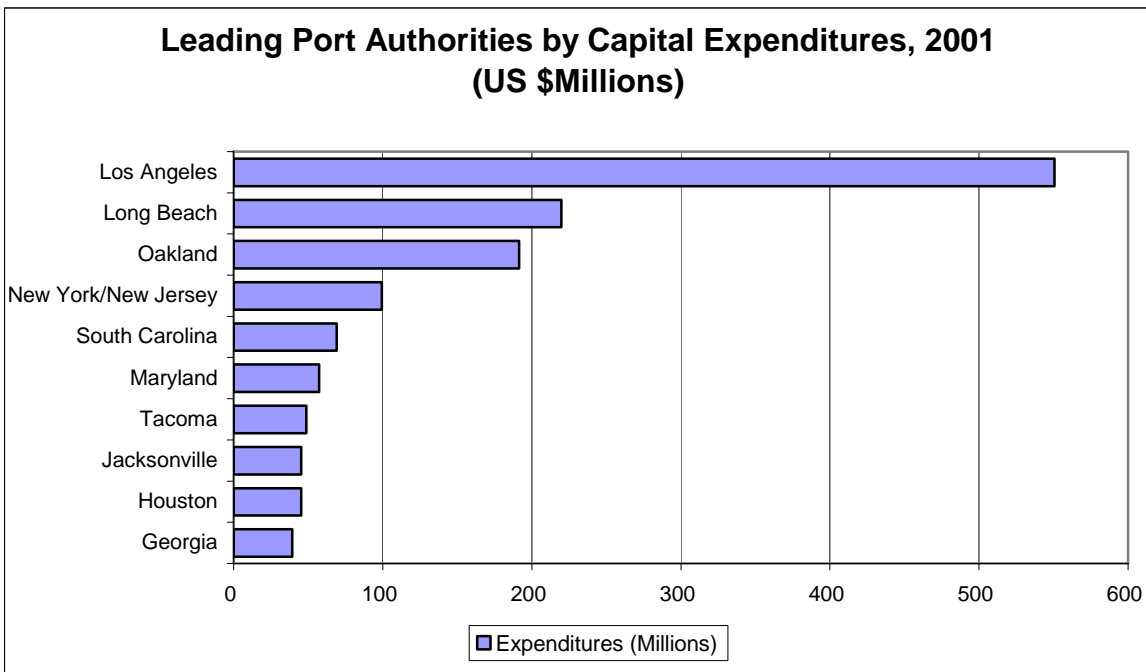


Figure 6-5: Leading US Port Authorities by Capital Expenditures, 2001

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

Expenditure by Facility Type

Figure 6-6 shows the capital expenditure by types of facilities. Specialized cargo handling (mostly for containers) is the leading expenditure category, and California accounted for nearly 80% of the total investment in this category. California represented one third of the expenditure in dry and liquid bulk. Investment on general cargo and passengers in California is not very significant.

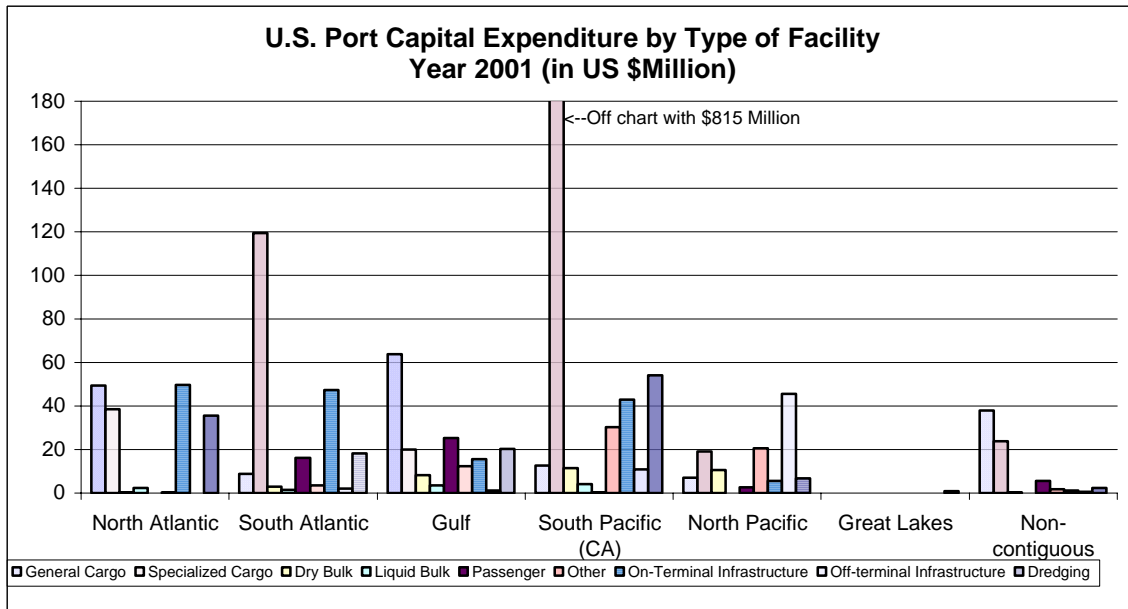


Figure 6-6: Expenditures on US Ports by Type of Facility, 2001

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

Figure 6-7 gives a more detailed picture of California’s share of total port development expenditure by facility type in 2001. More than 55% of total port investment by all US ports was spent on California ports in 2001. California expenditures on specialized cargo, dredging, and other facilities such as administrative and maintenance buildings, as well as dry and liquid bulk facilities, represented over 30% of the total spent by US ports.

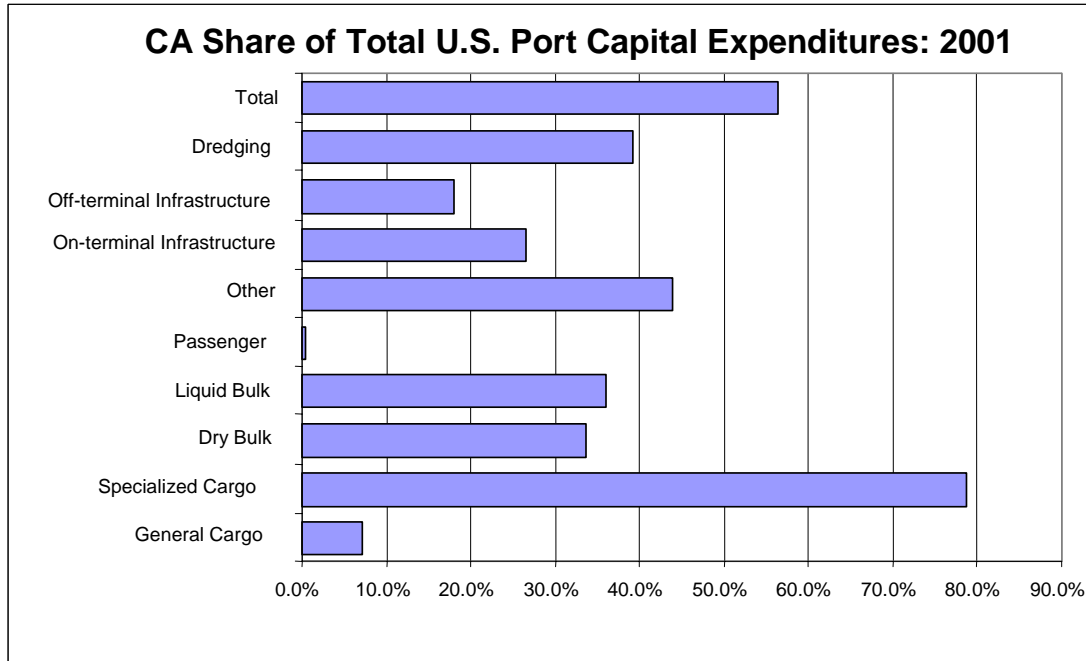


Figure 6-7: California’s Share of US Expenditures on Ports, 2001

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

Expenditure by Construction Type³⁸

The following three graphs, Figures 6-8, 6-9, and 6-10, show details of capital expenditure on new construction and modernization/rehabilitation by facility type in 2001, as well as California’s portion of total expenditure by all US ports by construction type.

Nearly 60% of the nation’s ports’ spending on new construction was on California ports in 2001, an estimated \$586.8 million. Of this California expenditure, \$541.9 million was spent on specialized cargo. In addition, California ports invested in more than 45% of the dredging activities across the nation that year.

For modernization and rehabilitation expenditures, California led the total with \$203.3 million (39.7%) in 2001. The investments on specialized cargo and other facilities stand out as the most significant.

³⁸ In most cases, investment decisions for construction and expansion of port facilities are made by individual ports and their governing boards. While large amounts of federal monies are made available to port authorities, much of their construction money is raised through bonds, revenues and other mechanisms. Most ports operate as separate private or private-public entities.

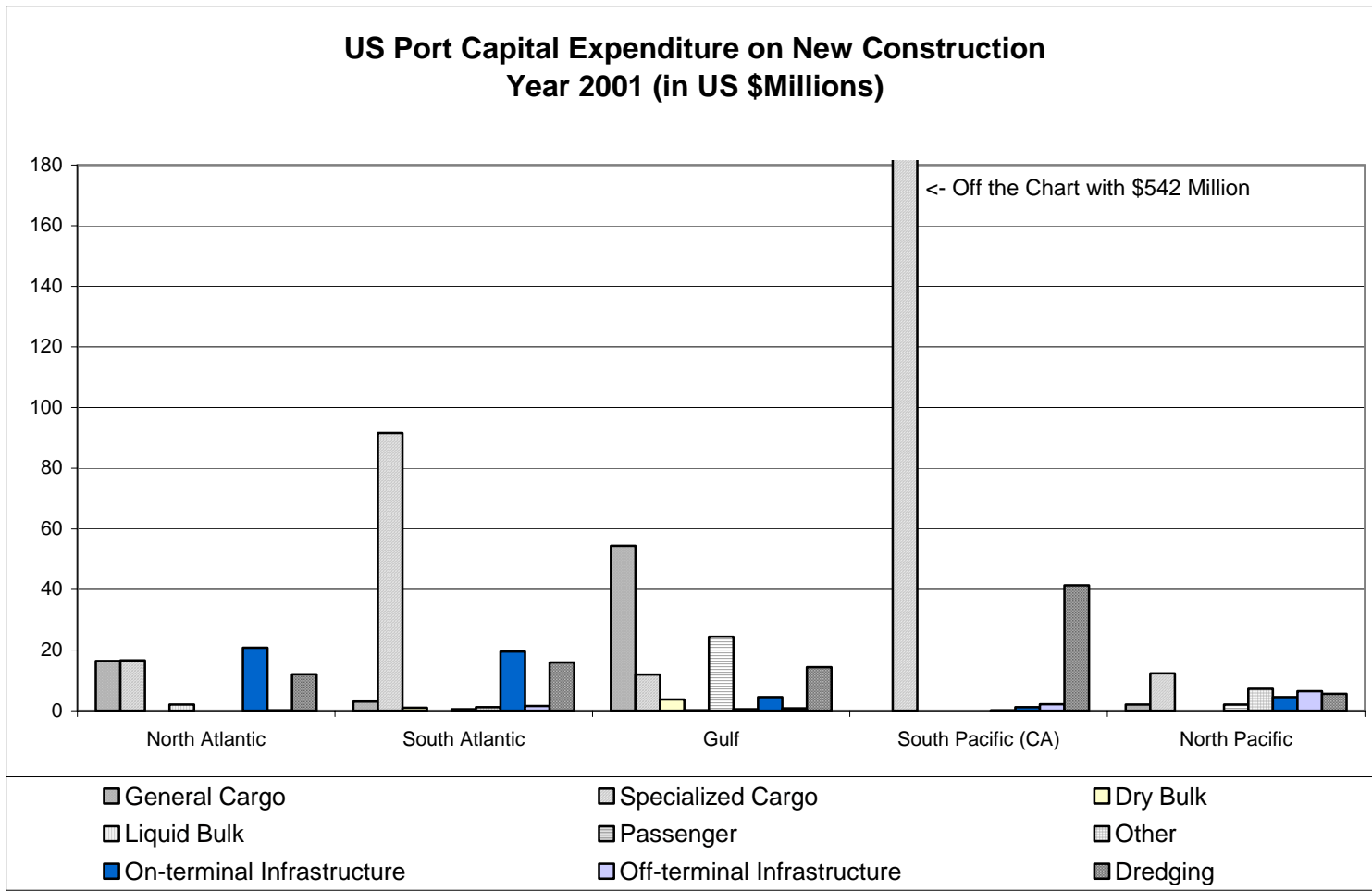


Figure 6-8: US Expenditures on New Port Construction, 2001

Source: US Port Development Expenditure Report

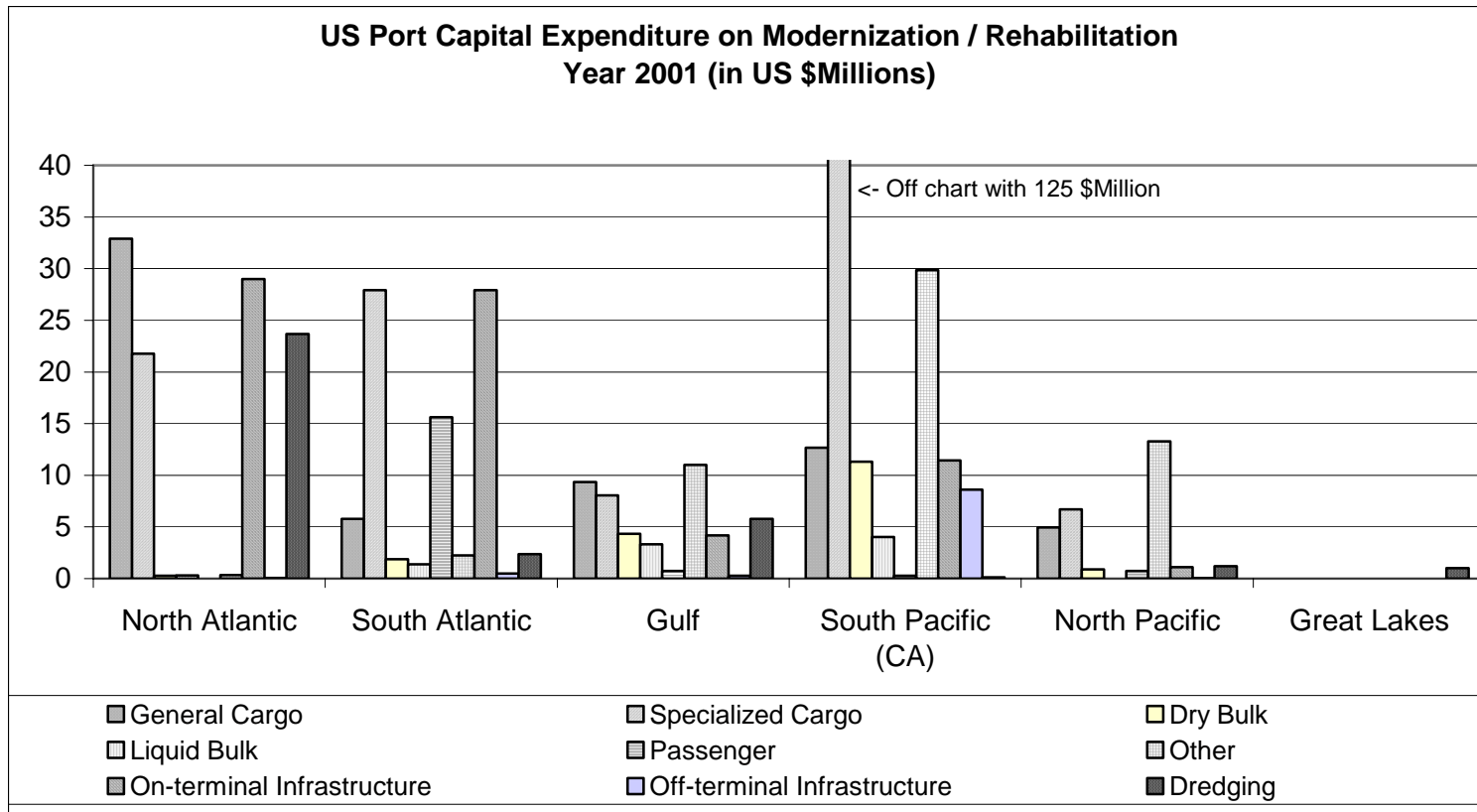


Figure 6-9: US Expenditures on Port Modernization and Rehabilitation, 2001

Source: US Port Development Expenditure Report <http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

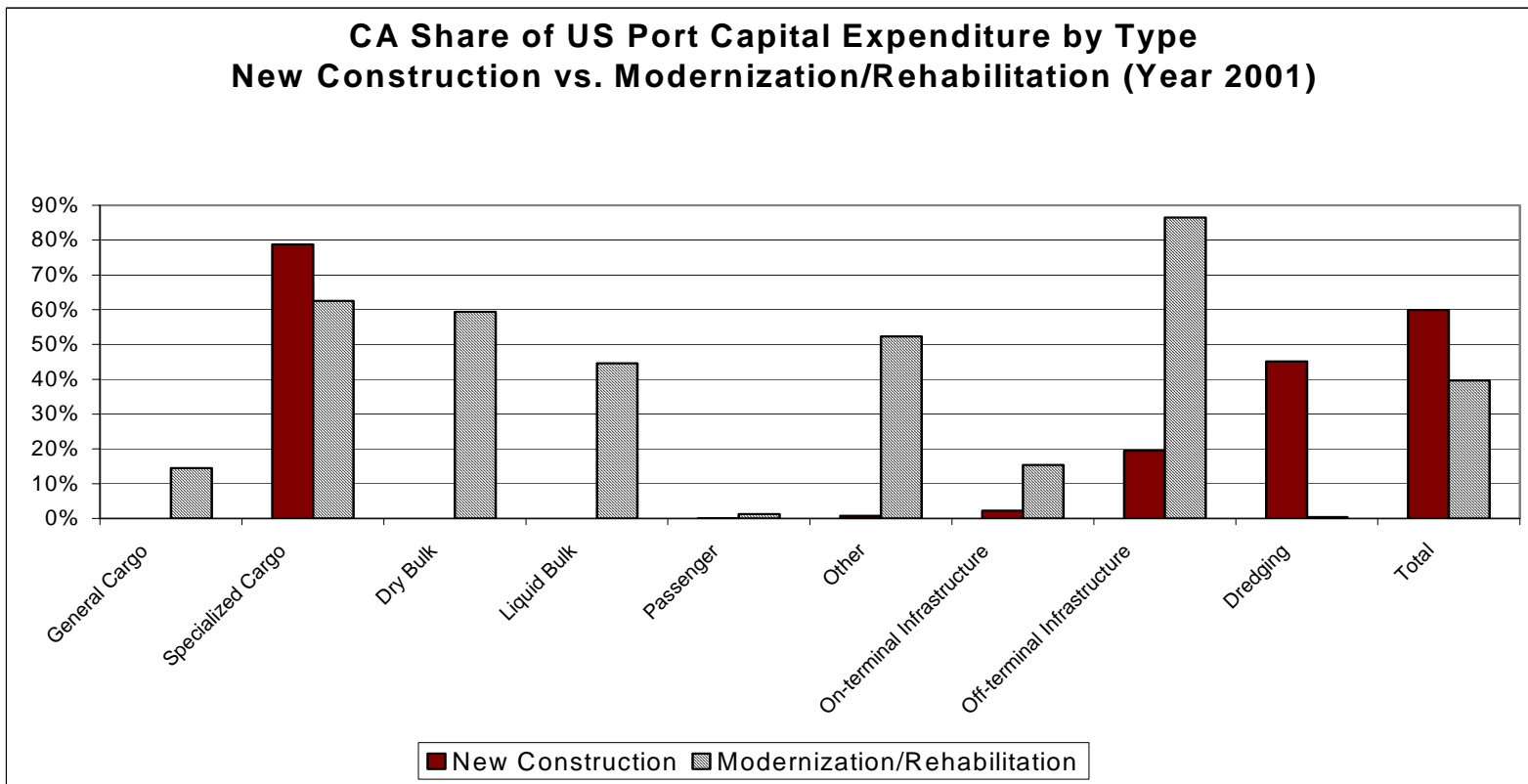


Figure 6-10: California’s Share of US Port Expenditures by Construction Type, 2001

Source: US Port Development Expenditure Report <http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

6.2.2 Proposed Capital Expenditure for California Public Port Development: Total US vs. CA 2002-2006

California also leads for planned investments with proposed spending of \$3 billion for the five-year period 2002-2006, which constitutes 28.6% of the proposed investment by all US ports.

Proposed Port Development Expenditure 2002-2006

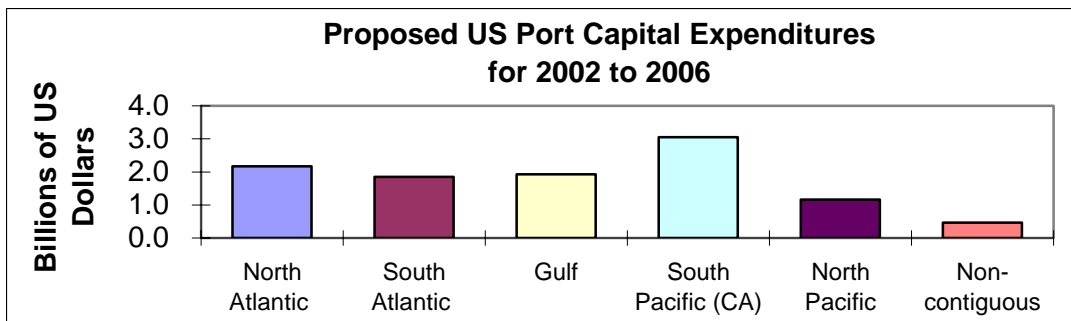


Figure 6-11: Proposed US Port Construction Expenditures, 2002-2006

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

Figure 6-12 lists the top ten ports in the US in terms of future capital expenditure. Among them, three are located in California. More than \$1.5 billion and more than \$1 billion are proposed to be spent on the development of Long Beach and Los Angeles ports respectively, in the period of 2002 to 2006. In addition, the Port of Oakland anticipates \$0.44 billion in capital expenditures.

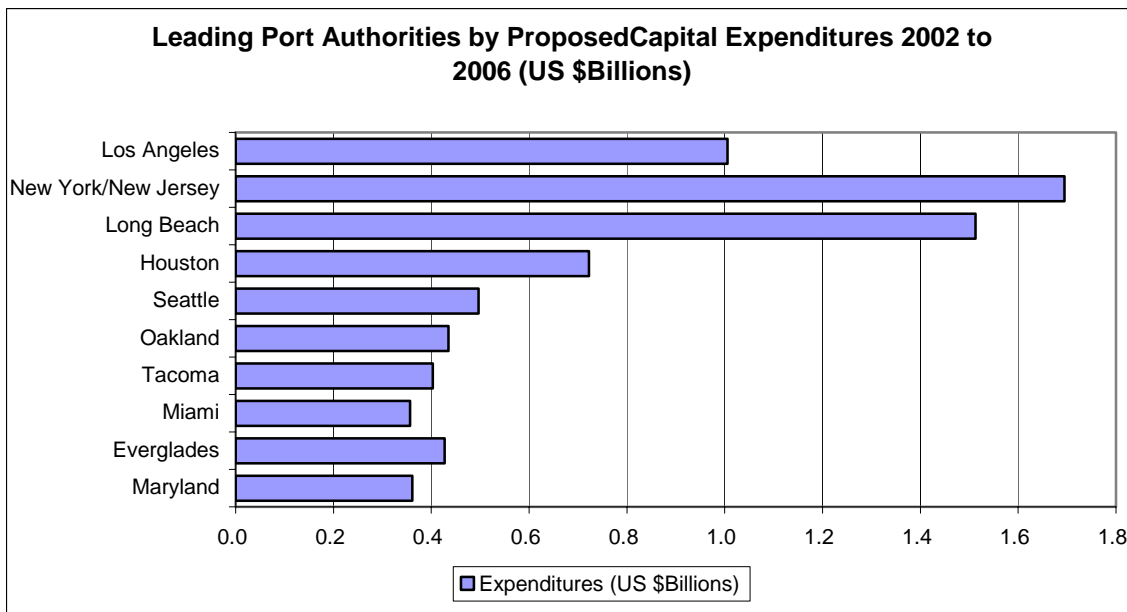


Figure 6-12: Leading Port Authorities by Proposed Expenditures, 2002-2006

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

Proposed Expenditure by Facility Type 2002-2006

California is expected to account for 39.2% of the proposed expenditures in specialized cargo with proposed spending of \$1.9 billion for the five-year period. California will also make significant investments in off-terminal infrastructure, such as underground traffic corridors to warehouses and other essential facilities that are more efficiently located away from the port terminal. Figures 6-13 and 6-14 exhibit the trends in detail.

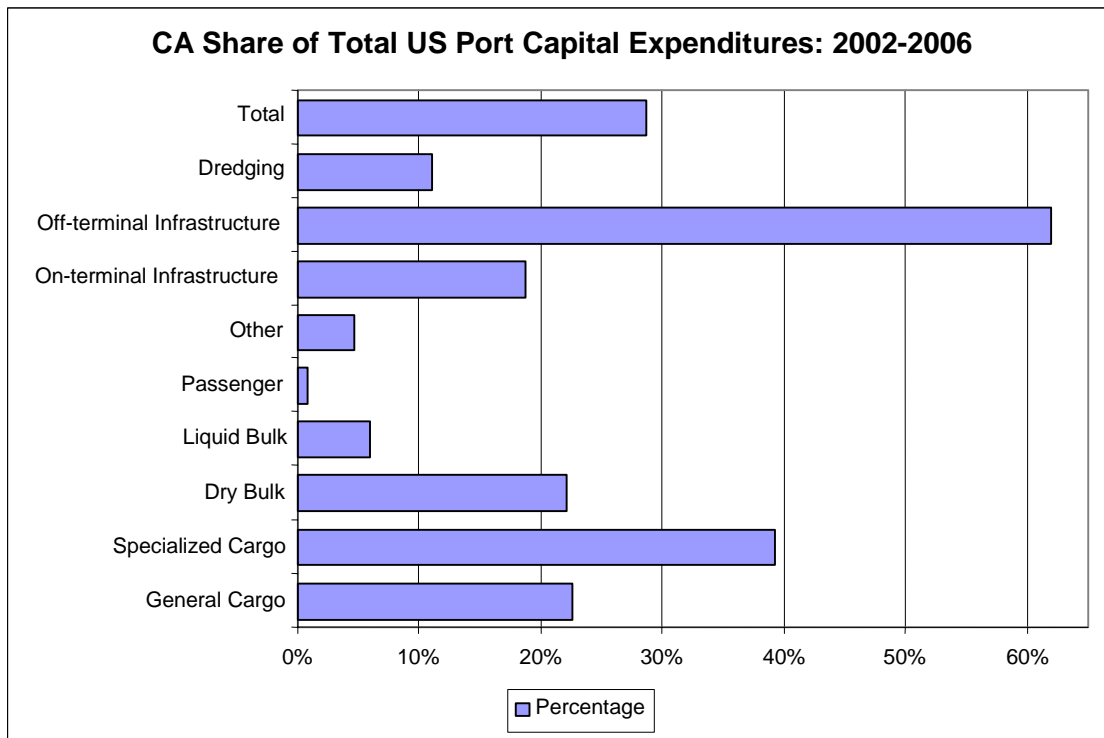


Figure 6-13: California’s Share of US Port Construction Expenditures, 2002-2006

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

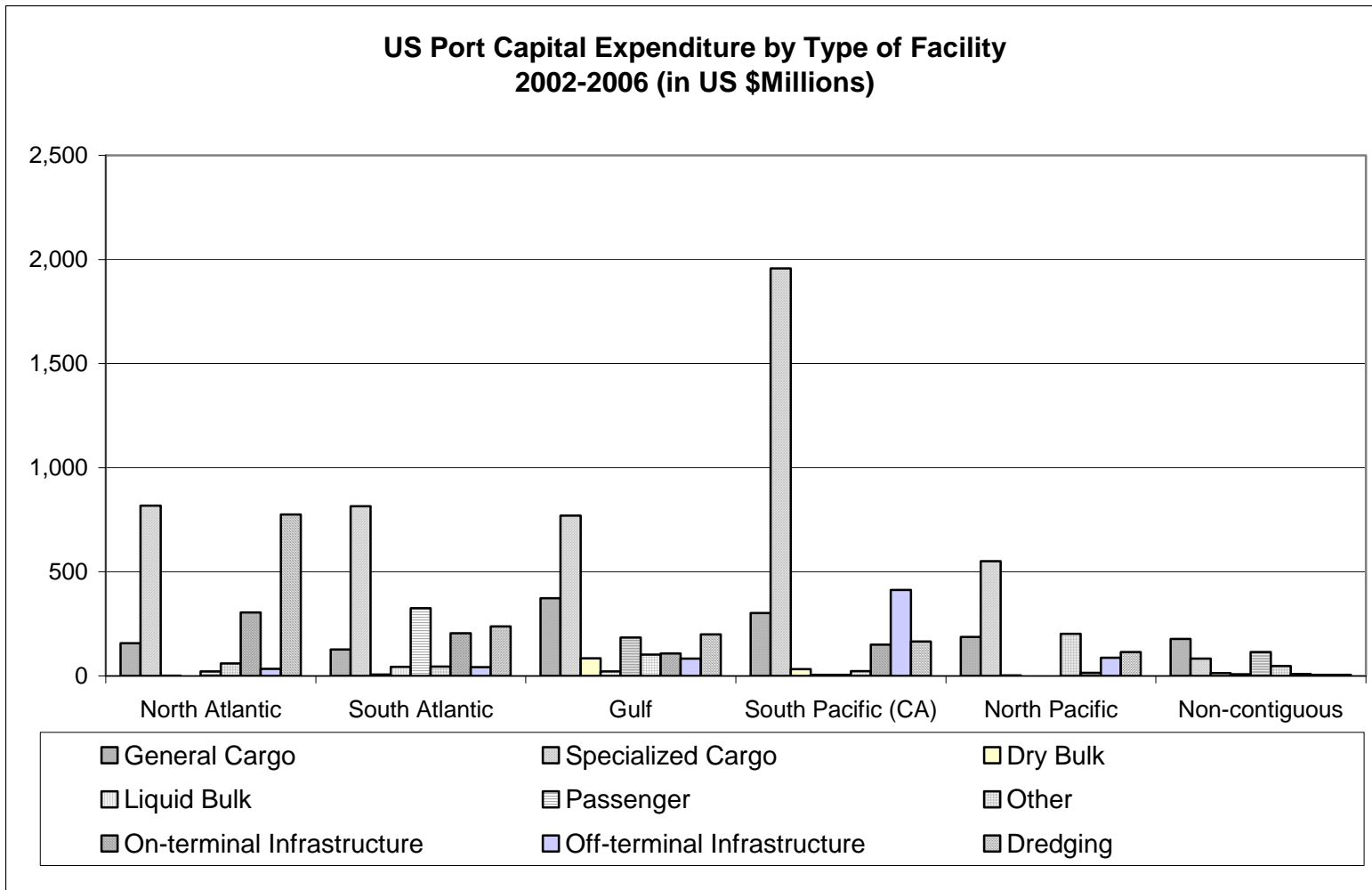


Figure 6-14: US Port Construction Expenditures by Type of Facility, 2002-2006

Source: US Port Development Expenditure Report <http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

6.2.3 Funding Resources for Port Development

Figures 6-15 and 6-16 show California’s past and future projections for income generation using various types of financing vehicles relative to other US ports. For example, in 2001, California’s offerings represented just under 85% of the revenue bonds issued by other US ports for port construction. California ports are among the most active issuers of revenue bonds.

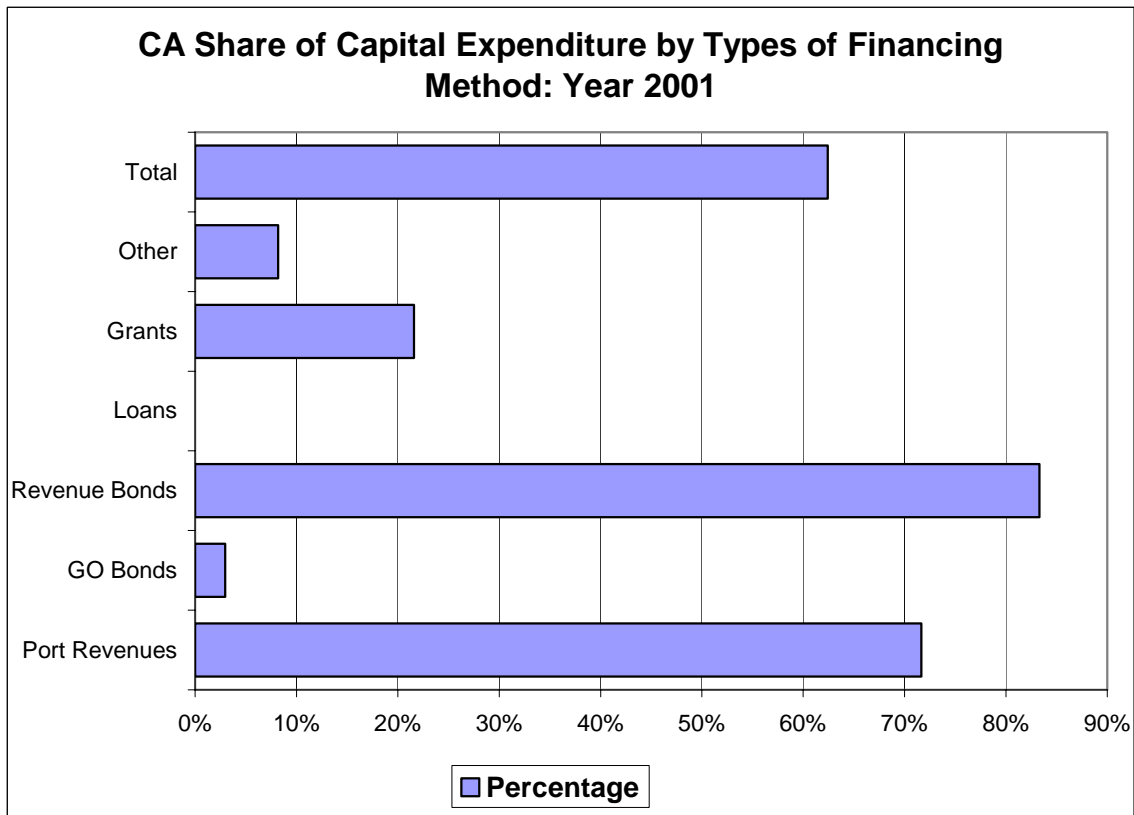


Figure 6-15: California’s Share of Port Expenditures by Types of Financing, 2001

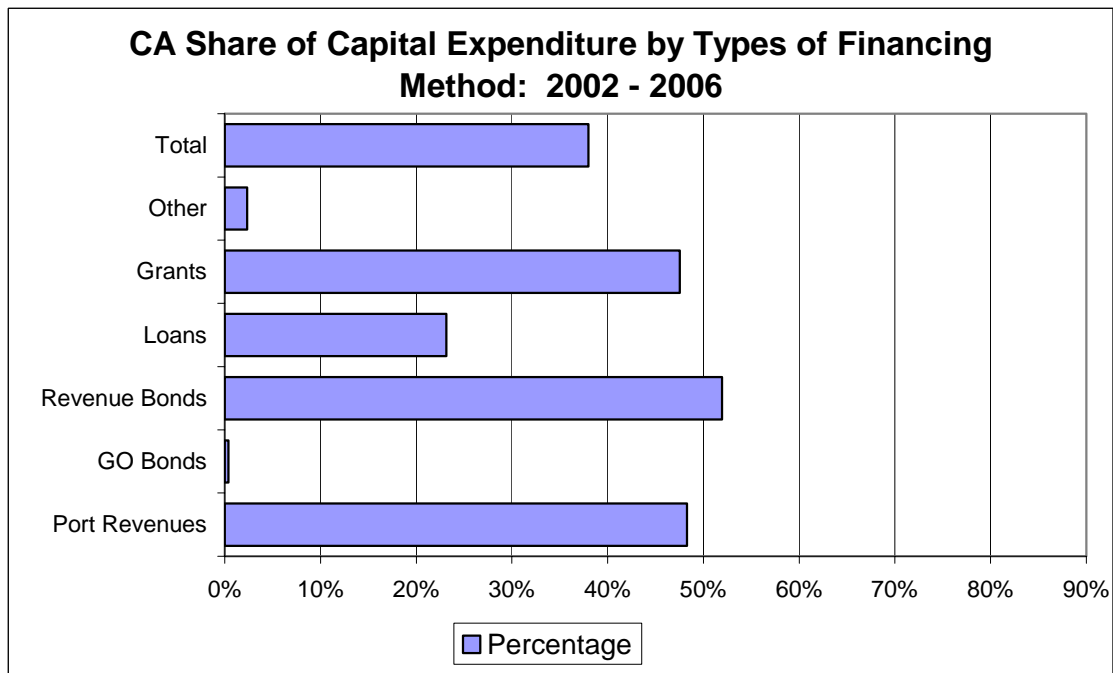


Figure 6-16: California’s Share of Port Expenditures by Types of Financing, 2002-2006

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

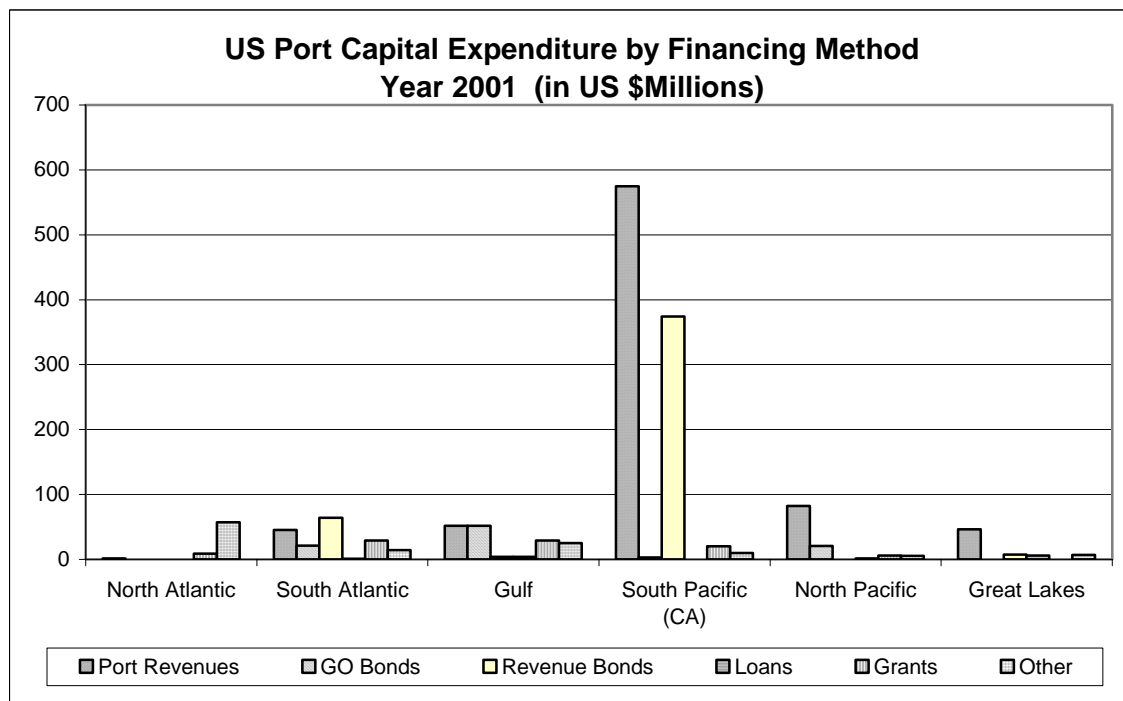


Figure 6-17: US Port Expenditures by Financing Methods, 2001

Source: US Port Development Expenditure Report

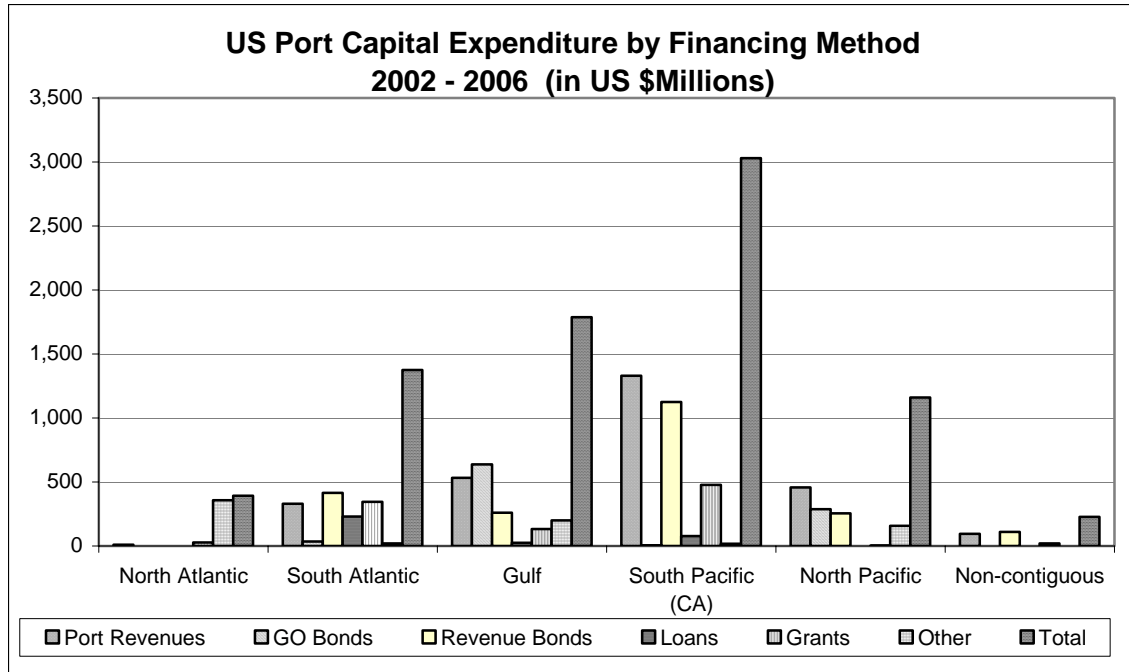


Figure 6-18: US Port Expenditures by Financing Methods, 2002-2006

Source: US Port Development Expenditure Report

<http://www.marad.dot.gov/publications/PDF/Exp2001rpt.pdf>

In 2001, California was the principal user of port revenue for development with \$574.7 million. California’s port revenues expenditures accounted for 71.6% of the all port investment from revenue for the nation. It was also the major user of revenue bonds with \$374 million, or 83.3% of the national total. California also captured 21.4% of grants, far more than any other region, worth \$20.1 million.

Looking ahead, California will remain the primary user of port revenue with \$1.3 billion from 2002 to 2006. Over half of the proposed issuance of revenue bonds by all ports will be issued by California ports with \$1.1 billion worth. Nearly half of all loans taken out by US ports, \$477.8 million, will be spent on the development of California ports.

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6.2.4 Economic Impact

The following table shows 1990 and 2000 economic indicators by region for the Marine Construction sector in California.

Table 6-3: Direct Regional Economic Impact of Marine Construction, 1990 and 2000

Region	1990			2000		
	Employment	Wages (\$Million)	GSP (\$Million)	Employment	Wages (\$Million)	GSP (\$Million)
North	384	\$20.00	\$37.77	62	\$1.50	\$2.81
North Central	4,429	\$231.84	\$437.87	2,446	\$139.10	\$261.50
Central	979	\$54.37	\$102.68	167	\$8.00	\$15.05
South Central	2,158	\$82.94	\$156.64	661	\$30.77	\$57.85
South	7,581	\$413.06	\$780.13	4,907	\$245.93	\$462.33
Total	15,531	\$802.20	\$1,515.10	8,243	\$425.31	\$799.54

Source: BLS

Regionally, the Southern part of California, with the Ports of Long Beach and Los Angeles, represents a major portion of the value of the Marine Construction sector in the state. The urban area of North Central is the other major source of value, with the range of activities associated with San Francisco Bay and the Delta.

Table 6-3 shows the results of economic activity directly related to the ocean, but this direct economic activity generates additional economic activity as employees spend salaries and ocean-related firms purchase inputs from other California firms. These indirect and induced, or multiplier effects, must also be accounted for. Estimates of these effects are shown in the following tables. The estimates were derived by a detailed analysis of the Ocean Economy industries in each of the coastal regions using IMPLAN, a standard and widely used economic impact model.

Table 6-4 shows the estimated impact on regional total wages, income and employment brought about by Marine Construction sector from the IMPLAN Model.

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Table 6-4: 2000 Employment, Wages and GSP: Impact of Marine Construction Industry from IMPLAN Model

Region	Direct Employment	Indirect and Induced Employment	Total Employment	Multiplier
North	62	50	112	1.8
North Central	2,446	2,201	4,647	1.9
Central	167	134	301	1.8
South Central	661	595	1,256	1.9
South	4,907	4,907	9,814	2
Total	8,243	7,419	15,662	1.9
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	\$1,495,567	\$1,046,897	\$2,542,464	1.7
North Central	\$139,103,215	\$139,103,215	\$278,206,430	2
Central	\$8,004,930	\$6,403,944	\$14,408,874	1.8
South Central	\$30,772,559	\$21,540,791	\$52,313,350	1.7
South	\$245,933,772	\$295,120,526	\$541,054,298	2.2
Total	\$425,310,043	\$425,310,043	\$850,620,086	2
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	\$2,811,516	\$1,968,061	\$4,779,577	1.7
North Central	\$261,500,123	\$261,500,123	\$523,000,246	2
Central	\$15,048,467	\$12,038,774	\$27,087,241	1.8
South Central	\$57,849,332	\$40,494,532	\$98,343,864	1.7
South	\$462,330,880	\$554,797,056	\$1,017,127,936	2.2
Total	\$799,540,318	\$799,540,318	\$1,599,080,636	2

Source: BLS

The total effect of the marine construction industry on California income is estimated as \$609.1 million. This industry provides employment (direct and indirect) to 5,452 workers.

6.3 Beach Nourishment³⁹

In California, both intense use of coastal resources and near-shore development have significantly impacted the state's beaches. Some beaches naturally erode, but many public beaches erode due to human activities that affect sediment supply. Dams, construction of harbor structures, coastal armoring, and offshore sand and gravel mining are among the human activities that impact sediment supply to beaches.

The loss of public beaches will continue without beach restoration efforts. Environmentally, beach nourishment preserves both certain animal species and threatened plants by restoring and enhancing habitat. It also provides public safety benefits to residents and visitors by providing safer access to the water, especially for recreational swimmers and surfers.

In 2000, a study of the economic benefit of specific beach projects across California was released by the Department of Boating and Waterways and the State Coastal Conservancy. A survey was conducted to collect information in the following categories:

- attendance numbers and corresponding methodology used to estimate;
- characteristics and duration of trips;
- recreational activities and amenities involved in trips;
- assessment of coastal protection and estimate of erosion and damages;
- assessment of public infrastructure threatened and likelihood of damages.

A summary of the costs and benefits estimated for a number of beach projects in California by the California Department of Boating and Waterways is shown in Table 6-5. The data indicate that there is substantial variation in the benefits and costs of such projects, but that benefits based on the basis of beach visits and visitor expenditures often substantially exceed costs.

³⁹. The process of replenishing a beach by artificial means; e.g., by the depositions of dredged materials, also called beach replenishment or beach feeding. For this study, we also include additional activities for stabilization of beaches and natural beach systems.

Table 6-5: Benefit of Beach Restorations in California⁴⁰

Location	Conceptual Project	Cost	Net Benefit	Benefit/Cost Ratio
Venice Beach	Groin repair	\$2,000,000	\$130,270,670	65.14
Leo Carrillo State Beach	Retention structure/dune	\$170,000	\$8,310,900	48.89
Dockweiler Beach	Groin repair	\$1,350,000	\$42,520,220	31.50
Topanga Beach	Seawall	\$630,000	\$8,798,226	13.97
East Beach	Groin repair	\$1,500,000	\$17,379,719	11.59
Will Rogers Beach	Groin repair	\$3,900,000	\$43,060,455	11.04
Pierpont Beach	Groin repair	\$820,000	\$13,432,299	16.38
Hueneme Beach	Seawall	\$850,000	\$12,382,432	14.57
El Granda	Revetment	\$1,000,000	\$13,843,292	13.84
Beach Boulevard	Repair Rock toe	\$824,000	\$10,328,642	12.53
Carpinteria State Beach	Cobble berm	\$6,500,000	\$44,106,263	6.79
Pismo Beach	Nourishment/retention structure	\$4,000,000	\$26,059,465	6.51
San Buenaventura	Groin repair	\$3,800,000	\$14,945,698	3.93
Beach Access way	Revetment	\$50,000	\$187,382	3.75
El Capitan State Beach	Nourishment/retention	\$3,600,000	\$10,301,836	2.86
Ashby Interchange	Revetment	\$275,000	\$735,491	2.67
The Hook	Shore retention wall	\$2,000,000	\$4,896,221	2.45
Regugio State Beach	Nourishment/retention	\$2,600,000	\$5,518,840	2.12
Coyote Point	Nourishment/retention	\$5,500,000	\$8,579,945	1.56
Twin Lakes Beach	Seawall	\$5,000,000	\$7,632,443	1.53
Surfers Point	Cobble berm/retention	\$7,700,000	\$10,820,353	1.41
Carlsbad State Beach	Nourishment	\$21,000,000	\$28,516,254	1.36
Hobson	Nourishment/retention	\$12,300,000	\$12,752,134	1.04
La Conchita	Nourishment/retention	\$12,300,000	\$12,608,042	1.03
Dan Blocker Beach	Nourishment/retention	\$5,700,000	\$5,748,354	1.01
Leadbetter Beach	Seawall	\$2,360,000	\$1,474,537	0.62
Isla Vista	Nourishment/retention	\$13,700,000	\$6,781,239	0.49
Cayucos Beach	Seawall	\$820,000	\$372,877	0.45

Source: California Beach Restoration Study, Department of Boating and Waterway

6.3.1 Funding Sources

In 1999, the Public Beach Restoration Program (PBRP) was created under the administration of the Department of Boating and Waterway. The program was motivated by the loss of public beaches due to man's activities in upland watersheds and along the shoreline. The following table lists the projects and funding for the program, which was funded for \$10 million in grants for fiscal year 2000-2001.

⁴⁰ Definitions to help understand chart: groins and jetties are walls built perpendicular to the shoreline. They are designed to trap sand that is moving along the shore due to the long shore current. A groin usually extends to the end of the surf zone while a jetty extends further into an inlet to stabilize a navigation channel. The construction of both groins and jetties severely affects the flow of sand moved by the long shore currents.

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Table 6-6: Funding for California Beach Restoration Projects

Recipient	Project	Funding
City of San Francisco	Nourishment at Ocean Beach	\$1,000,000
BEACON	Nourishment at Goleta County Beach	\$650,000
City of Port Hueneme	Dune restoration and vegetation at city beach park	\$129,500
Surfside-Sunset Project	Nourishment at Surfside-Sunset feeder beach	\$3,850,000
SANDAG Regional Beach Restoration Project	Nourishment at 12 beaches in San Diego County	\$1,236,500
Cities and Individual projects	Feasibility study of beach nourishment alternatives at various beaches	Approx. \$3,134,000

Source: California Beach Restoration Study, Department of Boating and Waterway

The funding allocation for the above projects is exhibited in Table 6.7 below.

Table 6-7: Total Beach Restoration Funding by Category

Project Category	Number of Projects	Total Funding (00-01)	Percentage of Program Budget
Beach Nourishment and Restoration	5	\$6,866,000	69%
Corps of Engineers Projects	9	\$2,594,000	26%
Research and Other Studies	2	\$540,000	5%
Total	16	\$10,000,000	100%

6.4 References

US Army Corps of Engineers <<http://www.usace.army.mil/>>.

CA Department of Boating and Waterway: *California Beach Restoration Study* <http://dbw.ca.gov/PDF/BeachReport/Ch4_Nourishment.pdf>. <http://dbw.ca.gov/PDF/BeachReport/Ch2_Setting.pdf>.

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Chapter 7: California Ship & Boat Building

Table 7-1 Summary of California Ship & Boat Building and Repair Industry in 2000

Industry	Employment	Wages	GSP
Boat Building & Repair	4,033	\$126,378,329	\$165,028,160
Ship Building & Repair	6,523	\$251,264,488	\$328,107,805
Total	10,557	\$377,642,817	\$493,135,966

Table 7-2 Summary of Ship and Boat Building & Repair with Multipliers for 2000

Indicator	Direct	Indirect & Induced	Total	Multiplier
Employment	10,557	8,639	19,196	1.8
Wages	\$377,642,817	\$308,890,473	\$686,533,290	1.8
GSP	\$493,135,966	\$403,357,340	\$896,493,306	1.8

Table 7-3: Changes in Direct Economy of California Ship & Boat Building and Repair 1990-2000

Industry	Employment		Wages (millions)		GSP (millions)	
	1990	Change in 2000	1990	Change in 2000	1990	Change in 2000
Boat Building and Repair	3,256	777	\$97.71	\$28.67	\$116.68	\$48.34
Ship Building and Repair	22,593	-16,070	\$975.73	-\$724.46	\$1,165.27	-\$837.16
Total	25,849	-15,292	\$1,073.43	-\$695.79	\$1,281.95	-\$788.81

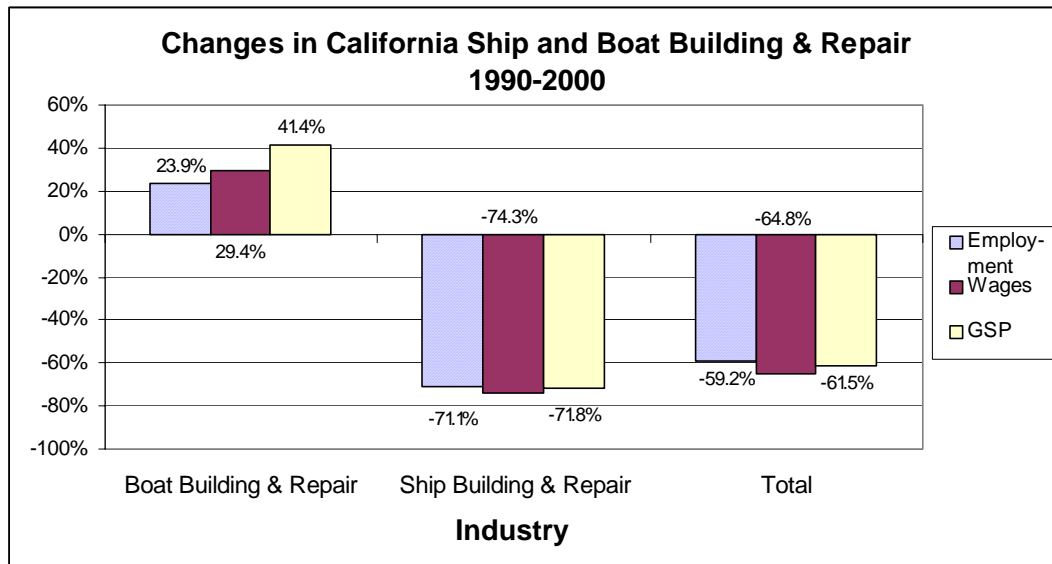


Figure 7-1: Change in Ship & Boat Building and Repair from 1990 to 2000

7.1 Ship & Boat Building and Repair: Description of the Sector

The shipbuilding and repair industry builds and repairs ships, barges and other large vessels, whether self-propelled or towed by other craft. This industry also includes the conversion and alteration of ships and a portion of the manufacture of offshore oil and gas drilling and production platforms. The boat building and repair industry is engaged in the manufacturing and repairing of smaller non-ocean going vessels primarily used for recreation, fishing, and personal transport

Unlike most other industries, only a small number of orders for large ships are received each year, and these often take years to fill. The orders for shipbuilding and repairs are primarily placed by large shipping, passenger and cruise, ferry, petrochemical, commercial fishing, and towing and tugboat companies, or the federal government. The principal federal government agencies placing ship building and repair orders include the Naval Sea System Command, the Military Sealift Command, the Army Corps of Engineers, the US Coast Guard, the National Oceanic and Atmospheric Administration, the National Science Foundation and the Maritime Administration. The boat building and repair industry is almost entirely privately owned and is characterized by a very large number of buyers with varied tastes and a larger number of producers with varied product ranges.

The US ship building and repair industry is primarily devoted to building ships for the US Navy and a small number of commercial shipping companies. The industry reached its peak output in the mid-1970s, when it held a significant portion of the international commercial market while maintaining its ability to supply military orders. Since then, new ship construction, the number of ship building and repair yards, and overall industry employment have decreased sharply, particularly since the end of the major naval buildup of the 1980's. This decline came on top of a severe drop in the construction of new vessels, which fell from about 77 ships (1,000 gross tons or more) per year in the mid-1970s to only about eight ships through the late 1980s and 1990s. Smaller shipyards have been able to keep much of their mainly commercial market share, since these shipyards build vessels used on the inland and coastal waterways, which, by law, must be built in the US.

7.2 Ship & Boat Building in California

California was a major ship builder during World War II, when the Richmond and other shipyards were flourishing.⁴¹ The ship building industry in California is heavily dependent on the federal government as its primary market. The Navy's new ship procurement has declined since the accelerated Navy ship construction in the 1980s. First tier shipyards may face the possibility of closure. The General Dynamics National Steel and Shipbuilding Co. (NASSCO) in San Diego CA is the biggest private shipyard on the West coast and employed more than 3000 people in 2000. Over the last four decades, NASSCO has delivered over 100 ships to the world's fleets -- 53 ships to commercial customers, becoming America's leading commercial shipbuilder during that period; and 53 auxiliary and support ships for the US Navy. These have included oil tankers, ferries, containerships, and oceanographic

⁴¹ Comments by G. Pontecorvo for review of this document.

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research ships for commercial customers; and hospital ships, fast combat support ships, tank landing ships, and roll-on/roll-off ships for the US Navy. NASSCO as of 2000, had contracts to build six commercial ships and three Navy ships. Because of its location, expertise and full-service capabilities, the Navy relies on NASSCO as a repair facility for its Pacific Fleet ships. The company also performs maintenance and repair for commercial operators⁴². Since California has a large ship building capacity, changes in national policies that might drive increased shipbuilding for the Navy could have a positive influence on California's economy.

The Boat Building and Repair industry in California includes a large number of products, manufacturers and dealers. Table 7-4 gives the 1990 direct estimates for this industry.

Table 7-4: Direct Employment, Wages, and GSP for Ship and Boat Building and Repair Industry 1990

	SIC4 Name	Employment 1990	Wages 1990	GSP 1990
California	Boat Building & Repair	3,256	\$97,705,470	\$116,684,864
	Ship Building & Repair	22,593	\$975,728,866	\$1,165,265,257
	TOTAL	25,849	\$1,073,434,336	\$1,281,950,121

Comparisons drawn in Table 7-3 and Figure 7-1 clearly reflect the difficulties in the industry in the last decade. The major decline has come from the shipbuilding industry, while the Boat Building and Repair industry has remained stable. The Ship Building and Repair industry employed more than 22,500 people in 1990, but that number declined to less than 6,500 in 2000. The employment in the Boat Building and Repair industry remained relatively constant at approximately 2,700. The sharp decline in the Ship Building and Repair industry also led to a significant drop in wages; they declined from around \$800 million in 1990 to around \$331 million in 2000 in constant 2000 dollars. Similarly the industry's contribution to GSP also contracted to less than half of its value: from \$958 million in 1990 to around \$433 million.

⁴² <http://www.nassco.com/>

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Table 7-5: Total Regional Employment, Wages, and GSP for CA. Shipbuilding and Repair Industry for 2000

Region	Employment	Indirect Employment	Total Employment	Multiplier
North	D	D	D	1.7
North Central	1,056	782	1,838	1.6
Central	73	50	122	1.5
South Central	D	D	D	1.6
South	7,907	6,563	14,470	1.7
Total	9,036	7,394	16,430	1.7
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Multiplier
North	D	D	D	1.6
North Central	\$40,835,602	\$30,218,345	\$71,053,947	1.7
Central	\$2,154,988	\$1,465,392	\$3,620,380	1.7
South Central	D	D	D	2.0
South	\$288,651,239	\$239,580,528	\$528,231,767	1.8
Total	\$331,641,829	\$271,264,266	\$602,906,095	1.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	Multiplier
North	D	D	D	1.6
North Central	\$53,324,208	\$39,459,914	\$92,784,121	1.7
Central	\$2,814,040	\$1,913,547	\$4,727,588	1.7
South Central	D	D	D	2.0
South	\$376,928,412	\$312,850,582	\$689,778,995	1.8
Total	\$433,066,660	\$354,224,043	\$787,290,704	1.8

7.3 References

CA Employment Development Department
<http://www.calmis.ca.gov/>

CA Department of Boating and Waterway
http://dbw.ca.gov/PDF/BeachReport/Ch4_Nourishment.pdf

Maritime Administration, US Department of Transportation
<<http://www.marad.dot.gov/publications/index.html>>.

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<<http://www.nassco.com/>>.

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<<http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm>>.

California Research Bureau 1994 Report: Economic Assessment of Ocean-Dependent Activities.

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Chapter 8 Coastal Tourism & Recreation

8.0 Estimated Economic Summaries of the California Coastal Tourism & Recreation Sector

Table 8-1: California Coastal Tourism & Recreation Direct Values 2000

Industry	Employment	Wages	GSP
Amusement and Recreation Services	17,783	\$410,474,527	\$688,823,549
Amusement and Recreation Services NEC	488	\$7,889,632	\$17,896,189
Boat Dealers	1,702	\$61,022,843	\$139,818,073
Eating and Drinking Places	216,533	\$3,207,978,118	\$7,350,252,717
Hotels and Lodging	70,489	\$1,612,618,217	\$3,657,929,867
Marinas	833	\$24,329,879	\$40,105,751
Sporting Goods Retailers	4,679	\$199,345,181	\$501,688,464
Zoos, Aquaria	906	\$21,317,910	\$30,085,003
Total	313,417	\$5,544,976,307	\$12,426,599,613

Source: BLS Quarterly Census using SIC code categories.

Table 8-2: California Coastal Tourism & Recreation Sector with Multipliers for 2000

Indicators	Direct	Indirect & Induced	Total	Multiplier
Employment	313,417	94,025	407,442	1.3
Wages	\$5,544,976,307	\$4,435,981,046	\$9,980,957,353	1.8
GSP	\$12,426,599,613	\$9,941,279,690	\$22,367,879,303	1.8

Source: BLS and IMPLAN

Table 8-3: Changes in California Coastal Tourism & Recreation Direct Values between 1990 and 2000

Industry	Employment		Wages (millions)		GSP (millions)	
	1990	Changes in 2000	1990	Changes in 2000	1990	Changes in 2000
Amusement and Recreation Services	16,908	875	\$375.85	\$34.62	\$648.71	\$40.11
Amusement and Recreation Services NEC	455	33	\$7.94	-\$0.05	\$17.38	\$0.52
Boat Dealers	1,473	229	\$42.08	\$18.94	\$92.00	\$47.81
Eating and Drinking Places	157,489	59,044	\$2,097.83	\$1,110.15	\$4,586.39	\$2,763.86
Hotels and Lodging	52,373	18,116	\$985.87	\$626.75	\$2,157.26	\$1,500.67
Marinas	724	109	\$19.97	\$4.36	\$32.76	\$7.34
Sporting Goods Retailers	1,807	2,872	\$53.88	\$145.47	\$128.99	\$372.70
Zoos and Aquaria	677	229	\$17.67	\$3.65	\$26.20	\$3.88
Total	231,910	81,507	\$3,601.08	\$1,943.89	\$7,689.70	\$4,736.90

Source: BLS Quarterly Census using SIC codes.

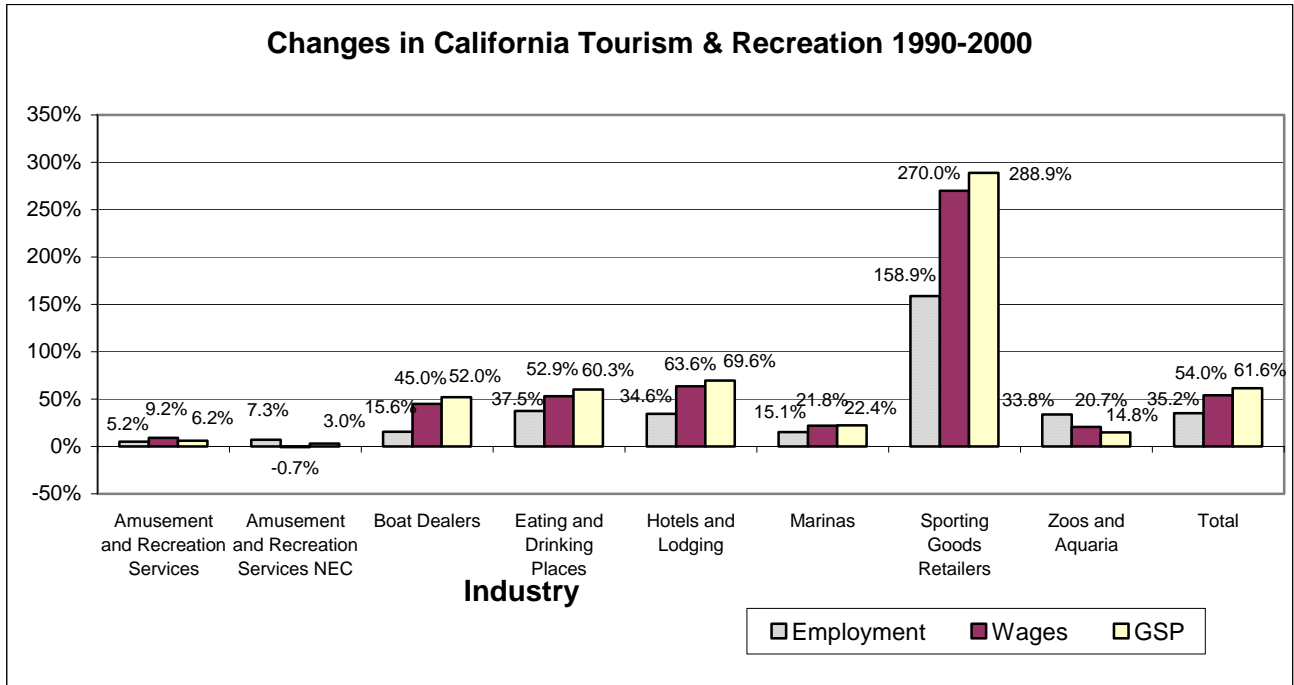


Figure 8-1: Changes in California Coastal Tourism & Recreation from 1990 to 2000
Source: BLS

8.1 California Coastal Tourism & Recreation: Scope, Scale and Definition

In this report, the “Coastal Tourism & Recreation” sector includes the full range of tourism, leisure, and recreational activities that take place in coastal areas and in offshore coastal waters. These include the hotel and restaurant industry, marinas, the coastal water sports industry, recreational boating harbors, recreational fishing facilities and stores, beaches, and retail businesses. We also include ecotourism and recreational activities such as recreational boating, swimming, recreational fishing, surfing, kayaking, diving and snorkeling. This chapter reveals estimates of the market and non-market use value of ocean related tourism and recreational activities in California. (See Appendix A, “Methodology” non-market section for more detail on the methodology used to derive market and non-market values.)

California is the number one travel destination in the US. The total California tourism industry annually generates more than \$75 billion in direct travel spending for the state economy, and supports more than 1 million jobs, which makes it the 3rd largest employer and 5th largest contributor to the state’s GSP⁴³. World famous sandy beaches and favorable weather conditions of Southern California make Coastal Tourism & Recreation an important component of California’s economy in general, and the overall tourism industry of the state in particular. Coastal Tourism & Recreation has been the fastest growing activity, both in

⁴³ *California Tourism’s Contribution to the California Economy: 1998-2002*, <http://www.gocalif.gov/state/tourism/tour_html>

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volume and diversity, along the coastal zone⁴⁴. As of 2000, it was one of the major growth engines not only for the coastal counties, but also for the entire state. Tourism and recreation-related economic activities are shaping development patterns in the coastal zone, which account for a major share of population and economic activities.⁴⁵ Coastal tourism also makes California's position competitive in international tourism as studies have shown that beaches are the leading international tourist destination.⁴⁶

Summary Tables 8-1, 8-2, and 8-3 show what a large influence California's Coastal Tourism & Recreation sector has had on the state. While its economic contribution was quite significant in 2000, its growth in the decade 1990-2000 was even more significant - far larger than any other Ocean Economy sector in California with a GSP increase of almost 62%, a wage increase of 55%, and an employment increase of more than 35%. In fact, its decadal growth kept the California Ocean Economy sector in positive numbers during that decade. Without Tourism & Recreation, there would have been a large net loss in all columns.

Understanding the role that California's ocean and coasts play in Tourism & Recreation, and estimating its value to the state is not a simple task. The NOEP has divided this chapter into three sections to untangle some of this complexity. First, we define coastal recreation and its scope and scale. This data is not captured in the market data, and so could be added with some degree of reliability. Within this section, the reader will find a brief paper estimating both market and non-market values for all of California's beaches, a number that is as high as \$5 billion a year, again measured in a different way and so cannot be added directly to the market data, but in many ways is added value to the estimated market totals. Second, travel spending is defined, described, and estimated for both California and the coast, since economic data for tourism is not easily separated, except by coastal counties. The travel spending data is actually included in the market data. Finally, we provide regional estimates of market values for employment, wages, and GSP to show geographic areas of largest and slowest sector growth between 1990-2000.

California Coastal Recreation - Definition and Measurement

Coastal recreation is undertaken by local residents, by residents of California who travel to the coast, and by residents of other states and countries. Recreation may impact the California economy by as much as spending at a luxury hotel in Santa Barbara or as little as a hot dog on the beach in Santa Monica. Data is not available for all expenditures by those who recreate along the California shore, but a comprehensive national survey undertaken in 2000 does measure the number of people and activity levels involved in California ocean recreation.⁴⁷ This data, combined with state data on use of key coastal recreation resources, provide a picture of the magnitude of coastal recreation resource use. This data is presented in the next part of this chapter.

Travel in California Coastal Counties - Definition, Description and Spending Estimates

⁴⁴ 1998 Year of the Ocean: Coastal Tourism and Recreation. http://www.yoto98.noaa.gov/yoto/meeting/tour_rec_316.html

⁴⁵ C. Cunningham, and Walker, K. 1996. "Enhancing Public Access to the Coast through the CZMA." *The Journal of Marine Education*, Volume 14, No.1. pp 8-11.

⁴⁶ J.R. Houston, 1996. "International Tourism and U.S. beaches". *Shore and Beach*.

⁴⁷ National Survey on Recreation and Environment, 2000.

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The travel economy is generally defined as activity associated with travel away from home. Travel may be undertaken for many purposes, including business, visiting friends and relatives, and for recreation. Trips may be single or multi-purpose. Travel to coastal counties in California may include coastal recreation or use of a coastal facility in whole or part. To get a sense of the entire travel industry affecting coastal California, we examined travel and tourism in the state as a whole and in the coastal counties. A portion of the economic value reported under travel and tourism is ocean related, but we do not know what that portion is precisely.

Regional Estimates of Economic Impact of California Tourism and Recreation

The NOEP team separated employment, wages, and contribution to GSP for those establishments located in shore-adjacent zip codes and defined this as ocean-related tourism and recreation. This is a smaller proportion of total travel activity in coastal counties, but it includes those activities most likely to be affected by ocean and coastal resources. It also includes the activities of both those who travel or spend money for recreation and for other purposes such as business.

The next sections of this chapter present data for each of these aspects of Tourism & Recreation in coastal California.

8.2 Coastal Recreational Activities

All economic activities relating to coastal recreation are affected by the quality of the environment. Coastal land, beaches, watersheds, and coastal waters each provide a link between the travel and tourism industry and coastal recreational industries such as swimming, surfing, boating and fishing. The level of participation in coastal water/nature-related industries affects several other industries and sectors of the economy. Increased demand for coastal recreation will result in increased demand for the hotel, restaurant, and service industry. This will also, indirectly, increase the construction activity along the coast as more hotels and vacation homes are built. For example, an increase in water-skiing will increase the manufacture and sale of boats used for these activities. Similarly, an improvement in a beach will lead to more beach visitors leading to increased beach-wear demand, which will lead to increased manufacturing and retailing business. Increased demand will also affect infrastructure construction activities. Roads, parking lots, water and waste water systems and the like will also be necessary. Therefore, it is important to define and measure the scale and scope of coastal recreational activities along the California coast before estimating market or non-market values for coastal tourism.

The National Survey of Recreation and Environment (NSRE) in 2000 was the first national survey that included an assessment of public participation in marine recreation. This survey defined nineteen activities as part of marine recreation. These nineteen activities can be divided into four major subgroups: beach activities, recreational fishing, recreational boating, and other marine recreational activities. Table 8-4 provides the estimates for California⁴⁸ for each of these subgroups. Figure 8-2 depicts the proportion of different marine recreational activities. The NRSE estimation method captures the number of California residents who

⁴⁸ Source NSRE 2000.

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participated in marine recreation activities anywhere in the US. We assumed that the number of California residents who participated in marine recreation in other states is likely to be smaller than the number of other states' residents who participated in marine recreation in California. Additionally, a significant number of foreign tourists visit California beaches.⁴⁹ Therefore, the NSRE numbers are likely to underestimate marine recreation participation in California.

Table 8-4: Measure of Participation in Marine Recreational Activities

Recreational Activity	Number of Participants
Beach Activities	14,789,653
Recreational Fishing	2,727,286
Recreational Boating	4,221,775
Other Marine Recreation	2,321,265

The numbers in Table 8-4 cannot be added together, because one person may have participated in more than one activity.

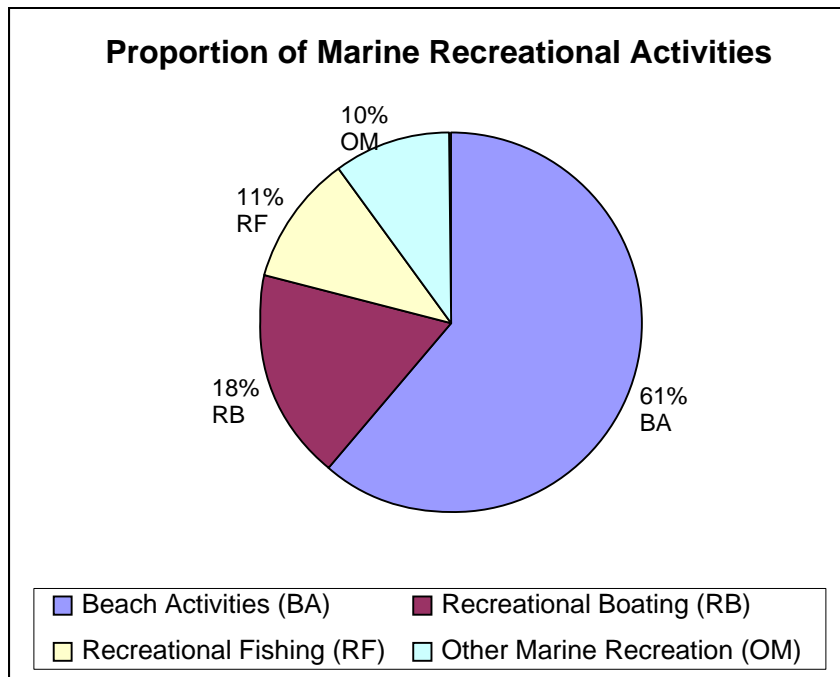


Figure 8-2: Proportion of Different Marine Recreational Activities

8.2.1 Beach Activities

Table 8-5 gives the estimates for the number of participants and number of activity days for different beach related recreational activities in California. More than 12 million people visited different beaches in California during the year 2000 and, on average, each person made slightly more than 12 trips per year. Beach visitation activity includes multiple recreational activities at a beach on a given day such as swimming, sunbathing, viewing

⁴⁹ More than 6.36 million foreign visitors came to California in 2000. California Fast Facts 2002.

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wildlife, or collecting seashells. So the beach visitation numbers should not be added to other activity numbers.

Table 8-5: Participation in Beach Related Recreational Activities

Recreational Activity	Number of Participants	Number of Days	Average Days Per Person
Visit Beaches	12,598,069	151,429,000	12.02
Swimming	8,398,997	94,573,000	11.26
Scuba Diving	288,023	1,383,000	4.80
Surfing	1,114,372	22,633,000	20.31
Wind Surfing	82,201	n/a	n/a
Snorkeling	706,998	3,818,000	5.40

Source: National Survey of Recreation and the Environment (NRSE) 2000, Preliminary Estimates from Versions 1-6: Coastal Recreation Participation, Table A-3

The average number of activity days per participant (participation rate) gives a measure of intensity of participation and it varies from activity to activity, being as low as 4.8 days for scuba diving and as high as 20 days for surfing. California accounts for approximately 35% of all surfers in the US in terms of the number of participants and 30% in terms of the number of surfing activity days⁵⁰ in the US.

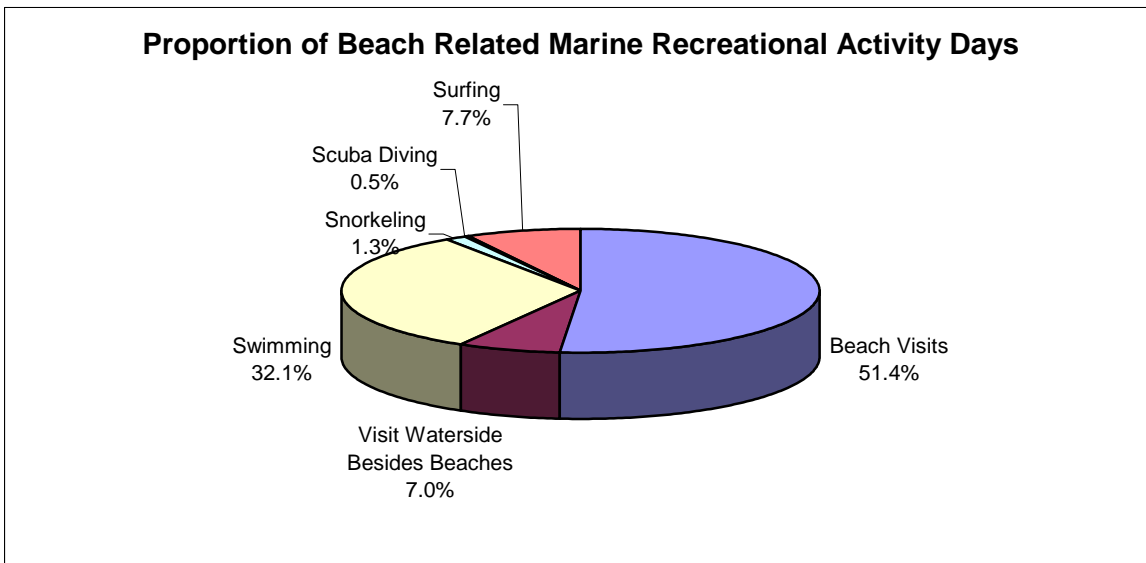


Figure 8-3: Proportion of Beach Related Marine Recreation Activity Days

⁵⁰ Hawaii pushes California to 2nd place in terms of number of activity days as it has a participation rate of 35.

8.2.2 California Beach Valuation: The Non-market Value of California Beaches⁵¹

Beach recreation is a cornerstone of the California coastal economy and even California culture. For at least four decades, Hollywood has carefully documented the California beach life. A more complete and accurate assessment of the number of actual beach users and the economic value of beach use, however, has only just begun. Nevertheless, the emerging picture of beach visitation and the potential value of market and non-market economic impacts of beach use in California corroborate the obvious importance of beach visitation for the California coastal economy.

The California Coastal Act protects access to public beaches throughout California. As a result, beaches are an important source of recreational open space for Californians with as many as 63.4% of all Californians making at least one visit to a California beach each year – 2.5 times the national average (California Department of Boating and Waterways, CDBW, 2002).

Day trips to beaches generate two distinct sources of economic value for the Coastal and Ocean Economy: market expenditures and non-market consumer surplus values. To begin, day visitors to beaches spend money locally on food, beverages, parking, and beach-related activities and rentals (e.g., body boards, umbrellas, etc.). These expenditures partially represent a transfer of expenditures that may have been made elsewhere in the state (e.g., gas and auto), but are largely expenditures that would not have been made in the absence of the beach trip. King (1999) estimated the fiscal impact of beaches in California and reported that in 1998, California's beaches generated \$14 billion dollars in direct revenue (King, 1999).⁵² In two other studies, the average expenditures per person per day trip (\$/trip/person) were estimated for visits to California beaches. A survey of beach goers in Southern California (Hanemann et al. 2002) found that per person per trip expenditures on beach related items and services were \$23.19 for beach goers that took at least one trip in the summer of 2000. In another study by King (California Department of Boating and Waterways 2002), average beach related expenditures (excluding gas and automobile costs) were \$29.66.

Visitors to beaches also place a value on beach visits above and beyond what they spend at the beach – the consumer surplus of beach visits. Unlike many marketed goods, access to the beach is largely free (aside from parking fees) in California. Because of the low cost of beach access and the importance of beach recreation to Californians, numerous studies have estimated the consumer surplus of beach going in California to better measure the true value of beaches and beach management in the state. Yet, no study has attempted to compile these values to find an estimate for the total non-market value of beaches in California. As we show below, the value of non-market beach uses is substantial and may even be within an order of magnitude of the market values of beach recreation. Failure to fully account for both the market and non-market values of beaches in California could lead to explicit and implicit benefit-cost assessments of beach policies that significantly undervalue beach recreation.

⁵¹ Linwood Pendleton, Judith Kildow, and S. Shivendu authored this section on beaches.

⁵² Direct Revenue is the direct expenditure from people making beach trips for items such as gas and parking, food and drinks from stores, restaurants, equipment rentals, beach sporting goods, beach related lodging and incidentals.

8.2.2.1 Methodology

The total non-market value of beaches in California was estimated using a two-step process. First, we estimated the total beach visitation activity days. This is the total number of days people spent on the beaches of California in one year. If a visitor went to the same beach or different California beaches ten times in one year then it was counted as ten beach visitation activity days. Second, we drew from the literature to find what we believed to be the most appropriate estimate of value for one day of beach visitation to find the total non-market value of beach visitation for California. The people who visit a beach on a given day may engage in multiple outdoor recreation activities. They swim, sunbath, walk, jog, view birds/wildlife, or just watch sunsets. Our estimates included beach visits for any recreational activity.

8.2.2.2 Estimating Total Beach Visitation Days

A number of different sources estimate beach visitation days for California. Philip King of the San Francisco State University estimates that as many as 378.5 million day trips were made to California beaches by Californians in 2001 (CDBW 2002, Chapter 3). Leeworthy (2001) uses data from the National Survey on Recreation and the Environment to estimate that 151,429,000 beach visits were made to California beaches in 2000. The United States Life Saving Association estimates that as many as 146 million visitor days were made to Southern California beaches alone (USLA 2002). In another study, Morton and Pendleton (2001) estimate that total beach attendance in Los Angeles and Orange County in 2000 exceeded 79 million visits. Morton and Pendleton's estimates, detailed in a report to the State Water Resources Control Board, are taken directly from lifeguard records.

Kildow and Shivendu (2001), use data from the US Environmental Protection Agency's BEACH Watch Program (EPA BEACH)⁵³ to estimate beach visitation in California. The authors estimate the attendance per mile of beach using US EPA's BEACH attendance estimates for four different regions of California, i.e., Northern California, North Central (San Francisco Bay area), Central California and Southern California and then extrapolate to get the estimates of attendance for those beaches for which only length is known. The EPA BEACH covers only 224 beaches, but the authors supplement the data with other sources including guidebooks and the Coastal Commission's Beach Access Guide. In all, the authors identify at least 417 California beaches (see Appendix D for a complete list of beaches) and estimate the attendance at these beaches to be 153.1 million activity days. The estimates of Kildow and Shivendu are in line with those of the NSRE (2000) estimates, the United States Lifeguard Agency (2002) data, and the estimates for beach attendance given by Morton and Pendleton (2001), but are significantly lower than those of King's estimates for the California Department of Boating and Waterways (2001).

8.2.2.3 Estimating the Value of a Day at the Beach

⁵³ This data collection has been discontinued because data methods were non-uniform.

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No attempt has been made to estimate the aggregate non-market value of beaches for large areas, in general, and for California in particular. Aggregating non-market values studies can be complicated if the studies examined estimate the value of different types of uses (e.g. surfing, swimming, or just sunbathing) and the value of uses at different seasons. Fortunately, most studies that have estimated non-market values for beach use in California have estimated the value of a general beach day, usually during the summer. Unfortunately, nearly all of the studies cited estimate values for Southern California beaches. As a result, the potential for extrapolation error in our estimates lies in the degree to which non-market beach values for Southern California beaches may not be representative of the values placed on beaches elsewhere in California. Nevertheless, because more than 85% of all beach visits in California are made to beaches in Los Angeles, Orange, and San Diego Counties, the sensitivity of our results to this geographical extrapolation error are likely to be relatively small.

Two primary methods have been used to value consumer surplus estimates: the travel cost method and the contingent valuation method. Chapman and Hanemann (2001) argue that to date contingent valuation estimates of California beach visits have been flawed and generate unreliable estimates of beach values, largely because the contingent valuation surveys often are not site specific and fail to account for varying travel costs to beaches around the state.

We employed travel cost estimates of consumer surplus for beach visits to estimate the value of visits to beaches, largely along the Central and Southern California coast. Table 8-6 provides estimates of consumer surplus values for visits to beaches in California. Consumer surplus estimates range from a low of \$10.98 (in 2001 dollars) for visits to Cabrillo Beach in Los Angeles County (Leeworthy and Wiley 1993) to a high of greater than \$70 (in 2001 dollars) per person per trip for visits to San Diego beaches (Lew 2002). In 1997, Michael Hanemann estimated the value of the consumer surplus of beach visits to Huntington Beach at \$15/visit (Hanemann 1997). Hanemann's estimate of beach-related consumer surplus was later discounted by ten percent and used as the basis for a jury award regarding lost beach recreation due to the American Trader oil spill (Chapman and Hanemann 2001).

Hanemann's conservative estimate of the value of a beach day (\$15) is used to find the total non-market value of beach days in all of California. Based on a conservative estimate of beach attendance of 150 million beach days annually, we estimate the non-market value of beach visits in California to be approximately \$2.25 billion dollars annually. (Using similar attendance figures and the expenditure results reported earlier, we estimate that beach-related expenditures, i.e. the market value of beach going, would be \$3.75 billion.)

Table 8-6: Estimates of the Consumer Surplus Value of Beach Visits in Southern California

Consumer Surplus/Trip	US\$(1990)	US\$ (2000)
Cabrillo-Long Beach ¹	\$8.16	\$10.98
Santa Monica ¹	\$18.36	\$24.71
Pismo State Beach ²	\$26.20	\$35.26
Leo Carillo State Beach ¹	\$51.94	\$69.91
San Onofre State Beach ²	\$57.31	\$77.14
San Diego ²	\$60.79	\$81.82

Source: Environmental Damages in Court: The American Trader Case, published in The Law and Economics of the Environment, 2001, Anthony Heyes, Editor, pp. 319-367. The data are extracted from 1) Leeworthy and Wiley (1993) and 2) Leeworthy (1995).

Consumer Surplus/Day	US\$ (2001)			
Individual Surplus/Day	Carpinteria	Encinitas	San Clemente	Solana Beach
Method 1	\$20.48	\$18.84	\$25.70	\$14.58
Method 2	\$24.43	\$22.17	\$30.58	\$17.35

Source: Philip King, The Economic Analysis of Beach Spending and the Recreational Benefits of Beaches in the City of San Clemente, 2001. Note: Method 1 - dependent variable is a discrete random variable, Consumer Surplus (CS) calculated as the sum of a series of rectangles, each one day wide, touching the demand curve at its upper right corner. Method 2 - CS calculated as the sum of a rectangle for the area under the curve between zero and one, and the definite integral for the area between one and the average number of trips.

Total Value of Beach Trip (San Diego)	US\$(2002)			
Statistic	Two-step Heckman	Two-step HFS	Joint Heckman	Joint HFS
Mean	\$71.43	\$74.86	\$43.97	\$33.70
Median	\$74.03	\$77.33	\$46.31	\$36.13
Standard Deviation	\$10.57	\$10.79	\$9.70	\$9.77

Source: Dissertation by Daniel Kevin Lew, 2002, University of California Davis. Valuing Recreation, Time, and Water Quality Improvements Using Non-Market Valuation: An Application to San Diego Beaches.

8.2.2.4 Value of California's Beaches

Beach going is more than just an idle past time in California. Beach going represents a major economic use of the California coast and ocean. Concession stands, paid parking lots, and waterfront restaurants reveal that beach goers contribute to a thriving coastal market economy. In fact, we estimate that market expenditures by beach goers in California could substantially exceed \$3 billion. Less obvious, however, is the economic magnitude of beach values that never enter the market. Beaches in California represent a recreational and open space resource that provides a level of public access rarely matched elsewhere in the US. Thanks in part to the protection afforded by the California Coastal Act, beaches in California continue to produce non-market economic benefits that are on the order of \$2 billion or more. These values are real and affect a beach-going public that includes more than half of all Californians. Combined, the total value of beach going, including market and non-market values, may exceed \$5 billion annually.

8.2.3 Recreational Fishing and Boating

Table 8-7 gives the estimates for recreational fishing and boating activities. In 2000, more than 2.7 million fishers participated in more than 20.3 million recreational fishing activity days along the California coast, while more than 4 million people participated in marine boating related activities. Participation rates in different boating related activities varied in a narrow band around 6 days. California had the largest number of marine fishers and sailors, while it was ranked second, behind Florida, in motor boating in the US. The proportions of different boating and fishing related activities are given in Figure 8-4.

Table 8-7: Participation in Recreational Fishing and Boating Activities

Recreational Activity	Number of Participants	Number of Days	Average Days Per Person
Recreational Fishing	2,727,286	20,318,000	7.45
Motorboating	1,549,289	11,589,000	7.48
Sailing	1,087,755	6,755,000	6.21
Personal Watercraft	680,309	2,925,000	4.30
Canoeing	190,948	n/a	
Kayaking	433,209	n/a	
Rowing	280,265	n/a	
Total for Recreational Boating	4,221,775		6.41

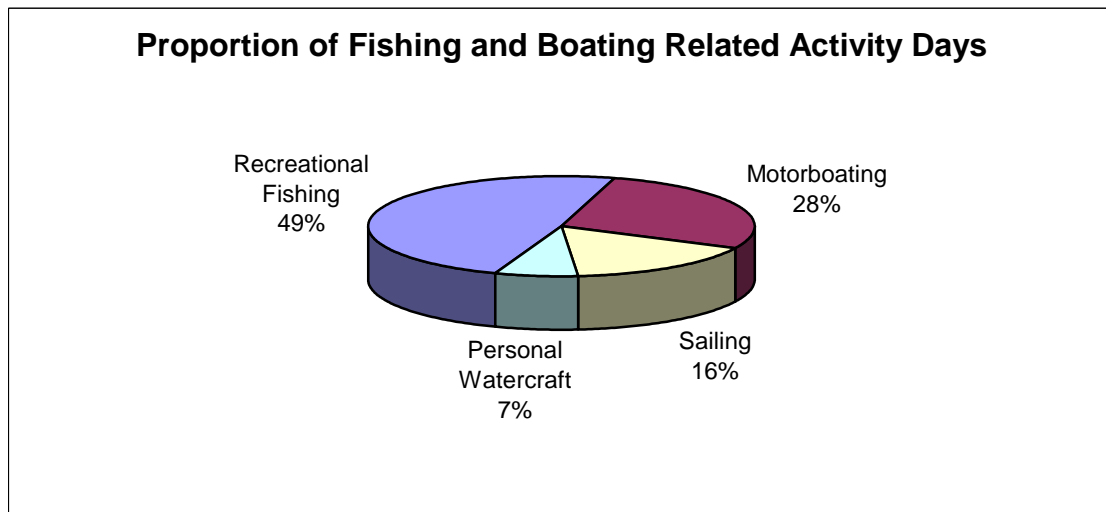


Figure 8-4: Fishing and Boating Related Activity Days

8.2.4 Marinas

In 2000 marinas accounted for a substantial economic activity in marine recreation in California, especially in Central and Southern California. Table 8-8 and Table 8-9 give the marina recreators’ characteristics and use pattern.

Table 8-8: Marina Recreators' Characteristics by Use

Visitor Characteristics	Day Users	Overnight Users
Total trips using boat	36.16	36.08
Nights away from home	0	2.52
Days use boat	1	2.68
People on boat	3.79	3.88

Table 8-9: Marina Recreators' Characteristics by Boat Length Segment

Visitor Characteristics	20' and smaller	21' - 30'	31' and larger
Total trips using boat	49.72	28.14	43
Nights away from home	1.17	1.47	2.27
Days use boat	1.73	1.98	2.59
People on boat	3.36	3.87	4.44

8.2.5 State parks and recreational areas along the coast

Table 8-10 provides the attendance estimates of the national parks and state parks along the coast, including the state beaches. Santa Monica State Beach attracts more than 7.3 million visitors per year, while Golden Gate National Recreation Area accounts for more than 13.4 million visitors. The total attendance exceeds 40 million visitor days or activity days per year, which is approximately 23% of gross beach visit activity days for California.

Table 8-10: California's Top Beach/Coastal Park Attendance

Golden Gate National Recreation Area *	13,459,000
Santa Monica State Park	7,342,250
Light House Field State Beach	3,977,600
Dockweiler State Beach	3,855,700
Huntington State Beach	2,780,400
Seacliff State Beach	2,424,400
Bolsa Chica State Beach	2,289,300
Doheny State Beach	2,145,100
Sonoma Coast State Beach	201,600
San Clemente State Beach	495,100

Source: *California Fast Facts*. (Based on 2000/2001 fiscal year visitation)

* US Park Service

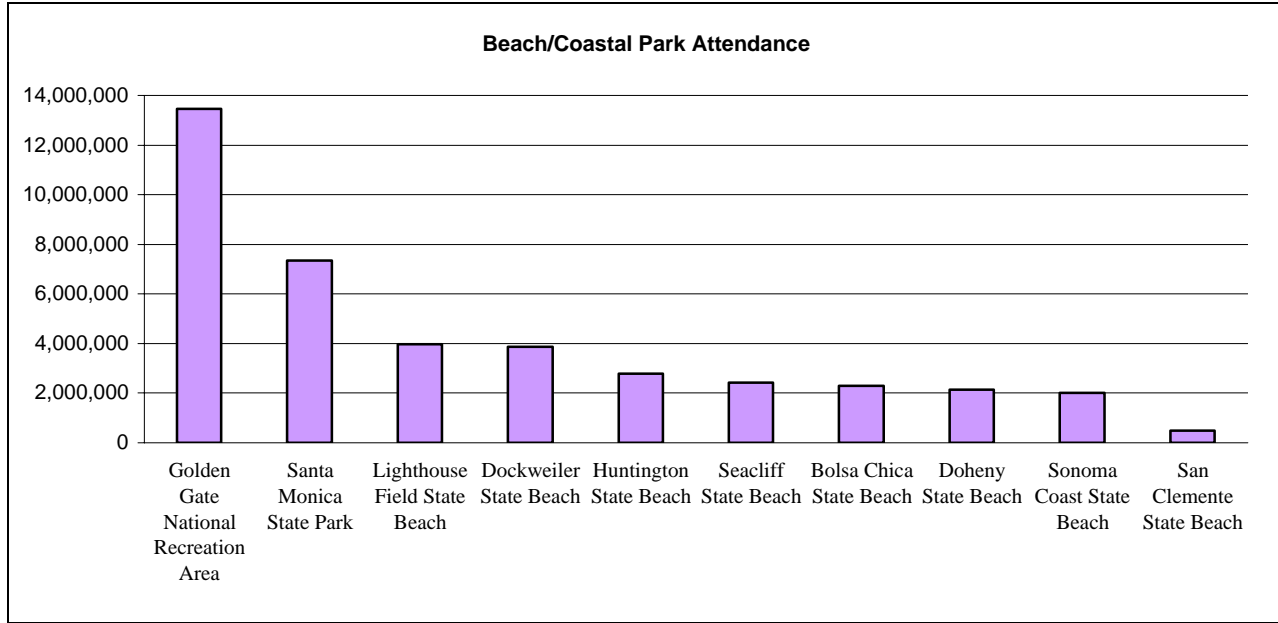


Figure 8-5: Attendance at Top 10 California Beach/Coastal Parks

8.2.6 Other marine recreational activities

Table 8-11 gives the estimates of participants and number of activity days for all other marine recreational activities along the California coast, such as wild life viewing, photography, viewing scenery, or water fowl hunting in the saltwater surrounding.

Table 8-11: Participation in Other Marine Related Recreation

Recreation Activity	Number of Participants	Number of Days	Average Days Per Person
Visit Waterside Besides Beaches	1,500,965	20,683,000	13.78
Snorkeling	706,998	3,818,000	5.40
Bird Watching in Saltwater Surrounding	2,581,958	65,762,000	25.47
Viewing or Photographing Scenery in Saltwater Surroundings	4,175,372	n/a	n/a
Hunting Waterfowl in Saltwater Surroundings	113,302	n/a	n/a

8.3 The Travel and Tourism Industry in California Coastal Counties: Description and Expenditures

Unlike the Tourism & Recreation sector, the state of California aggregates information into a Travel and Tourism industry. Travel and Tourism is the third largest employer in California,

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following business and health services.⁵⁴ Beach and waterfront activities are the second most popular recreational pursuits of travelers to California. Coastal tourism plays an important role in attracting recreators to California and generating significant economic. The California Travel and Tourism industry reflected the following highlights for the entire state for 2001.⁵⁵

- The destination for an estimated 287 million domestic travelers and approximately 9 million international travelers.
- The most visited state with an 11.1% share of the domestic travel market.
- Expenditures amounted to \$75.4 billion, or 6% of California's GSP.⁵⁶
- Los Angeles County received the most domestic tourists in California. More than 45 million person-trips took place in and through Los Angeles County.
- Generated over \$4.8 billion in tax revenues in 2001.

8.3.1 Travel Spending Estimates

The Travel and Tourism industry is a major part of California's economy and is a primary industry in many local communities. Travel spending by domestic and international travelers generates sales and employment for many different types of businesses in the state. Table 8-12 provides the estimates of the economic impact of the California travel industry from 1991 to 2001.

Table 8-12: Economic Impact of the Travel Industry of California

Year	Destination Spending (\$Billion)	Total Travel Spending (\$Billion)	Employment (1,000 jobs)	Wages (\$Billion)	Tax Receipts (\$Billion)
1991	37.9	44.6	852	15.2	2.6
1992	40.1	47.1	878	16.0	2.9
1993	40.9	48.4	882	16.2	3.0
1994	42.2	50.0	914	16.8	3.1
1995	44.2	52.7	935	17.5	3.2
1996	48.6	57.6	990	19.0	3.6
1997	53.7	62.6	1,054	20.8	3.9
1998	56.5	64.9	1,045	21.9	4.1
1999	61.1	69.8	1,087	23.4	4.5
2000	66.0	75.4	1,100	24.9	4.8
2001p*	66.1	75.4	1,051	25.0	4.8
**Annual Change					
2000-2001p	0.2%	0.0%	-4.4%	0.2%	-0.6%
1991-2001p	5.7%	5.4%	2.1%	5.1%	6.2%

Source: California Fast Facts 2002.

* 2001 numbers are provisional.

** Annual Change for 1991-2001p is the average annual percentage change.

⁵⁴ California fast Facts 2002.

⁵⁵ California Fast Facts 2002.

⁵⁶ Expenditure includes accommodations, meals, ground and air transportation, travel arrangements by travel agents, spending in retail stores while on the trip, and the recreational spending such as equipment rental or admissions to amusement parks. The Office of Tourism defines travel as either spending at least one night away from home or traveling at least 50 miles from home.

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The travel industry supported more than one million jobs in 2001 in California and earnings grew at an average rate of 5.1% over the last decade.

Figures 8-6 and 8-7 reflect travel spending and employment in the travel industry. Both show declines in 2001, which may be traced to the September 2001 events and a downturn in the economy. One interesting characteristic of these patterns is that travel spending increased by approximately 4% in 1998, though employment remained about the same.

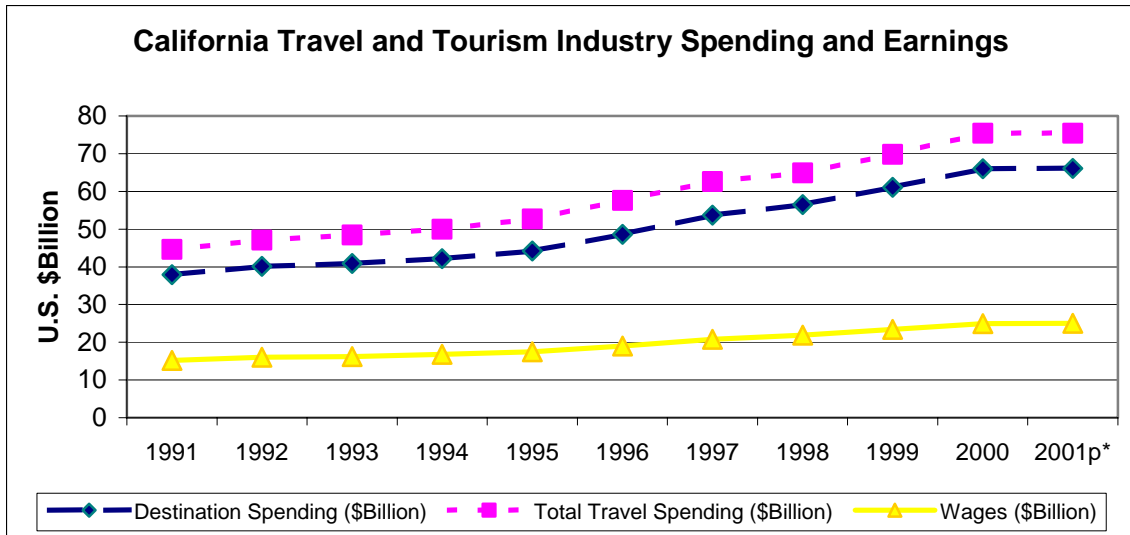


Figure 8-6: Travel and Tourism Industry Spending and Earnings in California



Figure 8-7: Travel and Tourism Industry Employment in California

Table 8-13 provides the travel spending by type of business service and Table 8-14 the estimates of employment generated by travel spending in different types of businesses. Accommodations account for around 20% of the total spending, while eating and drinking accounts for approximately 15%. Recreation accounts for about 12% to 15% of spending.

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In terms of employment, recreation accounts for from 22% to 25% of the total employment generated by the travel industry in California.

Table 8-13: Travel Spending by Type of Business Service (\$ Billion)

Type of Business	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Destination Spending	37.9	40.1	40.9	42.2	44.2	48.6	53.7	56.7	61.1	66.0	66.1
Accommodations	6.8	7.0	7.2	7.4	7.9	8.9	10.0	10.7	11.7	12.9	12.7
Eating, Drinking	9.9	10.2	10.3	10.6	11.1	12.0	13.4	14.3	15.3	16.0	16.2
Food Stores	1.4	1.4	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3
Ground Transport	5.1	5.4	5.4	5.5	5.7	6.3	6.8	6.5	7.4	8.8	8.6
Recreation	6.8	7.4	7.6	7.9	8.3	9.1	10.0	10.7	11.5	12.1	12.2
Retail Sales	7.9	8.7	8.9	9.2	9.7	10.6	11.6	12.3	13.2	13.9	14.1
Air Transportation	6.4	6.7	7.2	7.5	8.0	8.6	8.5	7.9	8.2	8.8	8.7
Travel Arrangement	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.5
Total Spending	44.6	47.1	48.4	50.0	52.7	57.6	62.6	64.9	69.8	75.4	75.4

Table 8-14: Employment Generated by Travel Spending (1,000 Jobs)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Accommodations	141	144	142	150	154	165	183	181	194	201	187
Eating, Drinking	324	322	328	332	341	362	379	181	393	398	387
Food Stores	11	10	10	11	11	12	13	12	12	12	12
Ground Transport	35	34	34	37	38	41	44	40	43	47	45
Recreation	171	195	194	206	210	222	241	236	248	248	236
Retail Sales	92	95	97	99	103	111	116	117	118	114	106
Air Transportation	52	51	51	51	50	51	51	50	51	52	51
Travel Arrangement	27	27	26	28	28	27	28	28	28	28	27
Total Employment	852	878	882	914	935	990	1,054	1,045	1,087	1,100	1,051

Source: "California Travel Impacts by County, 1992-2000," California Travel and Tourism Commission and Division of Tourism, 2002.

8.4 Regional Estimates of California Coastal Tourism & Recreation

Coastal tourism is an important and pivotal component of the Travel and Tourism industry of California. There are twenty-one coastal counties in California. Before estimating the economic impact of the Coastal Tourism industry, a measure of tourism activity in these coastal counties is instructive. Table 8-15 gives the estimates of visitor volume since 1998 for all the coastal counties, except those noted.

Table 8-15: Visitor Volumes in Coastal Counties of California*(Millions of person-trips)

Table 8-15: Visitor Volumes in Coastal Counties of California*(Millions of person-trips)												
County	1998			1999			2000			2001		
	Total	Leisure	%	Total	Leisure	%	Total	Leisure	%	Total	Leisure	%
Mendocino	1.8	1.5	83.3	1.4	0.9	64.3	2.3	2.2	95.7	3.6	3.5	97.2
Sonoma	5.4	4.1	75.9	6.0	4.5	75.0	6.3	4.9	77.8	6.9	5.3	76.8
Napa	2.2	1.7	77.3	3.3	2.5	75.8	3.9	3.0	76.9	3.4	2.4	70.6
Sacramento	11.7	6.9	59.0	12.0	7.9	65.8	14.2	9.0	63.4	15.1	9.6	63.6
Marin	1.1	1.0	90.9	2.1	1.8	85.7	1.8	1.7	94.4	1.2	1.1	91.7
Contra Costa	2.9	1.7	58.6	3.2	2.1	65.6	3.5	2.5	71.4	3.2	2.2	68.8
Alameda	6.0	3.3	55.0	6.3	3.5	55.6	6.4	3.5	54.7	7.8	4.2	53.8
San Francisco	16.8	11.1	66.1	17.9	12.0	67.0	18.7	12.0	64.2	21.3	14.6	68.5
San Mateo	1.9	1.4	73.7	1.8	1.4	77.8	2.6	2.1	80.8	2.6	2.2	84.6
Santa Clara	9.3	5.7	61.3	10.3	6.4	62.1	10.8	6.7	62.0	11.9	7.3	61.3
Santa Cruz	3.7	3.2	86.5	3.7	3.2	86.5	4.3	3.7	86.0	4.5	3.9	86.7
Monterey	6.1	4.9	80.3	6.7	5.6	83.6	7.2	5.8	80.6	7.7	6.3	81.8
Santa Barbara	8.4	5.8	69.0	9.0	6.7	74.4	9.7	6.7	69.1	9.6	7.2	75.0
Ventura	2.7	2.1	77.8	3.2	2.8	87.5	3.4	2.9	85.3	3.6	3.5	97.2
Los Angeles	37.4	23.3	62.3	42.2	27.0	64.0	45.4	28.6	63.0	49.0	30.9	63.1
Orange	20.3	16.0	78.8	22.2	17.9	80.6	23.8	19.3	81.1	25.5	21.1	82.7
San Deigo	28.3	20.0	70.7	31.9	23.1	72.4	35.2	25.1	71.3	38.0	27.1	71.3

*Data for Del Norte, Humboldt, Yolo, Solano, San Joaquin, and San Luis Obispo coastal counties are not available.

Table 8-16 tells the story of the large increase in the direct contribution of the Tourism & Recreation industry to California between 1990 and 2000. Table 8-16 also gives detailed activity information on the direct impacts on the California economy by region.

Table 8-16: Employment, wages and GSP: Coastal Tourism & Recreation Sector

Region	SIC name	Employ 1990	Wages 1990	GSP 1990	Employ 2000	Wages 2000	GSP 2000
North	Amusement and Recreation Services	237	\$1,904,465	\$3,287,060	548	\$8,241,712	\$13,830,542
	Boat Dealers	17	\$278,781	\$609,487	D	D	D
	Eating and Drinking Places	2,984	\$23,088,454	\$50,477,293	4,074	\$40,991,235	\$93,920,820
	Hotels & Lodging Places	1,466	\$13,317,529	\$29,141,245	1,936	\$23,427,349	\$53,140,662
	Marinas	D	D	D	D	D	D
	Recreational Vehicle Parks and Campgrounds	D	D	D	D	D	D
	Zoos and Aquaria	D	D	D	D	D	D
	TOURISM & RECREATION	4,765	\$39,289,773	\$84,976,861	6,674	\$74,372,905	\$164,581,624
	North Central	Amusement and Recreation Services	7,114	\$141,427,734	\$244,100,822	9,163	\$225,582,798	$378,553,925
Boat Dealers		759	\$15,665,485	\$34,248,775	363	\$10,789,365	\$24,721,041
Eating and Drinking Places		64,554	\$689,685,228	\$1,507,829,108	92,365	\$1,482,888,549	\$3,397,655,840
Hotels and Lodging Places		18,579	\$303,401,347	\$663,898,905	26,177	\$691,246,163	\$1,567,965,659
Marinas		233	\$4,883,247	\$8,011,566	241	\$7,443,259	\$12,269,584
Recreational Vehicle Parks and Campgrounds		D	D	D	77	\$1,150,123	\$2,608,844
Sporting Goods		191	\$4,733,845	\$11,333,930	331	\$13,156,663	\$33,111,139
Zoos and Aquaria		D	D	D	454	\$10,480,821	\$14,791,109
TOURISM & RECREATION		91,623	\$1,162,470,431	\$2,474,425,311	129,171	\$2,442,737,741	\$5,431,677,142

Table 8-16 Cont.

Region	SIC4 Name	Employ 1990	Wages 1990	GSP 1990	Employ 2000	Wages 2000	GSP 2000
Central	Amusement and Recreation Services	614	\$7,298,675	\$12,597,335	810	\$12,271,768	\$20,593,441
	Boat Dealers	58	\$1,531,126	\$3,347,435	D	D	D
	Eating and Drinking Places	11,137	\$104,030,476	\$227,437,349	15,707	\$203,759,487	\$466,862,200
	Hotels and Lodging Places	4,725	\$56,904,914	\$124,518,597	8,519	\$186,206,452	\$422,375,324
	Marinas	98	\$1,755,085	\$2,879,432	90	\$2,376,608	\$3,917,638
	Recreational Vehicle Parks and Campgrounds	D	D	D	103	\$1,769,615	\$4,014,048
	Sporting Goods	D	D	D	77	\$1,393,704	\$3,507,510
	Zoos and Aquaria	D	D	D	D	D	D
	TOURISM & RECREATION	17,121	\$182,297,420	\$387,817,811	25,862	\$431,081,904	\$974,607,724
South Central	Amusement and Recreation Services	823	\$9,594,725	\$16,560,262	805	\$14,207,296	\$23,841,480
	Boat Dealers	89	\$1,586,375	\$3,468,223	58	\$809,319	\$1,854,345
	Eating and Drinking Places	9,434	\$82,125,709	\$179,547,900	14,390	\$174,141,504	\$399,000,247
	Hotels and Lodging Places	3,273	\$39,220,696	\$85,822,220	3,993	\$75,743,437	\$171,810,152
	Marinas	38	\$1,292,914	\$2,121,184	D	D	D
	Recreational Vehicle Parks and Campgrounds	41	\$813,396	\$1,779,863	D	D	D
	Sporting Goods	214	\$5,085,171	\$12,175,087	529	\$15,031,491	\$37,829,486
	Zoos and Aquaria	147	\$2,278,765	\$3,379,960	204	\$4,346,474	\$6,133,982
	TOURISM & RECREATION	14,058	\$141,997,751	\$304,854,699	20,020	\$285,660,011	\$642,767,752

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Table 8-16 Cont.

Region	SIC name	Employ 1990	Wages 1990	GSP 1990	Employ 2000	Wages 2000	GSP 2000
South	Amusement and Recreation Services	7,267	\$114,955,182	\$198,409,843	5,944	\$138,870,920	\$233,041,404
	Boat Dealers	506	\$12,010,953	\$26,259,029	643	\$23,958,054	\$54,893,688
	Eating and Drinking Places	58,424	\$585,090,288	\$1,279,157,696	81,191	\$1,154,471,234	\$2,645,172,446
	Hotels and Lodging Places	22,470	\$313,689,743	\$686,411,840	28,527	\$608,954,167	\$1,381,301,297
	Marinas	314	\$6,478,733	\$10,629,157	421	\$12,330,780	\$20,326,250
	Recreational Vehicle Parks and Campgrounds	127	\$1,491,051	\$3,262,699	D	D	D
	Sporting Goods	1,377	\$30,767,014	\$73,663,417	3,722	\$169,131,582	\$425,650,438
	Zoos and Aquaria	52	\$468,373	\$694,710	D	D	D
	TOURISM & RECREATION	90,537	\$1,064,951,337	\$2,278,488,391	120,863	\$2,117,233,382	\$4,776,667,273
Total of Regions	Amusement and Recreation Services	16,054	\$275,180,781	\$474,955,322	17,270	\$399,174,494	\$669,860,792
	Boat Dealers	1,428	\$31,072,720	\$67,932,949	D	D	D
	Eating and Drinking Places	146,532	\$1,484,020,155	\$3,244,449,346	207,728	\$3,056,252,009	\$7,002,611,554
	Hotels and Lodging Places	50,514	\$726,534,229	\$1,589,792,808	69,152	\$1,585,577,568	\$3,596,593,094
	Marinas	D	D	D	D	D	D
	Recreational Vehicle Parks and Campgrounds	D	D	D	D	D	D
	Sporting Goods	D	D	D	D	D	D
	Zoos and Aquaria	D	D	D	D	D	D
	TOURISM & RECREATION	218,103	\$2,591,006,712	\$5,530,563,073	302,591	\$5,351,085,943	\$11,990,301,515

Source: BLS

Note: Regional totals contain data suppressions and are slightly lower than the state level aggregates of Table 8-1 and 8-3.

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Table 8-17 summarizes the total economic impact of the California Coastal Tourism and Recreation sector by region.

Table 8-17: Regional Summary of Coastal Tourism & Recreation Total Employment, Wages and GSP 2000

Region	Direct Employment	Indirect and Induced Employment	Total Employment	Employment multiplier
North	6,672	2,002	8,674	1.3
North Central	112,856	33,857	146,713	1.3
Central	45,155	13,547	58,702	1.3
South Central	26,231	10,492	36,723	1.4
South	120,861	36,258	157,119	1.3
Total	311,775	93,533	405,308	1.3
Region	Direct Wages	Indirect and Induced Wages	Total Wages	Wages Multiplier
North	\$74,372,905	\$44,623,743	\$118,996,648	1.6
North Central	\$2,122,346,352	\$1,697,877,082	\$3,820,223,434	1.8
Central	\$843,387,471	\$590,371,230	\$1,433,758,701	1.7
South Central	\$365,505,566	\$292,404,453	\$657,910,019	1.8
South	\$2,117,233,382	\$1,905,510,044	\$4,022,743,426	1.9
Total	\$5,522,845,676	\$4,418,276,541	\$9,941,122,217	1.8
Region	Direct GSP	Indirect and Induced GSP	Total GSP	GSP Multipliers
North	\$164,581,623	\$115,207,136	\$279,788,759	1.7
North Central	\$4,724,735,090	\$2,834,841,054	\$7,559,576,144	1.6
Central	\$1,886,575,918	\$1,509,260,734	\$3,395,836,652	1.8
South Central	\$823,712,612	\$741,341,351	\$1,565,053,963	1.9
South	\$4,776,667,271	\$3,821,333,817	\$8,598,001,088	1.8
Total	\$12,376,272,514	\$9,901,018,011	\$22,277,290,525	1.8

Source: BLS

Note: Regional totals contain data suppressions and are slightly lower than the state level aggregates of Table 8-1 and 8-3.

The Tourism & Recreation sector component of the California Ocean Economy grew significantly in the 1990s. The growth in the Central region was highest in terms of employment, wages, and contribution to GSP, followed by the San Francisco Bay, or North Central area. The growth in wages and contribution to GSP are relatively high compared to employment growth using constant 2000 dollars. The estimates that follow include data suppressions, and therefore are slightly higher than those found in Table 8-17.

- The total economic impact of the Tourism & Recreation sector of the Ocean Economy in California was estimated to be \$22,367,879,303 in 2000.
- Total employment generated more than 400,000 jobs.

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- Direct wages were estimated at \$5,544,976,307. Including indirect estimates, wages totaled \$9,980,957,353.
- The Coastal Tourism & Recreation sector accounts for around 72% of the jobs that can be attributed to the Ocean Economy and approximately 55% in terms of wages and contribution to GSP.

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PART III CONCLUSION

Future Directions in Understanding the Ocean Economy of California

This report has provided a detailed overview of important trends in the California Ocean Economy. It has relied on both published data sources and analysis of unpublished data undertaken specifically for analysis of the Ocean Economy. The ocean and coast make vital contributions to the welfare and economy of Californians, but it also is clear that the nature of those contributions is changing over time, as the ocean and coast become more and more a center of tourism and recreation.

This analysis is incomplete due to inadequate time and resources and because multiple aspects of the California Ocean Economy data are unavailable. Given the importance of the Ocean Economy, additional investments are warranted in improving the measurement and tracking of this segment of California's overall economy. We suggest the following:

1. **The Government Sector of the Ocean Economy:** This report has concentrated on the private sector Ocean Economy because the relationship to the ocean can be directly or indirectly inferred from industrial definitions and geographic locations. Federal, state, and local governments also are a key part of the Ocean Economy and provide a variety of services such as parks and resource management, as well as key roles in defense and homeland security. Because data sources do not permit a separation of function and geography for government activities, it is difficult to determine the employment levels needed to maintain the federal, state, and local parks along the ocean, or the size of the US Navy's presence in California. Determining the employment levels needed requires detailed analysis of budgetary and other internal government documents and specific surveys of local and county governments. The addition of these data would provide a more complete picture of the Ocean Economy.
2. **Improved measurement of ocean recreation values:** The Tourism & Recreation sector now is the single most important part of the Ocean Economy in California. However, as the analysis in this report shows, the measurement of this key sector is still imprecise. It is possible to measure the activity that takes place near the shore in industries such as hotels or restaurants, a large (but unknown) portion of which is related directly to the use of ocean resources like beaches, boating, or whale watching. There also is a large (and also unknown) portion of the activity in hotels away from the shore that uses the ocean resources for at least some portion of recreational activity. Measurement of the number of people who use beaches (whether tourists or residents) in California is best at state parks and very uneven through the rest of the coast. There is little measurement at all of recreational boating except for counting the number of boats. Moreover, these limitations apply only to market-related economic activity. While studies of the non-market values of California's beaches have been undertaken, little has been done with the non-market values of other ocean related resources, such as wildlife viewing. For all the data available, ocean-based tourism and recreation in California remains a poorly understood activity from an economic perspective.

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3. Employment in fisheries harvesting: A major gap in the measurement of the Ocean Economy in the US and in California is the absence of reliable, consistent figures on employment in the fisheries harvesting sector. By law this sector is exempt from the unemployment insurance laws that require reporting by almost all other industries (including all governments). However, the use of license data for commercial fish harvesters does provide a means to measure employment. Because it is possible to hold multiple licenses, changes in the licensing system are required to add statistical measurement capabilities to what is fundamentally an administrative system designed for other purposes. It is not clear the extent to which such changes are feasible in California, but a review of procedures to assess feasibility might lead to an important addition to the capacity to measure this important industry.

For all these reasons, the data in this report represent an under estimate of the value of the ocean to California. However, the size of the ocean's contribution documented here should spur additional efforts to measure more accurately both that contribution and its change over time.

PART IV APPENDIX

Appendix A: The NOEP Ocean Economy: The Methodology

The NOEP is sponsored by NOAA to develop new methods to measure the Ocean Economy of the US in a way that is consistent across the entire country.

A.1 Market Data

The methodology developed to estimate market values is based on using the ES-202 employment data, which are collected monthly by each state's department of labor and reported to the US Department of Labor. The ES-202 data are used as the basis for administering the nation's unemployment insurance laws, and covers about 90 percent of all employees. The data series excludes farm and self-employment.

A.1.1 NOEP Methodology

ES-202 data are at the establishment level. Any single place of business is an establishment, regardless of who owns it. A business firm may have many establishments or only one. Nonprofit organizations and government also report its employment through this system. For purposes of the NOEP methodology, establishments (see table A-2) are defined as ocean-related based on SIC codes and, for certain industries, by the location of a given establishment in a zip code adjacent to the shore.

Most of the industries defined in this table are single 4-digit SIC codes. Some 4-digit SIC industries have been combined to create the industries as shown in order to minimize the disclosure of data for single firms, which is prohibited. Table A-1 shows the industries and corresponding SIC codes (1987 Revision)

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Table A-1: NOEP Industries and Related SIC Codes

<u>SECTOR/INDUSTRY</u>	<u>SIC CODE</u>
LIVING RESOURCES	
Fishing	0912 0913 0919
Fish Hatcheries & Aquaculture	0921 0273
Seafood Processing	2077 2091 2092
MINERALS	
Oil & Gas Exploration and Production	1311 1321 1381 1382
Oil & Gas Exploration Services	1382
Limestone, Sand & Gravel	1422 1442
CONSTRUCTION	
Marine Related Construction	1629
SHIP AND BOAT BUILDING	
Ship Building & Repair	3731
Boat Building & Repair	3732
TRANSPORTATION	
Search and Navigation Equipment	3812
Warehousing	4222 4225
Deep Sea Freight	4412 4424
Marine Passenger Transportation'	4481 4489 4482
Marine Transportation Services	4491 4492 4499
Petroleum and Natural Gas Pipelines	4612 4922
TOURISM AND RECREATION	
Sporting Goods	3949
Marinas	4493
Boat Dealers	5551
Eating & Drinking Places	5810 5812
Hotels & Lodging Places	7011
Recreational Vehicle Parks & Campsites	7033
Amusement and Recreation services	7999 7990

In California, all zip codes adjacent to the Pacific Ocean or San Francisco Bay in the coastal counties defined by the state were included based on analysis using geographic information systems. Arc Map® was used, combining zip code polygons from ESRI with Census boundary files from the Bureau of the Census.

The zip codes of the physical address of the establishment as recorded in the ES-202 were used to determine location where available on the record. If not available, the zip code of the mailing address was used.

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All ES-202 data are reported to the Bureau of Labor Statistics of the US Department of Labor, which compiles the state reports into a longitudinal database (LDB) of all reporting establishments in the US. This database was used to access California's information. Because of differences in revisions of the data between the LDB and California's own records, there may be minor differences between totals reported here and those available from the California Employment Development Department.

Except where noted, all reported data are annual average data from monthly reports. All wage data are annual totals from monthly reports.

ES-202 data include only wage and salary employment. It excludes self-employment and farm employment. While the latter is not relevant to the Ocean Economy, self-employment can be significant in the tourism and recreation sector. Thus the figures reported here understate employment and wages in that sector.

Fisheries harvesting employment is also excluded from this analysis, since the fish harvesting industry is not covered by the federal law requiring reporting of employment. Estimates of fisheries harvesting derived using IMPLAN are included in the living resources sector for 2000. These should be treated cautiously as they are derived, not reported data.

All data derived from the ES-202 data series are subject to confidentiality screening. Federal law prohibits the release of data at any level of aggregation, which could reveal the employment or wages of a single firm. The estimates for employment and wages were developed using the original non-public data series, which includes all establishments. However, all reported data in this report were screened for confidentiality by the Bureau of Labor Statistics before being released. This screening included comparing the released data with other published data sources to be certain that no confidential data could be imputed based on combining this data series with any other data.

In all tables, totals of the sectors, regions, and the state include all data from all establishments selected as above. Industry level totals are suppressed to prevent disclosure of confidential data. In any sector where one industry's data is suppressed, a second industry's data also are suppressed to prevent complimentary disclosure.

The ES-202 data are the basis for all information regarding employment, wages, and the number of establishments in this report. GSP for each sector is estimated using Equation A-1*, which states that an establishment's share of the state's GSP is based on the establishment's share of the 2-digit SIC code's wages as reported by the Bureau of Economic Analysis multiplied by the GSP for that two digit industry, and then summed across all establishments in that industry. This method assures that the sum of wages and GSP for the ocean sector is consistent with the total GSP as reported by BEA. Wage percentages were also cross-checked against the totals reported in the BLS LDB for the state to assure consistency in proportions.

Equation A-1

$$GSP_r^i = \sum_{i=1}^n \left(\frac{W_e^i}{W_S^I} \right) GSP_S^I$$

Where:

GSP_r^i = the Gross State Product for industry i in region r

W_e^i = the wages for a given establishment in industry i

W_S^I = the total wages in industry i in state S (from BLS data)

GSP_S^I = the total gross state product for industry I in state S from BEA.

A.1.2 Strengths and Weaknesses of the NOEP methodology.

The NOEP methodology was developed to overcome the limitations of other approaches to measuring the Ocean Economy. The methodology may be considered to have the following strengths:

- Use of primary data. The use of the ES-202 data permits all estimates to be based on primary reporting data from almost all establishments in the US. The data are verified by both the state and US Departments of Labor and is the basis for all employer-related government employment statistics in the US.
- Consistency and comparability. The data are collected using consistent methodologies across all fifty states. It can be aggregated by industry and geography (although small area geographies do have limitations discussed below). The data are also consistent over time, at least until the implementation of the new North American Industrial Classification System in 2001, which created a break in the industrial data series.
- Estimates are derived from the bottom up. Employment and wage estimates are the sum of actual reported data and, except where limited by confidentiality restrictions, are the sum of firm-level reports.
- Using the zip codes permits a much finer geographic level of detail than the county level at which employment data are normally released. This is especially important in California, where large urban counties such as in Southern California seriously distort the picture of ocean related activities measured at the county level only.

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At the same time, this data series does have some weaknesses:

- Zip code geography is imperfect. Zip codes change over time, and available GIS files on zip codes (from Environmental Systems Research Institute) do not always contain correct historical or recent revisions. The zip code data used here are for 1999. It matches very closely with 2000 data, but there may be unknown errors in the 1990 data since zip code information in GIS format for that year was not available.
- There are errors in the original employment reports. Firms make errors in reporting SIC codes and may make errors in reporting addresses. For example, while required to give the physical location of each establishment, not every record contains this information. In such cases, alternative mailing addresses on the record were used. If no address was given, the record was omitted. These reporting errors introduce biases in the data of unknown directions and sizes that may be amplified in the fine-level geographic detail examined here.
- Industry definitions related to the ocean are imperfect. Some industries, such as those in SIC 44 (Water Transportation) are reasonably well related to the oceans. Others such as restaurants and hotels always will present problems in determining the degree to which they are related to the ocean.
- Still others, such as SIC 1629 (Heavy Construction) and SIC 3999 (Sporting Goods not elsewhere classified) do not separate a marine from a non-marine component. In these cases, the assumption is that the marine component (dredging and pier construction companies or surfboard manufacturers) are most likely located near the shore and so may be captured in a shore-adjacent zip code. But in both cases it is likely that other non-marine related firms may be located in a near shore zip code and thus over-counted in the data.
- A somewhat similar problem occurs with search and navigation equipment. This industry produces primarily electronic equipment such as radar, sonar, geographic positioning systems, etc. These products all have applications in marine transportation (and increasingly in recreational boating) but also in aviation. No information exists to separate the applications to which the products of this industry may be put. All of the output is counted in marine transportation, which probably overstates the actual marine component of the output.
- Industries might be included in more than one ocean sector. The example of search and navigation equipment just discussed indicates that the products of the industry may be used both in marine transportation of goods and people but also in recreational boating. It has been assigned to transportation since the largest dollar volume of marine related products is in the commercial side of the business.
- Marinas are another example of possible sectoral confusion. Marinas are the home to both recreational boats and some commercial boats, primarily in the fishing industry. However, the vast majority of boats in marinas are recreational boats and so this sector is assigned to tourism and recreation.

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- Where data for the individual industries are available, users may adjust the sector totals to suit specific preferences, if desired.

On balance, the strengths of the methodology outweigh the weaknesses. For the most part, the weaknesses are inherent to either the original data sources used or to the nature of any taxonomic process or to data availability limitations that cannot easily be overcome. The NOEP methodology is still under development, and ways must be found to control for both the upward and downward biases in the data in order to improve the estimates.

A.2 Market and Non-Market Valuation

The ocean, like other environmental assets, may be viewed as a set of natural resources that provide a stream of valuable services over a period of time (Freeman, 2003). These services can be direct, like swimming or sunbathing on a beach, boating or recreational fishing. Or they can be indirect, like ecological preservation or influencing climates. Moreover, these services may be traded in markets with prices, like overnight camping fees, or fishing permits. These services can also be available outside traditional markets, like the recreational value of a day at the beach, or day of recreational fishing. Much of what a beach visitor values in a “day at a beach” or a surfer values in a “day of surfing” is not bought and sold in markets, and therefore, the value of these added services is often omitted in traditional economic valuation/impact studies, or is not directly linked to the natural asset that provides these services.

The process of determining the economic value of those activities that are not traded in the market is not the same as calculating the value of something that is traded in the market place such as purchasing a boat or buying a swim suit. These activities have non-market use values to those who partake in them, which must be estimated indirectly and somewhat less precisely than a market activity. Non-market valuation methods have been increasingly used to estimate that “value “of recreational activities that are not captured by market transactions, although the methods for determining these values are less precise and still becoming more sophisticated. Non-market valuation methods can be broadly divided into two groups: surrogate market techniques and simulated market techniques. Surrogate market techniques attempt to estimate implicit (substitute) values for environmental goods and services by means of the price of another good or service that is marketed. These techniques use actual market prices to value an environmental quality or resource that is not marketed. The idea behind these methods is that prices for many marketed goods and services differ across seemingly equal units due to different environmental qualities, scale or setting, and these price differentials reflect a purchaser’s valuation of the environmental effects associated with any particular unit. Hedonic Pricing and Travel Cost are the two most widely used methods under this category. Simulated market techniques are not based on observed behavior, but on a user’s responses to survey questions, which try to mimic the actual market. These experimental situations ask users to choose between things, to give information about the value they place on certain costs or benefits. Contingent Valuation methods are the most commonly used simulated market techniques.

Estimates of non-market values of ocean-related recreational activities in California are imprecise and subject to a range of biases. The users’ valuation of beaches, recreational

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fishing, or boating will not only depend on the ocean/water/beach/fish stock characteristics, it will also be a function of the users' characteristics and situation. Even assuming that the appropriate non-market valuation methods were available to determine the exact price which the users would be willing to pay for the use of these ocean-related environmental assets, each recreational activity in each area will have different dollar values. For example, while a surfer may value a beach by its surf, a sunbather may value it by the quality of the sand. In order to get willingness to pay for a day at a particular beach, the valuation of these different uses is aggregated, which may create aggregation error. To get the overall non-market value of ocean-related recreational activities in California, gross aggregations were used to get the total number of users and then again aggregated different types of uses in three broad categories, namely, beach visitation, recreational fishing and recreational boating; leading to additional estimation errors. Therefore, the reader must keep in mind, that the estimated non-market values are not precise, but only give gross estimates.

Appendix B: Fishing Industry Data

2001 Employment And Payroll By NAICS Codes

Until 2001, the Federal Government used SIC codes to classify the range of industries for which data was compiled. As of 2001, they system changed to the NAICS system, which provided a more detailed breakdown of industry sectors, giving a better picture of our Ocean Sectors. Past information has now been reconfigured to allow back year comparisons according to these new NAICS categories. The California Economic Development Department provides the record of employment and wages for workers covered by unemployment insurance programs from 1997 to 2001. Although these data are not the official estimates, they offer a benchmark for future research analysis. Additionally, some of the data are at the county level, which make detailed analysis possible. Table B-1 through B-3 present the results of commercial fisheries, seafood preparation and packaging, and aquaculture industries by county and by NAICS codes.⁵⁷

⁵⁷ After 2000, all industries are classified by BLS using the North American Industry Classification System (NAICS) rather than the Standard Industrial Classification (SIC). NAICS uses a production-oriented approach to categorize economic units with similar production processes. NAICS focuses on how products and services are created, as opposed to SIC which focuses on what is produced. Using NAICS yields significantly different industry groupings from those produced using SIC. Due to these differences in NAICS and SIC structures, NAICS data will not be directly comparable to the SIC-based data for earlier years.

BLS is currently in the process of transferring the previous SIC-based employment and payroll data to the new NAICS-based data. During this transitional period, we are not able to present historical employment and payroll data by NAICS codes. However, it does not affect our analysis in the previous sections since we compared historical data of 1990 and 2000 based on SIC industries. 2001 employment and payroll data are available by NAICS code.

Table B-1: Commercial Fisheries (NAICS Code 1141) 2001 Employment and Total Effects on Income by County and Region

County and Region	Number of Establishments	Monthly Employment	Average Annual Pay (\$)	Total Annual Wages (\$1,000)	Proportion of Labor Costs	Estimated Total Costs (\$1,000)
North Coast	65	108	\$32,685	\$3,530	40%	\$8,825
Humboldt	38	51	\$28,447	\$1,451	40%	\$3,628
Mendocino	27	57	\$36,520	\$2,079	40%	\$5,198
North Central	11	17	\$68,706	\$1,168	40%	\$2,920
Marin	5	13	\$52,028	\$655	40%	\$1,638
San Francisco	6	10	\$41,881	\$426	40%	\$1,065
Sonoma	6	4	\$21,257	\$87	40%	\$218
Central Coast	22	74	\$26,797	\$1,983	40%	\$4,958
Monterey	22	74	\$26,916	\$1,983	40%	\$4,958
South Central Coast	19	35	\$31,200	\$1,092	40%	\$2,730
San Luis Obispo	11	19	\$32,683	\$624	40%	\$1,560
Ventura	8	16	\$29,877	\$468	40%	\$1,170
South Coast	88	409	\$40,528	\$16,576	40%	\$41,440
Los Angeles	34	200	\$24,966	\$4,993	40%	\$12,483
San Diego	54	209	\$55,399	\$11,583	40%	\$28,958
All Coastal	205	643	\$37,868	\$24,349	40%	\$60,873

Source: CA Employment Development Department: <http://www.calmis.ca.gov/file/es202/cew-select.htm>

Table B-2: California's Seafood Product Preparation and Packaging (NAICS Code 3117) 2001 Employment and Total Effects on Income by County and Region

County and Region	Number of Establishments	Average Monthly Employment	Average Annual Pay (\$)	Total Annual Payroll (\$1,000)	Proportion of Labor Costs in Total Costs	Estimated Total Costs (\$1,000)
North Coast Mendocino	5	204	\$14,129	\$2,875	40%	\$7,188
North Central San Francisco	4	26	\$34,837	\$906	40%	\$2,265
South Central Coast Ventura	4	52	\$14,737	\$766	40%	\$1,915
South Coast Los Angeles	31	1,468	\$24,310	\$35,688	40%	\$89,220
All Coastal	44	1750	\$22,991	\$40,235	40%	\$100,588

Source: CA Employment Development Department: <http://www.calmis.ca.gov/file/es202/cem-select.htm>

Table B-3: Aquaculture (NAICS Code 11251) 2001 Employment and Total Effects on Income in California.

NAICS Codes	Detailed Industry Title	Number of Establishments	Average Monthly Employment	Average Annual Pay	Total Annual Payroll (\$1,000)	Proportion of Labor Costs in Total Costs	Estimated Total Costs (\$1,000)
11251	Total Animal aquaculture	84	564	\$26,534	\$14,965	40%	\$37,413
112511	Finfish farming and fish hatcheries	64	415	\$25,068	\$10,405	40%	\$26,013
112512	Shellfish farming	14	135	\$31,951	\$4,303	40%	\$10,758
112519	Other animal aquaculture	7	14	\$18,024	\$257	40%	\$643

Source: CA Employment Development Department: <http://www.calmis.ca.gov/file/es202/cem-select.htm>

Appendix C: California Marine Research Institutions

Telonicher Marine Laboratory (Humboldt State University)

Trinidad, CA 95570

< <http://www.humboldt.edu/~marinelb/>>

Bodega Marine Laboratory (cooperative program UC Davis and UC Berkeley)

Bodega Bay, CA 94923-0247

< <http://www-bml.ucdavis.edu/>>

Romberg Tiburon Center (San Francisco State University)

Tiburon, CA 94920

< <http://www.rtc.sfsu.edu/>>

Institute of Marine Science (UC Santa Cruz)

Long Marine Lab (UC Santa Cruz)

Santa Cruz, CA 95064

< <http://ims.ucsc.edu/>>

Elkhorn Slough National Estuarine Research Reserve

Moss Landing, CA 95039

<<http://www.elkhornslough.org/>>

Moss Landing Marine Laboratories (California State University)

Moss Landing, CA 95039

< <http://arkeia.mlml.calstate.edu/>>

Monterey Bay Aquarium Research Institute (MBARI)

Moss Landing, CA 95039-9644

< <http://www.mbari.org/default.htm>>

Naval Postgraduate School

Monterey, CA 93943

< <http://www.nps.navy.mil/>>

Hopkins Marine Station (Stanford University)

Pacific Grove, CA 93950-3094

< <http://www.marine.stanford.edu/>>

Santa Barbara Marine Science Institute (UC Santa Barbara)

< <http://www.msi.ucsb.edu/>>

Santa Barbara, CA 93106-6150

Santa Cruz Laboratory

Santa Cruz, CA 95060

< <http://santacruz.nmfs.noaa.gov/index.php>>

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Wrigley Institute for Environmental Studies (University of Southern California)
Los Angeles, California 90089-0371

< <http://wrigley.usc.edu/>>

and

Wrigley Marine Science Center
Avalon, California 90704

Marine Science Center (UC Los Angeles)

Los Angeles, CA 90095-1606

< <http://www.msc.ucla.edu/>>

Southern California Marine Institute in Long Beach (cooperative program California State University, University of Southern California, and Occidental College)

Long Beach, CA 90803

<<http://www.longbeachmarineinst.com/>>

Marine Conservation Research Institute (MCRI) (Aquarium of the Pacific)

Long Beach, CA 90802

< <http://www.aquariumofpacific.org/MCRI/>>

Kerckhoff Marine Lab, California Institute of Technology

Corona Del Mar, CA 92625

<<http://www.cco.caltech.edu/~mirsky/kml.htm>>

Pacific Marine Mammal Center

Laguna Beach, CA 92651

<http://www.pacificmmc.org/>

The Ocean Institute

Dana Point, CA 92629

< <http://www.ocean-institute.org/>>

Scripps Institution of Oceanography-UC San Diego

La Jolla, CA 92093-0233

< <http://sio.ucsd.edu/>>

Hubbs Sea World Research Institute (San Diego State University)

San Diego, CA 92109

< <http://www.hswri.org/>>

Cetacean Behavior Laboratory (San Diego State University)

San Diego, CA 92182

< <http://www.sci.sdsu.edu/CBL/CBLHome.html>>

Appendix D: California Beaches

Table D-1: Regional Beaches and Locations

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
Humboldt	Clam Beach	Pacific Ocean	Trinidad	1
	Freshwater Lagoon Beach	Pacific Ocean	Orick	1
	Samoa Beach	Pacific Ocean	Samoa	5
Mendocino	Pudding Creek Beach	Pacific Ocean	Fort Bragg	1
	Virgin Creek Beach	Pacific Ocean	Fort Bragg	0.5
Sonoma	Black Point	Pacific Ocean	Sea Ranch	0.5
	Campbell Cove State Beach	Pacific Ocean	Bodega Bay	0.1
	Doran Park County Regional Park	Pacific Ocean	Bodega Bay	1
	Goat Rock State Beach	Pacific Ocean	Jenner	1
	Gualala Regional Park	Pacific Ocean	Gualala	0.5
	Salal	Pacific Ocean	Sea Ranch	
	Salmon Creek State	Pacific Ocean	Bodega Bay	1
	Shell Beach	Pacific Ocean	Sea Ranch	
	Stengel Beach	Pacific Ocean	Sea Ranch	
	Stillwater Cove Regional Park	Pacific Ocean	Timber Cove	0.05
San Francisco	Walk-On	Pacific Ocean	Sea Ranch	
	Aquatic Park	San Francisco Bay	San Francisco	1
	Baker Beach	San Francisco Bay	San Francisco	1
	Candlestick Park Recreation Area	San Francisco Bay	San Francisco	1
	China/Phelan Beach	San Francisco Bay	San Francisco	1
	Fort Funston	San Francisco Bay	San Francisco	
	Ocean Beach	San Francisco Bay	San Francisco	3
Marin	Ayala Cove	San Francisco Bay	Tiburon	0.33
	China Cove	San Francisco Bay	Tiburon	0.25
	Hearts Desire Beach	Tomales Bay	Point Reyes	0.33
	Perles Beach	San Francisco Bay	San Francisco	0.25
	Quarry Beach	San Francisco Bay	San Francisco	0.5
	Shell Beach	Tomales Bay	Point Reyes	0.33
	West Garrison Beach	San Francisco Bay	Tiburon	0.25
Solano				
Alameda	Crown Memorial State Beach	San Francisco Bay	Alameda	2
San Mateo	Bean Hollow State Beach	Pacific Ocean	Pescadero	
	Capistrano Beach	Pacific Ocean	Princeton	0.25
	Dunes Beach	Pacific Ocean	Half Moon Bay	1
	Elmar Beach	Pacific Ocean	Half Moon Bay	1
	Erckenbrack Park	Lagoon	Foster City	
	Fitzgerald Marine Reserve	Pacific Ocean	Moss Beach	2
	Francis Beach	Pacific Ocean	Half Moon Bay	2
	Gazos Creek Beach Access	Pacific Ocean	Gazos	
	Gull Park	Lagoon	Foster City	
	Linda Mar Beach	Pacific Ocean	Pacifica	

Table D-1: Regional Beaches and Locations (Cont.)

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
San Mateo	Marlin Park - Foster City	Lagoon	Foster City	
	Marlin Park - Redwood City	Lagoon	Redwood City	
	Miramar	Pacific Ocean	Half Moon Bay	1
	Montara Beach	Pacific Ocean	Montara	2
	Naples Beach	Pacific Ocean		1
	Pacifica State Beach (San Pedro Beach)	Pacific Ocean	Pacifica	2
	Pescadero State Beach	Pacific Ocean	Pescadero	
	Pillar Point Beach	Pacific Ocean	Princeton	
	Pomponio State Beach	Pacific Ocean	San Gregorio	
	Poplar Beach	Pacific Ocean	Half Moon Bay	1
	Rockaway Beach	Pacific Ocean	Pacifica	1
	Roosevelt Beach	Pacific Ocean	Half Moon Bay	
	San Gregorio State Beach	Pacific Ocean	San Gregorio	
	Sharp Park	Pacific Ocean	Pacifica	1
	Surfer's Beach	Pacific Ocean	El Granada	
Venice Beach	Pacific Ocean	Half Moon Bay	1	
Santa Cruz	Capitola Beach	Monterey Bay	Capitola	1
	Corcoran Lagoon Beach	Monterey Bay	Santa Cruz	1
	Cowell Beach	Monterey Bay	Santa Cruz	1
	Lighthouse Beach	Monterey Bay	Santa Cruz	
	Manresa State Beach	Monterey Bay	Watsonville	3
	Mitchell's Cove Beach	Monterey Bay	Santa Cruz	
	Moran Lake Beach	Monterey Bay	Santa Cruz	0.5
	Natural Bridges State Beach	Monterey Bay	Santa Cruz	0.5
	New Brighton State Beach	Monterey Bay	Santa Cruz	2
	Pajaro Dunes State Beach	Monterey Bay	Watsonville	
	Palm Beach/Pajaro Dunes Beach	Monterey Bay	Watsonville	1
	Rio del Mar Beach	Monterey Bay	Rio del Mar	1
	Santa Cruz Main Beach at the Boardwalk	Monterey Bay	Santa Cruz	1
	Seabright State Beach	Monterey Bay	Santa Cruz	1
	Seacliff State Beach	Monterey Bay	Rio del Mar	3
	Sunset State Beach	Monterey Bay	Watsonville	2
Trestle Beach	Monterey Bay	Watsonville		
Twin Lakes State Beach	Monterey Bay	Santa Cruz	0.5	
Monterey	Carmel Beach	Monterey Bay	Carmel	1
	Del Monte Beach	Monterey Bay	Monterey	
	Garrapata State Beach	Pacific Ocean	Big Sur	
	Heritage Harbor	Pacific Ocean	Monterey	0.1
	Lover's Point	Monterey Bay	Pacific Grove	0.25
	Monastery Beach	Monterey Bay	Carmel	0.5
	Monterey Beach Hotel	Monterey Bay	Monterey	0.25
	Moss Landing Beach	Monterey Bay	Moss Landing	

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Table D-1: Regional Beaches and Locations (Cont.)

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
Monterey	Oceanview Avenue	Pacific Ocean	Pacific Grove	1
	Pfeiffer Beach	Pacific Ocean	Big Sur	
	San Carlos Beach	Monterey Bay	Monterey	0.25
	Spanish Bay Beach	Monterey Bay	Pebble Beach	
	Stillwater Cove	Monterey Bay	Pebble Beach	0.25
	Sunset Drive Beach	Monterey Bay	Pacific Grove	2
	Zmudowski State Beach	Monterey Bay	Pajaro	
San Luis Obispo	Avila Beach	Avila Bay	Avila Beach	1
	Cayucos		Cayucos	
	Moonstone Beach	Pacific Ocean	Cambria	
	Morro Bay City Beach	Morro Bay	Morro Bay	2
	Olde Port Beach	Port San Luis	Avila Beach	0.5
	Pismo Beach	Pacific Ocean	Pismo Beach	2
	Pismo State Beach	Pacific Ocean	Oceano	5
Santa Barbara	Shell Beach	Pacific Ocean	Pismo Beach	
	Arroyo Burro Beach	Pacific Ocean	Santa Barbara	1
	Arroyo Quemada Beach	Pacific Ocean	Santa Barbara	1
	Butterfly Beach	Pacific Ocean	Montecito	1
	Carpinteria City Beach	Pacific Ocean	Carpinteria	1
	Carpinteria State Beach	Pacific Ocean	Carpinteria	1
	East Beach at Mission Creek	Pacific Ocean	Santa Barbara	1
	East Beach at Sycamore Creek	Pacific Ocean	Santa Barbara	1
	El Capitan State Beach	Pacific Ocean	Santa Barbara	1
	Gaviota State Beach	Pacific Ocean	Santa Barbara	1
	Goleta Beach	Pacific Ocean	Goleta	1
	Guadalupe Dunes	Pacific Ocean	Santa Maria	1
	Hammond's Beach	Pacific Ocean	Montecito	1
	Hope Ranch Beach	Pacific Ocean	Santa Barbara	1
	Jalama Beach	Pacific Ocean	Lompoc	1
	Leadbetter Beach	Pacific Ocean	Santa Barbara	1
	Ocean Beach	Pacific Ocean	Lompoc	1
	Refugio State Beach	Pacific Ocean	Santa Barbara	1
Rincon Beach	Pacific Ocean	Carpinteria	1	
Sands Beach at Coal Oil Point	Pacific Ocean	Santa Barbara	1	
Surf Beach	Pacific Ocean	Surf	1	
Ventura	Channel Islands Harbor Beach Park	Channel Islands Harbor	Oxnard	
	County Line Beach	Pacific Ocean		
	Deer Creek Beach	Pacific Ocean		
	Emma Wood State Beach	Pacific Ocean	Ventura	2

Table D-1: Regional Beaches and Locations (Cont.)

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
Ventura	Faria County Park	Pacific Ocean		
	Hobie Beach	Channel Islands Harbor	Oxnard	
	Hobson County Park	Pacific Ocean		
	Hollywood Beach	Pacific Ocean	Oxnard	
	La Conchita Beach	Pacific Ocean		
	Mandalay County Park	Pacific Ocean	Oxnard	
	Mandos Cove Beach	Pacific Ocean		
	Marina Park Beach	Pacific Ocean	Ventura	
	McGrath State Beach	Pacific Ocean	Oxnard	2.5
	Mussel Shoals Beach	Pacific Ocean		
	Oil Piers Beach	Pacific Ocean		
	Ormond Beach	Pacific Ocean	Oxnard	
	Oxnard Shores Beach	Pacific Ocean	Oxnard	
	Oxnard State Beach	Pacific Ocean	Oxnard	
	Peninsula Beach	Pacific Ocean	Ventura	
	Point Mugu State Beach	Pacific Ocean	Port Hueneme	5
	Port Hueneme Beach Park	Pacific Ocean	Port Hueneme	2.5
	Promenade Park	Pacific Ocean	Ventura	
	Rincon Beach	Pacific Ocean		
	San Buenaventura State Beach	Pacific Ocean	Ventura	2
Seaside Wilderness Park	Pacific Ocean	Ventura		
Silverstrand Beach	Pacific Ocean			
Solimar Beach	Pacific Ocean			
Los Angeles	10th Place Beach	Pacific Ocean	Long Beach	0.3
	16th Place Beach	Pacific Ocean	Long Beach	0.3
	1st and Bayshore	Alamitos Bay	Long Beach	0.4
	2nd Street Bridge and Bayshore	Alamitos Bay	Long Beach	0.4
	36th Place Beach	Pacific Ocean	Long Beach	0.3
	3rd Place Beach	Pacific Ocean	Long Beach	0.3
	54th Place Beach	Pacific Ocean	Long Beach	0.3
	55th Place Beach	Pacific Ocean	Long Beach	0.3
	56th Place Beach	Alamitos Bay	Long Beach	0.4
	5th Place Beach	Pacific Ocean	Long Beach	0.3
	62nd Place Beach	Pacific Ocean	Long Beach	0.3
	72nd Place Beach	Pacific Ocean	Long Beach	0.3
	Abalone Cove	Pacific Ocean	Rancho Palos Verdes	1
	Alamitos Bay Shore Float	Pacific Ocean	Long Beach	0.3
	Avalon Beach	Pacific Ocean	Avalon	1
	Basin H	Pacific Ocean	Marina Del Ray	1
	Belmont Pier	Pacific Ocean	Long Beach	0.6

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Table D-1: Regional Beaches and Locations (Cont.)

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
Los Angeles	Big Rock Beach	Pacific Ocean	Malibu	0.3
	Bluff Cove	Pacific Ocean	Palos Verde Estates	
	Broad Beach	Pacific Ocean	Malibu	1
	Cabrillo Beach	Pacific Ocean	Los Angeles	1
	Colorado Lagoon-Center	Alamitos Bay	Los Angeles	0.4
	Colorado Lagoon-North	Alamitos Bay	Los Angeles	0.4
	Colorado Lagoon-South	Alamitos Bay	Los Angeles	0.4
	Coronado Avenue Beach	Pacific Ocean	Los Angeles	0.3
	Corral Beach	Pacific Ocean	Malibu	1
	Dan Blocker Beach	Pacific Ocean	Malibu	1
Orange	Aliso County Beach Park	Pacific Ocean	Laguna Beach	
	Bolsa Chica State Beach Park	Pacific Ocean	Huntington Beach	3
	Capistrano Bay District	Pacific Ocean	Dana Point	1
	Capistrano County Beach	Pacific Ocean	Dana Point	1
	Corona Del Mar State Beach	Pacific Ocean	Newport Beach	0.5
	Crystal Cove State Beach Park	Pacific Ocean	Newport Beach	3.2
	Dana Point Harbor	Pacific Ocean	Dana Point	3
	Doheny State Beach Park	Pacific Ocean	Dana Point	1
	Emerald Bay	Pacific Ocean	Laguna Beach	0.4
	Huntington City Beach	Pacific Ocean	Huntington Beach	2
	Huntington Harbour	Pacific Ocean	Huntington Beach	38??
	Huntington State Beach	Pacific Ocean	Huntington Beach	2
	Laguna Beach	Pacific Ocean	Laguna Beach	4
	Little Corona - Cameo Shores	Pacific Ocean	Newport Beach	0.5
	Monarch Beach	Pacific Ocean	Dana Point	1
	Newport Bay	Pacific Ocean	Newport Beach	39??
	Newport Beach	Pacific Ocean	Newport Beach	6
	Poche County Beach	Pacific Ocean	San Clemente	0.2
	Salt Creek Beach Park	Pacific Ocean	Dana Point	0.2
	San Clemente City Beach	Pacific Ocean	San Clemente	2
	San Clemente State Beach	Pacific Ocean	San Clemente	1
	Seal Beach	Pacific Ocean	Seal Beach	
	South Laguna Beach	Pacific Ocean	Laguna Beach	
Sunset Beach	Pacific Ocean	Sunset Beach	1	
Surfside	Pacific Ocean	Seal Beach		

Table D-1: Regional Beaches and Locations (Cont.)

County Name	Name of the Beach	Water Body	Nearest city	Length of Beach
San Diego	Border Field State Park	Pacific Ocean	Otay Mesa	1.2
	Camp Del Mar (USMC Camp Pendleton)	Pacific Ocean	Camp Pendleton	0.75
	Cardiff State Beach	Pacific Ocean	Encinitas	2.94
	Carlsbad City Beach	Pacific Ocean	Carlsbad	0.6
	Carlsbad State Beach	Pacific Ocean	Carlsbad	3.4
	Coronado Municipal Beach	Pacific Ocean	Coronado	1.7
	Del Mar City Beach	Pacific Ocean	Del Mar	2.5
	Encinitas City Beach	Pacific Ocean	Encinitas	2
	Fletcher Cove	Pacific Ocean	Solana Beach	1.3
	Imperial Beach City Beach	Pacific Ocean	Imperial Beach	1.5
	La Jolla Community Beach	Pacific Ocean	San Diego	2
	La Jolla Shores Beach	Pacific Ocean	San Diego	0.6
	Leucadia State Beach	Pacific Ocean	Encinitas	1.3
	Mission Bay	Pacific Ocean	San Diego	2
	Mission Beach	Pacific Ocean	San Diego	2.5
	Moonlight State Beach	Pacific Ocean	Encinitas	0.4
	North Pacific Beach	Pacific Ocean	Pacific Beach	0.55
	Ocean Beach	Pacific Ocean	San Diego	0.7
	Oceanside City Beach	Pacific Ocean	Oceanside	3.7
	Pacific Beach	Pacific Ocean	San Diego	1
	San Diego Bay	Pacific Ocean	San Diego, Coronado, Chula Vista, Pt. Loma	1
	San Elijo State Beach	Pacific Ocean	Encinitas	1.1
	San Onofre State Beach	Pacific Ocean	San Clemente	0.75
Seascape Beach Park	Pacific Ocean	Solana Beach	1.3	
Shell Beach	Pacific Ocean	La Jolla	0.2	
Silver Strand State Beach	Pacific Ocean	Coronado	2	
Solana Beach	Pacific Ocean	Solana Beach		

Source: California Coastal Commission, Beach Access Guide

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Table D-2: Regional Beaches from EPA

Region	County	Beach	
North	Del Norte	High Bluff Beach	
		Wilson Creek Beach	
		Enderts Beach	
		Crescent Beach	
		South Beach	
		Beachfront Park	
		Pebble Beach	
		Point St. George	
		Lake Earl Wildlife	
		Area Beaches	
		Kellogg Beach	
		Clifford Kamph Memorial Park	
		Pelican State Beach	
		Humboldt	Dead Man's Beach
			Shelter Cove
	Little Black Sands Beach		
	Black Sands Beach		
	Mattole River Beach		
	Centerville Beach Co. Park		
	Crab County Park		
	South Spit & Jetty		
	Samoa Dunes Rec. Area		
	Mad River Beach C. Park		
	Clam Beach County Park		
	Little River Beach Co. Park		
	Moonstone Beach		
	Luffenholtz Beach		
	Baker Beach		
	Indian Beach		
	Trinidad Head		
	Trinidad State Beach		
	College Cove		
	Agate Beach		
	Big Lagoon County Park		
	Dry Lagoon		
	Stone Lagoon		
	Freshwater Lagoon		
	Redwood Creek Beach		
	Orick Fishing Access		
	Gold Bluffs Beach		
Carruthers Cove Beach			

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Table D-2: Regional Beaches from EPA (Cont.)

Region	County	Beach
North	Mendocino	Gualala River
		Fish Rock Beach
		Schooner Gulch Beach
		Bowling Ball Beach
		Moat Creek Beach
		Arena Cove Beach
		Manchester State Beach
		Greenwood Creek State Beach
		Navarro River Beach Access
		Albion Flat
		Van Damme State Park
		12. Mendocino Headlands State Park
		Russian Gulch State Park
		Caspar Headlands State Reserve
		Caspar State Beach
		16. Jug Handle State Reserve
		Noyo Harbor
		Glass Beach
		Pudding Creek Beach
		Virgin Creek Beach
		MacKerricher State Park
		Seaside Creek Beach
		Chadbourne Gulch
		Wages Creek Beach
		Westport-Union Landing State Beach
		Usal Beach
Little Jackass Creek Beach		
Bear Harbor Beach		
Needle Rock Beach		
Jones Beach		
North Central	Sonoma	Doran Beach Regional Park
		Campbell Cove
		Westside Regional Park
		Bodega Head
		Bodega Dunes
		South Salmon Creek Beach
		North Salmon Creek Beach
		Miwok Beach
		Coleman Beach
		Arched Rock Beach
		Carmet Beach
		Schoolhouse Beach

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Table D-2: Regional Beaches from EPA (Cont.)

Region	County	Beach
North Central	Sonoma	Portuguese Beach
		Gleason Beach
		Duncan's Landing
		Wright's Beach
		Shell Beach
		Blind Beach
		Goat Rock Beach
		North Jenner Beaches
		Russian Gulch
		Vista Point
		Fort Ross Reef
		Fort Ross Cove
		Timber Cove
		Stillwater Cove Regional Park
		Ocean Cove
		Gerstle Cove
		Stump Beach
		Fisk Mill Cove
		North Horseshoe Cove
		Black Point Beach
		Pebble Beach
		Stengel Beach
		Shell Beach
		Walk-On Beach
		Gualala Point Regional Park
		Marin	Kirby Cove
	Bonita Cove	
	Rodeo Beach	
	Tennessee Cove	
	Muir Beach	
	Steep Ravine Beach	
	Red Rock Beach	
	Stinson Beach	
	Bolinas Beach	
	Agate Beach	
	Palomarin Beach	
	Wildcat Beach	
	Kelham Beach	
	Sculptured Beach	
	Santa Maria Beach	
	Limantour Beach	
	Drakes Beach	
Point Reyes Beach South		

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Table D-2: Regional Beaches from EPA (Cont.)

Region	County	Beach
North Central	Marin	19. Point Reyes Beach North
		20. Abbotts Lagoon
		Kehoe Beach
		McClures Beach
		Marshall Beach
		Hearts Desire Beach
		Shell Beach
		Alan Sieroty Beach
		Lawson's Landing
		Dillon Beach
		San Francisco	Burton Memorial Beach
	Fort Funston Beach	
	Ocean Beach	
	Lands End Beach	
	China Beach	
	6. Baker Beach	
	7. North Baker Beach	
	8. Crissy Field	
	9. Marina Green	
	Aquatic Park	
Central	San Mateo	Ano Nuevo State Reserve
		The Fist
		Gazos Creek Access
		Pigeon Point
		Bean Hollow State Beach
		Pebble Beach
		Pescadero State Beach
		The Gulch
		Pomponio State Beach
		San Gregorio State Beach
		San Gregorio Private Beach
		Martin's Beach
		Cowell Ranch Beach
		Pelican Point Beach
		Francis Beach
		Venice Beach
		Dunes Beach
		Miramar Beach
		El Granada Beach
		Pillar Point Harbor
Mavericks		
James V. Fitzgerald Marine Reserve		
Montara State Beach		

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Region	County	Beach
Central	San Mateo	Gray Whale Cove State Beach 25. Pacifica State Beach
		Rockaway Beach
		Sharp Park State Beach
		Esplanade Beach
		Thornton State Beach
	Santa Cruz	Palm Beach
		Sunset State Beach
		Manresa Uplands
		4. Manresa State Beach
		5. Lundborgh Beach
		Rio Del Mar Beach
		Seacliff State Beach
		New Brighton State Beach
		Capitola City Beach
		Hooper Beach
		Key Beach
		Pleasure Point Beach
		Moran Lake Beach
		Corcoran Lagoon Beach
		Sunny Cove
		Lincoln Beach
		Twin Lakes State Beach
		Seabright Beach
		Main Beach
		Cowell Beach
		Steamer Lane
		22. Lighthouse Field State Beach
		Its Beach
		Mitchell's Cove
		25. Natural Bridges State Beach
		Wilder Ranch State Park
		Four Mile Beach
		Red, White, and Blue Beach
		Laguna Creek Beach
		Yellowbank Beach
		Bonny Doon Beach
		Panther Beach
		Davenport Beach
		Davenport Landing Beach
		Scott Creek Beach
		Greyhound Rock Fishing Access
		Waddell Creek Beach

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Region	County	Beach
Central	Monterey	Willow Creek Picnic Area
		Jade Cove
		Sand Dollar Picnic Area and Beach
		Mill Creek Picnic Area
		Kirk Creek Campground
		Limekiln State Park
		Julia Pfeiffer Burns State Park
		Partington Cove
		Pfeiffer Beach
		Andrew Molera State Park
		Garrapata State Park
		Point Lobos State Reserve
		Carmel River State Beach
		Carmel City Beach
		Fanshell Beach
		Moss Beach
		Spanish Bay
		Asilomar State Beach
		Lover's Point
		Shoreline Park
		Macabee Beach
		San Carlos Beach Park
		Monterey State Beach ("Willows on the Bay" unit)
		Del Monte Beach
		Monterey State Beach (Sand Dunes Drive unit)
		Monterey State Beach (Seaside unit)
		Marina State Beach
Salinas River State Beach		
Moss Landing State Beach		
Zmudowski State Beach		
South Central	San Luis Obispo	Pismo Dunes State Vehicular Recreation Area
		Pismo State Beach
		Avila State Beach
		Montana de Oro State Park
		Moro Dunes Natural Area
		Bayshore Bluffs Park
		Morro Bay State Park
		Morro Rock and Beach
		Morrow Strand State Beach (South)
		Morrow Strand State Beach (North)
		Cayucos Beach
		Cayucos State Beach
Moonstone State Beach		

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Region	County	Beach
South Central	San Luis Obispo	San Simeon State Beach
		W. R. Hearst Mem. State Beach
	Santa Barbara	Rincon Point
		Rincon Beach County Park
		Carpinteria State Beach
		Carpinteria City Beach
		Lookout County Park
		Miramar Beach
		Hammonds Beach
		Butterfly Beach
		East Beach
		West Beach
		Leadbetter Beach
		Mesa Lane Beach
		Arroyo Burro Beach County Park
		Goleta Beach County Park
		Isla Vista Beach
		Coal Oil Point Natural Reserve
		El Capitan State Beach
		Refugio State Beach
		Jalama Beach County Park
		Vandenberg Air Force Base Fishing Access
		Ocean Beach County Park
		Point Sal State Beach
		Guadalupe-Nipomo Dunes Preserve
	Ventura	Sycamore Cove Beach
		Thornhill Broome Beach
		Point Mugu Beach
		Ormond Beach
		Port Hueneme Beach Park
		Silver Strand Beach
		Channel Inds. Harbor Beach
		Hollywood Beach
		Oxnard State Beach
		Mandalay County Park
		McGrath State Beach
		Marina Cove Beach
		Marina Park
		San Buenaventura State Beach
		Promenade Park
Surfer's Point		
Emma Wood State Beach		
Solimar Beach		

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Region	County	Beach
South Central	Ventura	Faria Beach County Park
		Rincon Parkway North
		Hobson County Park
		Oil Piers Beach
		Mussel Shoals Beach
		La Conchita Beach
South	Los Angeles	Descanso Beach
		Crescent Beach
		Pebbly Beach
		Ben Weston Beach
		Little Harbor Beach
		Little Fisherman's Cove
		Alamitos Bay Beach
		Belmont Shore
		Long Beach City Beach
		Cabrillo City Beach
		Point Fermin Park
		White Point County Park
		Royal Palms County Beach
		Abalone Cove Beach
		Malaga Cove
		Torrance County Beach
		Redondo County Beach
		Hermosa City Beach
		Manhattan County Beach
		El Porto Beach
		El Segundo Beach
		Mother's Beach
		Dockweiler State Beach
		Venice City Beach
		Santa Monica State Beach
		Will Rogers State Beach
		Topanga County Beach
		Las Tunas County Beach
		Surfrider Beach
		Malibu Lagoon County Beach
		Dan Blocker County Beach
		Escondido Beach
		Paradise Cove
Point Dume County Beach		
Zuma County Beach		
Broad Beach		
El Matador State Beach		

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Region	County	Beach
South	Los Angeles	La Piedra State Beach
		El Pescador State Beach
		Nicholas Canyon County Beach
		Leo Carillo State Beach
		County Line Beach
	Orange	San Clemente State Beach
		San Clemente City Beach
		Poche Beach
		Capistrano Beach
		Doheny State Beach
		Salt Creek County Beach
		1,000 Steps Beach
		West Street Beach
		Aliso Creek County Beach
		Victoria Beach
		Brooks Beach
		Main Beach
		Picnic Beach
		Rockpile Beach
		Diver's Cove
		Shaw's Cove
		Crescent Bay Point Park
		Crystal Cove State Park
		Little Corona del Mar Beach
		Corona del Mar State Beach
		Rocky Point
		China Cove Beach
		Bayside Drive County Beach
		West Jetty View Park
		Balboa Beach
		Newport Beach Municipal Beach
		Santa Ana River County Beach
		Huntington State Beach
		Huntington City Beach
		Bolsa Chica State Beach
		Sunset Beach
		Surfside Beach
	Seal Beach	
	San Diego	Border Field State Park
		Imperial Beach
		Silver Strand State Beach
		Coronado Shores Beach
Coronado City Beach		

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Region	County	Beach
South	San Diego	Ocean Beach City Beach
		Ocean Beach Park
		Mission Beach
		Pacific Beach
		Tourmaline Surfing Park
		La Jolla Strand Park
		Windansea Beach
		Marine Street Beach
		Children's Pool Beach
		La Jolla Cove
		La Jolla Shores Beach
		Black's Beach
		Torrey Pines State Beach
		Del Mar City Beach
		Seascape Shores
		Fletcher Cove Park
		Tide Beach Park
		Cardiff State Beach
		San Elijo State Beach
		Swami's
		Boneyard Beach
		D Street Viewpoint
		Moonlight Beach
		Stone Steps Beach
		Encinitas Beach
		Beacon's Beach
		Ponto Beach
		South Carlsbad State Beach
		Carlsbad State Beach
		Carlsbad City Beach
South Oceanside Beach		
Oceanside City Beach 38. Harbor Beach		
San Onofre State Beach		

Source: EPA BEACH Watch Program

