

**The Potential Economic Impacts of the
Proposed Central Coast National Marine Sanctuary**

**Prepared for the Sierra Club of California
By Jason Scorse, Ph.D. and Judith Kildow, Ph.D.
September 2014**



i. Acknowledgments

The authors want to thank William Douros, Western Regional Director of National Marine Sanctuaries, for providing important financial information about sanctuary budgets; student assistant Maren Gardiner Farnum, for her research and analytical work; Professor Gary Griggs for providing information about marine institutional budgets in the Monterey Crescent; Deirdre Whalen and other Monterey Bay National Marine Sanctuary staff members for providing a range of information on tourism and other sanctuary activities that we could never have gotten without their assistance. We also want to thank Sarah Carr of EBM Tools Listserve and everyone who contributed citations per her request, for helping to compile our extensive bibliography on the economics of MPAs.

ii. Executive Summary

The U.S. National Marine Sanctuary designation process is being reopened after 20 years, and coastal communities across the country are being encouraged to submit nominations. In response, there is a proposal for a new California Central Coast Marine Sanctuary, stretching from the Channel Islands to the northern tip of San Luis Obispo County. This report provides our best estimates from available and extrapolated information, of the potential economic impact on San Luis Obispo County, if this proposed National Marine Sanctuary becomes a reality.

Communities seek Sanctuary designation for many reasons, including the preservation of unique cultural and natural resources, permanent prevention of offshore oil and gas development, or improving their local economies. This report focuses on the economic impacts possible from such a designation. Our results show that overall, the proposed Central Coast National Marine Sanctuary could add, at minimum 23 million dollars per year to the local economy and create almost 600 new jobs.

Our estimates draw from four channels of revenue and job generation we investigated:

1. Government expenditures on Sanctuary offices, staff, and infrastructure, as well as additional research money raised by Sanctuary staff
2. Money raised by local NGOs and academics to conduct Sanctuary-related research
3. Increased coastal tourism and the increases in relevant business revenues from it (due to both market signaling and improved ocean and coastal resource stewardship)
4. Increased property values, property taxes, and business, local, state and federal tax revenues due to Sanctuary proximity

It is important to note that these totals are conservative estimates and depend on the extent to which a) the Sanctuary staff aggressively market the unique natural, cultural, and historic resources as a focal point for preservation and education, b) the local tourist industry markets the Sanctuary, c) academics and NGOs seek to leverage the Sanctuary for research funding, d) the amounts of funding forthcoming from the Federal Government, and e) the extent to which Sanctuary policies lead to tangible improvements in coastal ecosystems.

A byproduct of this work is an appendix with an extensive bibliography of relevant literature, which we compiled to ensure we used all available information for this report.

We hope our report will serve to better inform the local community and help to determine whether the major effort required to submit a nomination for a new Sanctuary designation is in the region's best interests.

The Potential Economic Impacts of the Proposed Central Coast National Marine Sanctuary

By Jason Scorse, Ph.D. and Judith Kildow, Ph.D.¹

September 2014

1. Introduction

The U.S. National Marine Sanctuary designation process is being reopened after 20 years, and coastal communities across the country are being encouraged to submit nominations. When an area is ultimately chosen as a National Marine Sanctuary, a federal regulatory apparatus is immediately conferred on the areas within the new jurisdiction, along with the establishment of a local Sanctuary office and accompanying staff; and site-specific rules are put in place. The regulations that accompany a new Sanctuary both restrict specific ocean and coastal activity (i.e. oil and gas development), and provide opportunities for increased monitoring and research, education, partnerships, and incentives for more sustainable ocean and coastal management. There are myriad reasons why communities might seek a Sanctuary designation, including the preservation of unique cultural and natural resources, or to permanently prevent offshore oil and gas development.

It is beyond the scope of this paper to conduct a comprehensive economic assessment of the benefits of National Marine Sanctuary designations, or outline what such a study would entail. From our literature review, it is clear that no such analyses currently exist that could be extrapolated to the proposed Central Coast National Marine Sanctuary. Fortunately, there are means by which to provide some hard figures that are reasonable and defensible as to the likely economic impacts of a new Sanctuary for the economy of San Luis Obispo, County.² We

¹ Dr. Scorse is the Director of the Center for the Blue Economy at the Monterey Institute of International Studies (a Graduate School of Middlebury College) and Dr. Kildow is the Director of the National Ocean Economics Program at the Center for the Blue Economy.

² According to the sanctuary proposal, the Central Coast National Marine Sanctuary will directly border the Channel Islands National Marine Sanctuary to the south and the Monterey Bay National Marine Sanctuary to the north. It will span California's central coast from approximately 11 miles south of Point Conception to one mile north of Point Estero. This area encompasses all but seven miles of the northern coast of San Luis Obispo County and, while

estimate that overall the proposed Central Coast National Marine Sanctuary will add at minimum many millions of dollars per year to the local economy and the creation of hundreds of jobs.

In Section II, we discuss the various channels through which a new Sanctuary designation could help the regional economy within the Central Coast National Marine Sanctuary jurisdiction; in Section III we use available data and existing research to make some conservative projections as to the potential amount of new revenue and jobs that Sanctuary designation would likely bring to San Luis Obispo, County; in Section IV we provide a summary of the potential economic benefits; and in Section V we offer some concluding remarks.

II. Potential Benefits of Sanctuary Designation to Local Economies

There are both direct and indirect ways Sanctuary Designation can impact local economies. The primary direct economic impact is through the establishment of a new local Sanctuary office with an annual budget and staff, and often, new infrastructure. Some examples include: 1) The Monterey Bay National Marine Sanctuary Visitor Center and Education Facility, which opened in Santa Cruz in 2012, and contributed \$10.9 million to the local economy,³ and 2) in 2005 the Channel Islands National Marine Sanctuary began building new offices and research facilities on the UC-Santa Barbara campus—adding \$8.2 million to that community—and the Sanctuary continues to receive funding to complete a public education and outreach center, which is currently under construction.⁴

it does include roughly 30 miles of northern Santa Barbara County, the majority of that distance is within the Vandenberg Air Force Base, and not accessible by the public for recreational purposes and has a relatively insignificant residential population. Therefore, the Central Coast National Marine Sanctuary will mostly comprise San Luis Obispo County, which is the main unit of analysis for this study.

³ These values are in \$US 2010. These are the following citations for this information: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, 2008; Monterey Bay National Marine Sanctuary Management Plan, Silver Spring, MD. pp. 231-235; Staff, Office of Sam Farr, United States Congress. June 25, 2008. “Funding for local ocean projects advances”. <http://farr.house.gov/index.php/newsroom/press-releases-archive/2008-press-releases/396-june-25-2008-funding-for-local-ocean-projects-advances>; Douros, Bill. 2014. Personal Communication.

⁴ These values are in \$US 2010. These are the following citations for this information: Staff, Public Affairs and Communications Office for UC Santa Barbara, March 1, 2005, “New Marine Science Building Receives Federal Funds to House Marine Sanctuary Offices”. <http://www.ia.ucsb.edu/pa/display.aspx?pkey=1256>; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, 2008. Channel Islands National Marine Sanctuary Management Plan / Final Environmental Impact Statement. Silver

Apart from the direct federal expenditures given to maintain Sanctuary offices, programs, and staff, those staff often bring in additional outside money from foundations and other non-governmental organizations (NGOs) interested in ocean and coastal research and management. In addition, local NGOs and academics benefit in their grant fundraising by being able to solicit money for Sanctuary-related projects.

In most of the 14 current National Marine Sanctuaries, tourism is one of the largest sectors of the local economy. Millions of visitors are drawn to these areas for their beaches, recreational fishing, diving, snorkeling, surfing, fishing, wildlife viewing, and museums and aquariums.⁵ Much of this tourism would exist even without Sanctuary designation, but there are two ways in which it can increase it. The first is by simply signaling to the wider community that the resources in the particular area governed by the Sanctuary are special and worthy of a trip. The designation also provides an opportunity for promotion and marketing, a signal that something special is in the region that is worth visiting. Over the longer term, the extent to which Sanctuary regulations and management policies protect and improve the conservation of the region's ocean and coastal resources can help maintain and increase tourist visitation rates, along with the economic benefits they bring (Osso 2014). Finally, since National Marine Sanctuaries permanently prohibit oil and gas drilling and development, they remove the risks—and associated economic costs—of any potential environmental damages these activities might cause.

The extent to which Sanctuary designation preserves coastal resources can also translate into higher home values, and correspondingly higher local property tax revenue. It is well established

Spring, MD. p. 87.; Tim Schmidt, August 14, 2014, Office Manager, Marine Science Institute at UC Santa Barbara, Personal Communication; Bill Douros, 2014, Personal Communication.

⁵ In 2013 there were 69.8 million international visitors to the United States and the top four states visited were all coastal (New York, Florida, California, and Hawaii). Klein, et al. (2004) demonstrated that tourism-related earnings as a percentage of total earnings are highest in coastal counties (i.e. the location quotient for tourism in these counties is much higher - 1.82 and above - than it is in non-coastal counties). These figures are evidence that coastal areas of the United States and their associated recreational activities are a major draw for tourists. U.S. Department of Commerce, Office of Travel and Tourism Industries, "International Visitation to the United States: 2013 U.S. Travel and Tourism Statistics (Inbound)" Revised May 2014. Accessed September 03, 2014. http://travel.trade.gov/outreachpages/inbound.general_information.inbound_overview.html; Klein, Y.L., J.P. Osleeb, and M.R. Viola. 2004. Tourism-Generated Earnings in the Coastal Zone: A Regional Analysis. *Journal of Coastal Research*: 20(4):1080–1088.

by econometricians that proximity to beaches and ocean views contributes tremendous value to home prices. One only need look at the prices of homes with ocean views and direct beach access and compare them to the prices of almost identical homes a few blocks away to see how much people are willing to pay for these attributes. In fact, in many areas of California an unobstructed ocean view can add a premium as much as a million dollars to the price of a home (Kildow 2009). It is reasonable to expect that the cleanliness of the beaches, more abundant coastal wildlife, and the lack of view obstruction by oil rigs and mining vessels, (which are prohibited in Sanctuaries) also lead to higher home values. The extent to which Sanctuaries provide these services determines how much incremental value they add to regional real estate, along with the additional tax revenues.

To summarize, the economic benefits to local communities from Sanctuary designation can be generated through the following four channels:

1. Government expenditures on Sanctuary offices, staff, and infrastructure, as well as additional research money raised by Sanctuary staff
2. Money raised by local NGOs and academics to conduct Sanctuary-related research
3. Increased coastal tourism and the increases in relevant business revenues from it (due to both market signaling and improved ocean and coastal resource stewardship)
4. Increased property values, property taxes, and business, local, state and federal tax revenues due to Sanctuary proximity

In the next section we will examine the extent to which economic projections for the impacts of the proposed Central Coast National Marine Sanctuary in San Luis Obispo, County can be estimated for these four categories, using data on existing Sanctuaries and other research as a guide. We will also apply the appropriate employment multipliers to determine the overall job impacts.

III. Estimating the Economic Impacts of the proposed Central Coast National Marine Sanctuary Designation

III.1. Government expenditures

The most immediate and direct economic impact of any National Marine Sanctuary designation is the new government revenue brought to the region to establish a local Sanctuary office. William Douros, the West Coast Regional Director of the NOAA Office of National Marine Sanctuaries, provided us with data on the budgets for the four California National Marine Sanctuaries—Monterey Bay, Channel Islands, Cordell Bank, and Gulf of the Farallones—from the most recent decade, 2005-2014. The data includes the total operating budget, the construction budget, the number of staff, as well as the number of volunteer hours per year. Table 1 includes the averages for all four California Sanctuaries over the past decade, with all values in \$2010. These figures can help us estimate the expected direct economic benefits of a new Sanctuary Office in San Luis Obispo, County if the proposed Central Coast Sanctuary were established.

Table 1: National Marine Sanctuaries of California – Average Annual Budgets Per Sanctuary, 2005-2014.

Total Operating Budget	\$1,852,000
Construction Funds	\$1,022,000
No. of Paid Staff (Federal & Contracted)	18
Staff Wages	\$1,647,000
Volunteers: Hours/No.	11,769
External Funds (e.g. research grants)	\$491,000
Total Average Annual Spending	\$3,365,000

The four California Sanctuaries are very different. The Channel Islands Sanctuary is far from the mainland, the Monterey Bay Sanctuary is adjacent to a large population with a robust tourist economy, while Cordell Bank and the Gulf of the Farallones Sanctuaries are directly adjacent to each other and border much less dense populations. Therefore, it is difficult to extrapolate any of these figures directly to the proposed Central Coast Sanctuary. We believe that taking the average of all four is a reasonable first approximation of any new government spending that would come to San Luis Obispo, County to establish and operate a new Sanctuary office. We also believe that taking the average of the last three years' budgets is a reasonable predictor of the future fiscal situation.

Using averages from 2012-2014, we project that a new Central Coast Sanctuary would have a total annual budget of approximately \$1,767,000,⁶ a staff of 16, and attract outside grants of about \$410,000 per year. Based on revenue and employment multipliers derived from IMPLAN, this direct spending would lead to an additional \$1,088,50028 economic activity and 28 additional jobs in San Luis Obispo, County for a total of economic impact of \$3,265,500 and 44 new jobs. These total economic impacts are expected to be sustained indefinitely. However, given the unpredictability of the federal budget, it is difficult to know how this budget will change with any precision over time.

⁶ It is important to note that this represents a large drop when compared to the 10-year average because most of the construction spending for the big infrastructure projects was budgeted in many years ago. Again, this means that our estimates should be viewed as a lower bound.

In addition, we estimate that the proposed Central Coast Sanctuary would be able to attract 14,083 hours annually of volunteer time. Volunteers provide tangible services to a community; for example, as wildlife docents, or even cleaning beaches, which would otherwise cost money and can boost tourism revenue. Individuals get satisfaction from volunteering, as people are eager to invest in their local community, which can lead to real economic value that is measurable in the form of consumer surplus.⁷

III.2 Money Raised by Local NGOs and Academics to Conduct Sanctuary-Related Research

The presence of a Sanctuary in a community provides local NGOs and academics an opportunity to attract outside funding to do Sanctuary-related research. Much of this money is likely spent in the local community. However, there is almost no data collected on this outside funding, and even if there were, it would be difficult to determine how much of this money was awarded solely due to Sanctuary designation.

We were able to obtain data from Gary Griggs, Distinguished Professor of Earth Sciences at UC-Santa Cruz, who has collected information for many years on the research institutions within the Monterey Bay Crescent (representing a large share of the area covered by the Monterey Bay National Marine Sanctuary). His work includes data on total budgets and staff, and in addition, for the years 2010 and 2014 he compiled data on total outside funding raised by the majority of these institutions.

It is important to note that the bulk of the outside funding in the Monterey Bay Region comes from two institutions: The Monterey Bay Aquarium (MBA) and the Monterey Bay Aquarium Research Institute (MBARI).⁸ It is best to examine the total funding with and without these two institutions, as they are unique to the Monterey Bay National Marine Sanctuary and unlikely to

⁷ Consumer surplus is the amount of economic value that consumers derive from resources above and beyond what they paid for that good. For example, if beach visitation is a free activity, consumers can still receive economic value from this activity that can be measured based on the maximum that they are willing to pay for beach access. The same goes with volunteering; the sense of community participation has an economic value that can be estimated. A contingent valuation study could be undertaken to determine this value.

⁸ This excludes the large budget of Fleet Numeric that is unpublished.

be reproduced adjacent to a new Central Coast Sanctuary. In 2010 and 2014 the total outside funding in \$2010 raised by Monterey Bay Crescent Research Institutions, both with and without MBA and MBARI was \$150,700,000 in 2010 with MBA and MBARI, and \$60,700,000 without. In 2014, external funding including MBA and MBARI was \$168,064,000 and \$53,246,000 without it.

Without detailed interviews of staff at the participating institutions and a thorough review of their research proposals, it is impossible to determine what percentage of these grants was awarded because this research was conducted within a National Marine Sanctuary. Nonetheless, one can use these figures as a guide to a likely upper bound of what could be raised by local research organizations that could conduct Sanctuary-related research in any new California Sanctuary. The proposed area for the new Central Coast National Marine Sanctuary includes research institutions, such as California Polytechnic State University, and Morro Bay National Marine Estuary (one of only 28 EPA-supported Estuaries in the nation), which could become anchors for the research and monitoring that accompany Sanctuary designations and attract significant outside funding. If even as little as 10% of the funds raised in Monterey were due to Sanctuary designation and if the local Central Coast research institutions could only raise half as much money annually as in Monterey Bay, this would represent \$2-3 million in new money spent for research in San Luis Obispo, County.

III.3. Increased Coastal Tourism

There are many variables that impact tourism (i.e. infrastructure, range of activities and services, weather, alternative and substitute sites, along with larger macroeconomic trends). Complicating matters even further, it is complicated to draw a clear causal link between Sanctuary policies and any improved quality of the natural environment—which could potentially be linked to increased tourism—and no current research makes this connection.⁹

⁹ It is possible that for the new Central Coastal Sanctuary researchers could establish a benchmark set of tourism data before the sanctuary is designated, track the tourism estimates once the designation occurs, track predetermined environmental indicators before and after designation, and after some years attempt to make a connection between environmental changes and tourist numbers that account for other variables that could have affected both.

However, the Sanctuary designation does confer a signal to the broader public that the region in question has unique and valuable resources that are attractive to large segments of the tourism market. In many ways, Sanctuary designation is similar to UNESCO World Heritage site designation in that both are relatively rare (there are only 1007 UNESCO sites in the entire world), provide opportunities for more sustainable management and preservation of both cultural and natural resources, and provide a market signal that may be attractive to tourists.

Fortunately, some excellent work on the tourism impacts associated with UNESCO Heritage Site designation has been carried out by Rebanks Consulting Ltd. and Trends Business Research Ltd. (2009) that is applicable to our understanding of the Sanctuary designation. In their report entitled, “World Heritage Status: Is there an opportunity for economic gain?”, the authors find that UNESCO Heritage Site status does not automatically confer significant tourism benefits on surrounding local communities, but that it does if the communities make a point of using the new status as part of a broader marketing effort. This latter point is key to understanding what the economic impacts of the Central Coast Sanctuary might be on the local tourism industry.

If the new designation is used as an opportunity to increase the visibility of the San Luis Obispo, County coastal region and extol its unique and attractive features — thereby creating a new “brand identity” — there is the potential to have a significant tourism impact. For example, research at a coastal UNESCO site in Nova Scotia suggests that designation led to a 6.2% increase in tourism in the immediate years following designation (Kayahan and Blarcom 2012). The Rebanks Consulting and Trends Business Research study also presents case studies where tourism revenues increased from approximately 5% to as much as 45% in communities that took the opportunity to increase and improve marketing and branding.

Currently, there is no uniform national marketing strategy for National Marine Sanctuaries, and each Sanctuary is left to determine its own outreach efforts to the local community. For this paper, we conducted our own survey of local businesses along the Monterey Bay and discovered that many Monterey Bay Area tourist operators believe that the Sanctuary is a tourist draw; 63% of outdoor recreational businesses on the coast directly advertise the Sanctuary in their materials (of the 27 tour operators, 18 (67%) cited the Sanctuary on their web page), and 14% of coastal

hotels cite the Sanctuary as a reason to come visit.¹⁰ If efforts such as these were made, the Central Coast Sanctuary could reap even greater tourism benefits because of its unique cultural and historic significance.

The most comprehensive study to date on changes over time in tourism activities within a National Marine Sanctuary, conducted by Leeworthy (2010) in the Florida Keys National Marine Sanctuary, showed that while almost all coastal tourism in the Sanctuary decreased between 1995 and 2007, visitation to museums and historic areas increased dramatically by 48%, from 837,181 visitors in 1995 to 1,242,717 visitors in 2007. This increase is incredibly large and stands out from the data, representing by far the greatest absolute change in visitation patterns in the Florida Keys Sanctuary.

We estimate that with a significant investment in marketing and education to potential tourists, the establishment of the proposed Central Coast Sanctuary could increase tourism in San Luis Obispo, County by at least 5%, with a much greater increase if special marketing was done to promote new museums and sites of historic and cultural significance. Given that average tourism revenues over the past three years for which data are available (2009-2011), were \$235,419,549 (in \$2010) and employment 6,685, a 5% increase would provide an annual economic impact of \$11,770,977 in new tourism revenue for the local community, and 334 new jobs.¹¹ Using the multipliers derived from IMPLAN, this would lead to an additional \$6,474,037 in revenue generated and 213 additional jobs for a total economic impact of \$18,245,014 and 547 new jobs.

¹⁰ Our survey focused on accommodations within two miles of the shore, and all marine recreation tour operators and retail stores in Monterey County. The Monterey County Convention & Visitors Bureau website, <http://www.seemonterey.com/>, provided a current master list of all relevant businesses. Of 165 coastal accommodations surveyed, 24 (14%) directly advertised the presence of the MBNMS, 98 (59%) advertised Monterey Bay's unique marine wildlife, and 94 (57%) advertised recreational activities associated the MBNMS, such as whale watching, ocean kayaking, and SCUBA diving. There were a total of 35 tour operators and retail stores in Monterey County linked to marine recreation activities within the Sanctuary; 22 (63%) of these businesses advertised the MBNMS. Of the 27 tour operators, 18 (67%) cited the Sanctuary on their web page.

¹¹ National Ocean Economics Program. "Market Data: Coastal Economy Data." <http://oceaneconomics.org/Market/coastal/coastalEcon.asp>. Revised July 2014. Accessed July 29, 2014.

III.4. Increased Property Values and Property Taxes Due to Sanctuary Proximity

Ocean views are tremendously valuable, and anything that degrades them is often met with fierce opposition, as evidenced by the huge battles over the siting of offshore wind farms on the East Coast.¹² If it could be demonstrated that the proposed Central Coast Sanctuary designation would prevent the degradation of ocean views by prohibiting the siting of offshore oil and gas rigs that would likely get built without the Sanctuary designation, these “avoided costs” could be calculated and would likely be large. Property values would likely decrease in the event of the presence of these large offshore structures and/or appreciate at a slower rate into the future and the cumulative impact, plus the lower property taxes that would result, could be large. In addition, the extent to which Sanctuaries improve the environmental quality of the coastal environment could translate into higher home values as well.

As there are currently no proposed permits for offshore drilling, the impact of prohibition on this activity is beyond the scope of this paper to quantify at this time. In addition, without more ecological data on the impact of Sanctuary policies it is not possible to fully value the environmental amenities they augment.

It is important to emphasize that just because we are not able to estimate economic values for these two potential benefits of Sanctuary designation, does not mean that they do not exist; it just means that the research and data don’t exist to provide hard numbers.

¹² McDonnell, Tim, Top 4 Reasons the US Still Doesn't Have a Single Offshore Wind Turbine, Mother Jones, February 27, 2013, <http://www.motherjones.com/blue-marble/2013/02/us-rough-seas-offshore-wind>.

IV. Summary of Potential Economic Impacts of a New Central Coast National Marine Sanctuary

Table II summarizes the potential economic impacts for San Luis Obispo, County of a new Central Coast Sanctuary (\$2010):

Type of Economic Impact	Magnitude	Confidence Level
1. Government Expenditures		
Direct local revenue	\$1,767,000	High
- Indirect revenue	\$883,500	Medium-High
Outside grants	\$410,000	Medium
- Indirect revenue	\$205,000	Low - Medium
Direct local jobs	18	High
- Indirect jobs	26	Medium-High
Volunteer hours	14,083	Medium
2. Money Raised by Outside NGOs and Academics	Lower bound \$2-3 million	Medium
3. Increased Coastal Tourism		
Direct local revenue	\$11,770,977	Medium
- Indirect revenue	\$6,474,037	Low - Medium
Local jobs	337	Medium
- Indirect jobs	213	Low - Medium
4. Increased Property Values	N/A	N/A
Totals	Revenue: \$23,305,514+ (direct and indirect) Jobs: 594+ Volunteer hours: 14,083+	Medium Medium Medium

It is important to note that all of these are conservative estimates and much of the overall economic impact from a new Central Coast Sanctuary will be dependent on the extent to which a) the Sanctuary staff aggressively market the unique natural, cultural, and historic resources as a focal point for preservation and education, b) the local tourist industry markets the Sanctuary, c) academics and NGOs seek to leverage the Sanctuary for research funding, d) the amounts of funding forthcoming from the Federal Government, and e) the extent to which Sanctuary policies lead to tangible improvements in coastal ecosystems.

V. Conclusion

Estimating the economic impact of a new National Marine Sanctuary Designation to the local economy is difficult, both because of the paucity of available data and the inability to differentiate between correlation and causation for many important variables. However, reasonable approximations of some of the likely economic effects can be estimated. In this report, we have taken a conservative approach to provide some numbers of how much new revenue and how many new jobs could be generated for San Luis Obispo, County if a new Central Coast National Marine Sanctuary were designated, along with approximate values for outside research grants and the new volunteer service for the region. We hope that this work can serve to better inform the local community and help to determine whether submitting a nomination for a new Sanctuary designation is in the region's best interests.

VI. References

Global Insight. "An Assessment Of The Potential Costs And Benefits Of Offshore Wind Turbines, A report for the State of New Jersey, 2008.

Kayahan, B and Brian Van Blarcom, Cost Benefit Analysis of a UNESCO World Heritage Site Designation in Nova Scotia, *Review of Economic Analysis* 4(2012) 247-73. Data on p. 259.

John a dell Osso, "Point Reyes National Seashore Tourism Creates Nearly \$110 Million in Economic Benefits in 2013" National Park Service, July, 24, 2014 press release. National Park Visitor Spending Report, 2014.

Kildow, Judith T. "The Influence of Coastal Preservation and Restoration on Coastal Real Estate Values." In *The Economic and Market Value of America's Coasts and Estuaries, What's at Stake*, Linwood Pendleton, ed. 2009, prepared for Restore American's Estuaries,

McDonnell, Tim, Top 4 Reasons the US Still Doesn't Have a Single Offshore Wind Turbine, *Mother Jones*, February 27, 2013, <http://www.motherjones.com/blue-marble/2013/02/us-rough-seas-offshore-wind>.

Rebanks Consulting Ltd and Trends Business, Research Ltd, “World Heritage Status, Is there Opportunity for Economic Gain,” UNESCO, 2007. Pp. 17-35., pp. 26-27 for charts

Appendix A: Papers Used for Literature Review

Batha, C., J. Driscoll, E. Freeman, C. Gray, H. Hoffman, and S. Pierce. 2013. Analyzing the Suitability of the San Francisco-Pacific Exclusion Area for Incorporation Into the National Marine Sanctuary System. Bren School of Environmental Science and Management and the Gulf of the Farallones National Marine Sanctuary. Santa Barbara, CA. 194 pp.

Bird, C., B. Hooker, G. Moretti, L. Nojek, and D. Wusinich. 2002. An Analysis of Recreational Fishers' Activities and Attitudes at Gray's Reef National Marine Sanctuary. Duke University. Durham, NC. 36 pp.

California Department of Fish and Game, Partnership for Interdisciplinary Studies of Coastal Oceans, Channel Islands National Marine Sanctuary, and Channel Islands National Park. 2008. Channel Islands Marine Protected Areas: First 5 Years of Monitoring: 2003–2008. Airamé, S. and J. Ugoretz (Eds.). Sacramento, CA. 20 pp. www.dfg.ca.gov/marine.

Cesar, H., P. van Beukering, and A. Friedlander. 2004. Assessment of Economic Benefits and Costs of Marine Managed Areas in Hawaii. National Oceanic and Atmospheric Administration, Coastal Ocean Program, University of Hawaii for the Hawaii Coral Reef Initiative Research Program. Arnhem, The Netherlands. 9 pp.

Cesar, H., P. van Beukering, S. Pintz, and Jan Dierking. 2002. Economic Valuation of the Coral Reefs of Hawaii. National Oceanic and Atmospheric Administration, Coastal Ocean Program, University of Hawaii for the Hawaii Coral Reef Initiative Research Program. Arnhem, The Netherlands. 144 pp.

Ehler, R. 2008. Socioeconomic Assessment of Georgia Offshore Spearfishing. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. Silver Spring, MD. 4 pp.

Ehler, R. 2009. Economic Analysis of the Proposed Gray's Reef National Marine Sanctuary Research Area. National Oceanic and Atmospheric Administration, National Ocean Service,

Office of National Marine Sanctuaries. Silver Spring, MD. 10 pp.

Ehler, R. and V.R. Leeworthy. 2002. A Socioeconomic Overview of Georgia's Marine Related Industries and Activities. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. Silver Spring, MD. 33 pp.

English, D.B.K., W. Kriesel, V.R. Leeworthy, and P.C. Wiley. 1996. Linking the Economy and Environment of Florida Keys/Florida Bay: Economic Contribution of Recreating Visitors to the Florida Keys/Key West. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 26 pp.

Gornik, K., T. Lin, G. McDonald, N. Ng, C. Quigley, and D. Viana. 2013. The Non-Market Value of Private Recreational Boating in the Channel Islands National Marine Sanctuary. Bren School of Environmental Science and Management. Santa Barbara, CA. 49 pp.

Hoagland, P. and A.E. Meeks. 2000. The Demand for Whalewatching at Stellwagen Bank National Marine Sanctuary. In: *The Economic Contribution of Whalewatching to Regional Economies: Perspectives From Two National Marine Sanctuaries*. Marine Sanctuaries Conservation Series MSD-00-2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Marine Sanctuaries Division. Silver Spring, MD. pp. 53-87.

Hoegh-Guldberg, H. 2005. Socioeconomic Effects of Climate Change in the Florida Keys. National Oceanic and Atmospheric Administration, National Ocean Service, Coral Reef Conservation Program. Oberon, Australia. 37 pp.

Leeworthy, V.R. 1996. Linking the Economy and Environment of Florida Keys/Florida Bay: Technical Appendix: Sampling Methodologies and Estimation Methods Applied to the Florida Keys/Key West Visitors Surveys. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 181 pp.

Leeworthy, V.R. 2001. Socioeconomic Monitoring Program Florida Keys National Marine Sanctuary Preliminary Findings from Two Years of Monitoring the Commercial Fisheries: Impact of No Take Areas. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. Silver Spring, MD. 4 pp.

Leeworthy, V.R. 2002. "Economic Impact of the Recreational Lobster Fishery On Monroe County, 2001". NOAA National Marine Sanctuaries. Revised April 11, 2014, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/lobsterecon.pdf>

Leeworthy, V.R. 2010. Linking the Economy and the Environment of Florida Keys/Key West: Monterey County Resident Recreation: Selected Comparisons 1995-06 and 2008. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 15 pp.

Leeworthy, V.R. 2010. Linking the Economy and the Environment of Florida Keys/Key West: Visitor Study: Selected Comparisons 1995-06 and 2007-08. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 19 pp.

Leeworthy, V.R. 2012. Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Gray's Reef National Marine Sanctuaries by Users and Non Users of the Sanctuary. Marine Sanctuaries Conservation Series NMSP-12-01. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 48 pp.

Leeworthy, V.R. 2012. Technical Appendix: Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Gray's Reef National Marine Sanctuaries by Users and Non Users of the Sanctuary. Marine Sanctuaries Conservation Series NMSP-12-02.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 107 pp.

Leeworthy, V.R., D. Jerome, K. Schueler and T. Reyer. 2013. Study Area Profile 1990 to 2010, Socioeconomic Research & Monitoring Olympic Coast National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD.

Leeworthy, V.R., D. Jerome, and K. Schueler. 2013. Technical Appendix: Economic Impact of the Commercial Fisheries on Local County Economies from Catch in California National Marine Sanctuaries 2010, 2011 and 2012. Marine Sanctuaries Conservation Series ONMS-13-07. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries: Silver Spring, MD. 259 pp.

Leeworthy, V.R., D. Jerome, and K. Schueler. 2014. Economic Impact of the Commercial Fisheries on Local County Economies from Catch in all California National Marine Sanctuaries 2010, 2011 and 2012. Marine Sanctuaries Conservation Series ONMS-14-05. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries: Silver Spring, MD. 44 pp.

Leeworthy, V.R., D.K. Loomis, and S.K. Paterson. 2010. Linking the Economy and the Environment of Florida Keys/Key West: Visitor Profiles: Florida Keys/Key West 2007-08. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 210 pp.

Leeworthy, V.R. and F.C. Morris. 2010. Linking the Economy and the Environment of Florida Keys/Key West: A Socioeconomic Analysis of the Recreation Activities of Monroe County Residents in the Florida Keys/Key West 2008. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council.

Silver Spring, MD. 69 pp.

Leeworthy, V.R. and J.M. Bowker. 1997. Linking the Economy and Environment of Florida Keys/Florida Bay: Nonmarket Economic User Values of the Florida Keys/Key West. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 48 pp.

Leeworthy, V.R. and P.C. Wiley. 1997. Linking the Economy and Environment of Florida Keys/Florida Bay: Socioeconomic Analysis of the Recreation Activities of Monroe County Residents in the Florida Keys/Key West. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 58 pp.

Leeworthy, V.R. and P.C. Wiley. 1996. Linking the Economy and Environment of Florida Keys/Florida Bay: Visitor Profiles: Florida Keys/Key West. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 174 pp.

Leeworthy, V.R. and P.C. Wiley. 1997. Linking the Economy and Environment of Florida Keys/Florida Bay: Technical Appendix: Sampling Methodologies and Estimation Methods Applied to the Survey of Monroe County Residents. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 63 pp.

Leeworthy, V.R. and P.C. Wiley. 2003. Profiles and Economic Contribution: General Visitors to Monroe County, Florida 2000-2001. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. Silver Spring, MD. 39 pp.

Leeworthy, V.R., P.C. Wiley, and E.A. Stone. 2005. Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD. 299 pp.

Leeworthy, V.R. and P. Vanasse. 1999. Linking the Economy and Environment of Florida Keys/Florida Bay: Economic Contribution of Recreation Visitors to the Florida Keys/Key West Updates for Years 1996-97 and 1997-98. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 28 pp.

Leeworthy, V.R. and R. Ehler. 2010. Linking the Economy and the Environment of Florida Keys/Key West: Economic Contribution of Recreating Visitors to the Florida Keys/Key West 2007-2008. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, The Nature Conservancy/Florida Keys Initiative, and The Monroe County Tourist Development Council. Silver Spring, MD. 26 pp.

Leeworthy, V.R., T. Culliton, and T. Reyer. 2013. Study Area Profile 1990 to 2010, Socioeconomic Research & Monitoring Channel Islands National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD. 38 pp.

Leeworthy, V.R., T. Culliton, and T. Reyer. 2013. Study Area Profile 1990 to 2010, Socioeconomic Research & Monitoring Cordell Bank National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD. 40 pp.

Leeworthy, V.R., T. Culliton, and T. Reyer. 2013. Study Area Profile 1990 to 2010, Socioeconomic Research & Monitoring Gulf of the Farallones National Marine Sanctuary.

National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD. 40 pp.

Leeworthy, V.R., T. Culliton, and T. Reyer. 2013. Study Area Profile 1990 to 2010, Socioeconomic Research & Monitoring Monterey Bay National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries: Silver Spring, MD.

Markrich, M. 2004. The Hawaii Boat Industry 2003 – A Survey and Economic Description. Hawaii State Department of Business, Economic Development, & Tourism. Honolulu, HI. 50 pp.

Murray, T. 2005. Tortugas 2000 – A Post Mortem: Evaluation of Actual Versus Projected Socioeconomic Impacts of the Dry Tortugas Ecological Reserve. Thomas J. Murray & Associates, Inc., and National Marine Fisheries Service, Southeast Regional Office: St. Petersburg, FL. 33 pp.

Nelson, P.A., et al. 2008. Developing Wave Energy In Coastal California: Potential Socio-Economic And Environmental Effects. California Energy Commission, PIER Energy-Related Environmental Research Program & California Ocean Protection Council CEC-500-2008-083. Sacramento, CA. 202 pp.

Pendleton, L.H. 2005. Understanding the Potential Economic Value of Marine Wildlife Viewing and Whale Watching in California: Executive Summary. The National Ocean Economics Program and California Department of Fish and Game. Sacramento, CA. 15 pp.

Reeves, R.R. 2000. The Value of Sanctuaries, Parks, and Reserves (Protected Areas) As Tools for Conserving Marine Mammals. Final Report to the Marine Mammal Commission, contract number T74465385. Marine Mammal Commission. Bethesda, MD. 50 pp.

Pendleton, L.H. and J. Rooke. 2006. Understanding the Potential Economic Impact of SCUBA Diving and Snorkeling: California. The National Ocean Economics Program and California

Department of Fish and Game. Sacramento, CA. 15 pp.

Sanchirico, J.N., K.A. Cochran, and P.M. Emerson. 2002. Marine Protected Areas: Economic and Social Implications. Discussion Paper 02-26. Resources for the Future. Washington D.C. 27 pp.

Scholz, A., et al. 2004. Participatory socioeconomic analysis: drawing on fishermen's knowledge for marine protected area planning in California. *Marine Policy* 28(4): 335-349.

Scholz, A.J. and R.M. Fujita. 2001. Supplementary Report: Social and Economic Implications of a Channel Islands Marine Reserve Network. Environmental Defense. Oakland, CA. 47 pp.

Staff, Thomas J. Murray & Associates. 2007. Socio-economic Baseline Development Florida Keys National Marine Sanctuary: Fishing Years 1998-2006. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. Ft. Lauderdale, FL. 27 pp.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. 2007. Channel Islands National Marine Sanctuary Social Science Plan (2007 – 2010): Socioeconomic Research & Monitoring of Marine Reserves and Conservation Areas. Silver Spring, MD. 44 pp.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. "Channel Islands National Marine Sanctuary Socioeconomics Factsheet". NOAA National Marine Sanctuaries. Revised January 06, 2014, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/channelislands.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. "Cordell Bank National Marine Sanctuary Socioeconomics Factsheet". NOAA National Marine Sanctuaries. Revised January 06, 2014, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/cordellbank.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Fagatele Bay National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/fagatelebay.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Florida Keys National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/floridakeys.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Flower Garden Banks National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/flowergardenbanks.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Gray’s Reef National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/graysreef.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Hawaiian Islands Humpback Whale National Marine Sanctuary and Papahānaumokuākea Marine National Monument Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/hawaii_monument.html

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Monterey Bay National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised January 06, 2014, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/montereybay.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Olympic Coast National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/olympiccoast.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Stellwagen Bank National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/stellwagenbank.html>

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program. “Thunder Bay National Marine Sanctuary Socioeconomics Factsheet”. NOAA National Marine Sanctuaries. Revised May 02, 2013, accessed July 15, 2014. <http://sanctuaries.noaa.gov/science/socioeconomic/factsheets/thunderbay.html>

Utech, D. 2000. Valuing Hawaii’s Humpback Whales: The Economic Impact of Humpbacks on Hawaii’s Ocean Tour Boat Industry. In: *The Economic Contribution of Whalewatching to Regional Economies: Perspectives From Two National Marine Sanctuaries*. Marine Sanctuaries Conservation Series MSD-00-2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Marine Sanctuaries Division, Silver Spring, MD. pp. 6-52.

Van Beukering, P. and H. Cesar. 2004. Economic Analysis of Marine Managed Areas in the Main Hawaiian Islands. National Oceanic and Atmospheric Administration, Coastal Ocean Program, University of Hawaii for the Hawaii Coral Reef Initiative Research Program. Arnhem, The Netherlands. 28 pp.

Van Beukering, P., H. Cesar, J. Dierking, and S. Atkinson. 2004. Recreational Survey in Selected Marine Managed Areas in the Main Hawaiian Islands. National Oceanic and Atmospheric Administration, Coastal Ocean Program, University of Hawaii for the Hawaii Coral Reef Initiative Research Program. Arnhem, The Netherlands. 14 pp.

Van Schagen, Sarah. April 1, 2011. "Community Service Payment Awarded to National Marine Sanctuary Foundation for Fagatele Bay National Marine Sanctuary". National Marine Sanctuary Foundation. Accessed July 15, 2014. <http://www.nmsfocean.org/article/2011/04/01/community-service-payment-awarded-nmsf-fagatele-bay-national-marine-sanctuary>