Understanding the Potential Economic Value of Marine Wildlife Viewing and Whale Watching in California: Executive Summary

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Marine protected areas often are designed first and foremost to protect marine wildlife, and then secondly to do so in a way that meets important social goals. While MPA regulation usually is aimed at protecting fish and shellfish species, many other marine species benefit from well-designed MPAs. Numerous studies have demonstrated the economic value of wildlife viewing, especially whale watching. Whale watching contributes to local economies both in direct revenues (and the jobs these revenues support) and in the overall economic wellbeing of coastal users. Table EXEC 1 provides a summary of per person per day expenditures that have been estimated for whale watching and wildlife viewing in North America and parts of Europe. Within California, whale watching also contributes to local revenues. We estimate that whale watching in California alone probably generates on the order of $20 million in gross revenues annually and net revenues of between $4 million and $9 million.

Whale watching and wildlife viewing also generate non-market benefits for the millions of people lucky enough to see marine wildlife along the California coast. Non-market benefits represent the value of an asset to people beyond what they have to pay for that asset. Table EXEC 2 provides a summary of non-market values per person per day that have been estimated for a variety of marine wildlife viewing experiences in North America and parts of Europe. Many of the best opportunities for viewing marine wildlife, especially from land, occur along California's central coast – where the Pacific Coast Highway, that connects the large metropolitan areas of Los Angeles and San Francisco - runs along much of the rugged coast line. We estimate the non-market value for whale watchers alone at more than $40 million annually. While sufficient data do not exist to determine the non-market value of wildlife viewing generally in California, we estimate the value to be on the order of tens to hundreds of millions of dollars annually. Clearly, the economic value of protecting and enhancing near shore marine wildlife populations in California is non-trivial.

TABLE EXEC 1: Expenditures Associated with Wildlife Viewing and Whale Watching

	Author	Location	Species	Expenditures (per person per day, $2005)	Annual Expenditures (rounded to nearest million $2005)
WILDLIFE VIEWING	Colt (2001)	Alaska	Various	Primary purpose: $845 Secondary purpose: $586	
	Aldrich et al. (2001)	California	Sea otters		
	Duffus (1993)	Canada	Killer whales	1986: $472 1989: $530	
	Hoagland and Meeks (2000)	Stellwagen Bank, New England	Humpbacks, and others	$29.76	$26 million
	Kaza (1982)	California	Gray Whales	$19.92	$5 million
	Krauss (1989)	California	Not stated		$7-9.4 million
WHALE WATCHING	Leworthy and Wiley (2003) **	Channel Islands, California	Gray, blue, minke and humpback whales	$62.50 - $70.40	$2 million
	Utech (2000)	Hawaii	Humpbacks	Whale watching tours only $34.78 Including snorkeling $50.60	
	Parsons et al. (2003)	West coast of Scotland	Harbor porpoises, minke and killer whales	$92.50	$3 million

TABLE EXEC 2: Non-market Values Associated with Wildlife and Whale Watching

	Author	Method	Location	Species	Consumer surplus (per person per day, $2005	Annual Non-market Value (rounded to nearest million $2005)
WILDLIFE VIEWING	Colt (2001)	unreported	Alaska		Min: $143 Max: $229	
	Hall et al. (2002)	Contingent Valuation	California	Tide pools	$6.78/family visit	
	Bosetti and Pearce (2003)	Contingent Valuation	England	Gray seals	For seeing seals in the wild: $14.5	
	Johnston et al. (2002)	Travel Cost Method	New York	Not mentioned	$63.8	$35 million
	Leeworhty and Bowker (1997)	Travel Cost Model	Florida	not identified	$108.35	$287 million
	Hoagland and Meeks (2000)	Travel Cost method	Stellwagen Bank, New England	Humpback Whales	$32.15	$28 million
WHALE WATCHING	Leworthy and Wiley (2003)	Travel Cost and Contingent Valuation Methods	Channel Islands, California	Gray, blue and humpback whales	$42.23	$1 million
	Loomis and Larson (1994)	Contingent Valuation Method	California	Gray whales	Whalewatchers: 50% change: $32.75 100% change: $38.95	

Understanding the Potential Economic Value of Marine Wildlife Viewing and Whale Watching in California:

Using the Literature To Support Decision-Making for the Marine Life Protection Act

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I. INTRODUCTION

The California Marine Life Protection Act requires that the Department of Fish and Game, working with local stakeholders, develop a series of marine protected areas along the coast of California. The second goal of the Act states that marine protected areas should be designed "to help sustain, conserve, and protect marine life populations, including those of ECONOMIC VALUE." Identifying marine life populations with substantial economic value is not always straightforward. Because much of the readily available economic data come from fisheries landings receipts, commercially valuable fish populations are often easily and readily identified as having "economic value." Increasingly, though, non-fishery related marine populations have been recognized to contribute significantly to local and regional economic wellbeing. The question of just how valuable these populations are remains largely unanswered. Nevertheless, there is available a large and growing literature providing insight into the potential economic value of non-fishery marine populations. Bibliographic databases and information networks like the National Ocean Economics Program's "Non-market Literature Portal" (www.oceaneconomics.org) and the National Oceanic and Atmospheric Administration's Marine Economics website (www.marineeconomics.noaa.gov) now make it possible for researchers to quickly locate relevant studies from the literature. In the paper that follows, we review the literature to provide an overview of the economic value of two important uses of non-fishery resources – marine wildlife viewing and whale watching. We also provide a discussion of the potential value of similar resources in California.

II. The Importance of Marine Wildlife Viewing

In 1999 and 2000, more than 43% of all Americans participated in some form of marine recreation[1]. Americans flock to beaches and shores to swim, fish, boat, and view the natural scenery (see Table 1). While the Leeworthy et al. (2001) expect the proportion of the population that participates in marine recreation will decline over the coming decade, population growth in the coastal zone is expected to offset this trend. Overall, the total number of people participating in all forms of marine recreation is expected to increase, with the largest increases expected for beach-going activities (Leeworthy et al. 2005). California ranks second only to Florida in the total number of participants[2] in coastal recreation (17.6 million participants), but ranks first in terms of the number of state residents that participate in coastal recreation activities (Leeworthy 2001).

Wildlife viewing represents an important part of marine recreation. Bird watching and other wildlife viewing constitute the fifth and seventh most popular marine recreation activities in the United States, with more than 15 million people spending nearly 650 million person days watching birds at the shore alone (Table 2, Leeworthy and Wiley 2001). Using forecasting models of population growth and participation models for

[1] Estimates are based on a national survey of outdoor recreation known as the National Survey on Recreation and the Environment (Leeworthy et al. 2001)
[2] Includes both in-state and out of state participants.

marine recreation, Leeworthy et al. (2005) predict that by 2005, the number of people participating in coastal bird watching activities was expected to have grown by 6% to more than 16 million participants; by 2010 the figure is predicted to be just under 17 million. Other forms of wildlife viewing, including whale watching, also are expected to grow in overall numbers of participants. Using the same models, Leeworthy et al. (2005) predict that by 2005, almost 14.5 million people can be expected to participate in some other form of wildlife viewing nationally with this number growing to 15 million by 2010.

In California, wildlife viewing is also an important component of marine and coastal recreation. The state ranks second in the nation in terms of number of coastal birdwatchers with more than 2.5 million people participating in some kind of coastal birdwatching during 1999 and 2000. Other types of wildlife viewing, including whale watching are equally important in California. Leeworthy and Wiley (2001) et al. report that 2.5 million people participated in wildlife viewing other than bird watching in California; as many as 1.76 million people may have been whale watchers (Hoyt 2001).

Whale watching has grown to become an industry with gross receipts of over $150 million (in US$ 1999) in the United States alone. By the early twenty-first century, whale watching businesses operated in 87 countries and served more than 9 million whale watchers (Hoyt 2001). Worldwide, the number of participants in whale watching activities grew at a rate of more than 12% between 1991 and 1998. Nearly half of all whale watchers worldwide took trips in the United States (47.8%), more than 4.3 million whale watchers (Table 3). The growth rate in the United States, however, has remained relatively small, with a 4.17% average annual growth of whale watchers between 1991 and 1998. At the end of the twentieth century, nearly 270 whale watch tour companies were in operation in the United States generating over $158 million in direct revenues (in US$1999[3], Hoyt 2001).

Within the United States, whale watching is concentrated most heavily in New England, Alaska, California, and the Pacific Northwest. While California ranked second (tied with Alaska, see Table 4) in terms of numbers of boat-based whale watchers in 1999, the ease of seeing whales from land in California places it at the top of all areas in the United States where people view whales; more than one million people see whales in California from land-based vantage points (Hoyt 2001). In all, it is estimated that California whale watching generated over $14[4] million (US$ 1999) at the end of the twentieth century – approximately 10% of all whale watching revenues generated in the United States.

[3] If adjusted to $2005, the figure would be approximately $185million.
[4] If adjusted to $2005, the figure would be approximately $16.4 million.

Table 1: Participation Rates and Number of Participants by Activity/Setting and Year in the United States (from Leeworthy et al 2005)

	2000	2005		2010	
Activity/Setting (by Rank)	**Number of Participants (millions)**	**Number of Participants (millions)**	**Growth Rate (compared to 2000)**	**Number of Participants (millions)**	**Growth Rate (compared to 2000)**
Visiting Beaches	63.67	67.59	6%	70.94	11%
Swimming	54.13	57.21	6%	59.64	10%
Fishing	21.88	23.31	7%	24.54	12%
Viewing or Photographing Scenery	19.49	20.62	6%	21.62	11%
Bird-Watching	**15.2**	**16.1**	**6%**	**16.86**	**11%**
Motorboating	15.08	15.95	6%	16.7	11%
Viewing other Wildlife	**13.68**	**14.41**	**5%**	**15.01**	**10%**
Snorkeling	10.75	11.38	6%	11.88	11%
Visiting Watersides Besides Beaches	9.54	10.22	7%	10.84	14%
Sailing	6.32	6.69	6%	7	11%
Personal Watercraft Use	5.45	5.77	6%	5.99	10%
Surfing	3.37	3.63	8%	3.81	13%
Scuba Diving	2.86	3.12	9%	3.34	17%
Kayaking	2.82	3.01	7%	3.15	12%
Water Skiing	2.44	2.57	5%	2.69	10%
Canoeing	2.23	2.35	5%	2.45	10%
Rowing	1.12	1.21	8%	1.28	14%
Wind Surfing	0.83	0.89	7%	0.94	13%
Hunting Waterfowl	0.7	0.77	10%	0.83	19%

Table 2: Participation in Coastal Bird-watching or Wildlife Viewing (1999)

Location of Activity	**Participation Rate* (%)**	**Number of participants** (millions)**	**Number of days*** (millions)**
United States			
Bird-watching	7.17	14.79	630.13
Other Wildlife Viewing	6.45	13.30	340.70
California			
Bird-watching	1.25	2.58	65.76
Other Wildlife Viewing	1.24	2.55	38.58

From Leeworthy and Wiley (2001), * Percent of the US population that participated in the activity, ** Number of Participants is equal to the participation rate multiplied by the non-institutionalized population 16 years or older in all households of the U.S. as of September 1999 or 206,171,709, *** The number of days the respondents participated in each activity over a

period of 12 months. Note figures from Tables 1 and 2 differ due to the use of different base population levels in each report.

Table 3. Average Number of Whale Watchers And Related Expenditures (1999).

Country	Number. of Whale-Watchers (millions)	Direct Expenditures (million, US$1999)	Average Annual Growth (%)
Australia	0.74	11.87	
Canada	1.08	27.438	
France	0.00075	0.41	
Iceland	0.03	2.96	250.9
Ireland	0.18	1.32	
Italy	0.0053	0.24	139.9
Mexico	0.11	8.74	
New Zealand	0.23	7.5	
Norway	0.02	1.63	18.8
Spain	.025-.038	0.55	123.6
USA	4.32	158.39	4.17
Worldwide	9.02	299.51	12.1

(Taken from Hoyt, 2001. Note, all values are assumed to be in $US1999. These values were not adjusted to $2005.)

Table 4: Whale Watching in the United States (1999)

	Operators	Boat-based Whale watchers (millions)	Direct Exp. (million, $1999)	Land-based Whale watchers (thousands)
New England	36	1.23	30.6	10
Alaska	66	0.77	89.1	5
California	65	0.76	14.11	1,012.00
Oregon	10	0.64	0.82	126.2
Washington	26	0.52	3.31	265
Hawaii	40	0.44	16.03	10
Eastern US & Gulf	25	0.26	4.42	10
Totals	268	2.89	158.39	1,438.21

(from Hoyt 2001)

More than twenty communities in California offer whale watching opportunities, but most of these opportunities are land-based. Monterey, San Francisco, and several locations in southern California offer boat-based whale watching tours. Unlike southern California where many whale watchers are school children or local residents, nearly half of the whale watchers leaving San Francisco and Monterey are international residents (Hoyt 2001). The Monterey Bay and the Santa Barbara areas have longer whale watching seasons than the rest of the state due to the blue and humpback whale seasons in summer and early autumn (Hoyt, 2001). Nevertheless, Hoyt (2001) reports that residents of California continue to be major participants in the whale watching industry and represent an area of potential growth for the whale watching industry.

III. ECONOMIC CONTRIBUTION OF WHALE AND MARINE WILDLIFE VIEWING

Wildlife viewing, including whale watching, contributes to local, regional, and national economies in two important ways. First, wildlife viewing and whale watching generate gross revenues that create jobs, support salaries, and generate tax revenues for local and state governments. Only the net revenues associated with these gross receipts represent added economic value to the economy. Second, wildlife viewing and whale watching generate values beyond what people spend in the market. These non-market values represent a larger part of the total value that people place on the opportunity to see marine and coastal wildlife. Non-market values are especially important when species are rare or of high interest and when costs of viewing are low.

In the literature, two primary methods are used to estimate the non-market value of marine resources. Travel cost methods are used to estimate a demand curve for recreational activities by modeling the influence of travel cost and travel time on the frequency of visitation by marine recreational users. Travel cost methods use real economic behavior to estimate the consumer surplus of marine recreation (the value users place on a visit beyond what they have to pay), but the method can only estimate the value of current uses. When future or potential uses are under consideration, authors have used contingent methods to estimate values for marine recreation and other types of non-market uses of marine resources. Contingent valuation methods use surveys to ask respondents about their willingness to pay to see or protect environmental resources.

In the following section, we review the literature to summarize the economic expenditures and values that have been estimated for wildlife viewing and whale watching, primarily in the United States. Note, that unless stated otherwise, all values that follow have been converted into US$2005 using the Bureau of Labor Statistics' Consumer Price Index Calculator.

Expenditures

Except in Alaska, where wildlife-related tours have been shown to generate over $845/trip, coastal and marine wildlife viewing generally has not been demonstrated to generate substantial direct revenues for local businesses in the United States (Table 5). Nevertheless, the draw of wildlife viewing may contribute indirectly to spending by wildlife viewers on accommodations, meals, and other items. To better understand the indirect contribution of otters to tourism spending, three students at the University of California at Santa Barbara (Aldrich et al. 2001) conducted an analysis[5] of the impact of otters on tourism spending for coastal counties in California. The study used statistical methods (hedonic regression analysis) to determine how various factors contributed to overall tourism revenues, by county. The study was limited by the fact that county level tourism data were not disaggregated to separate coastal tourism from other kinds of tourism. Further, the study included few characteristics about the destination counties

[5] The study was an hedonic analysis in which tourism expenditures were modeled as a function of attributes of coastal counties, their tourism sectors, and the abundance of otters in those counties.

that might help explain coastal visitation (e.g. length of sandy shores, marinas, parks and marine reserves, and presence of other wildlife). Both factors reduce the statistical power of the study's results. Despite the limitations of the study, the authors were able to show that the presence of otters had a significant and positive impact on total tourism revenues (i.e. the presence and number of otters statistically increased overall tourism spending in California counties, all other factors held constant). Since the presence of otters may be correlated with other natural features that were omitted, the students' findings may reflect the value of wildlife viewing overall.

As noted earlier, whale watching trips generate direct revenues where boat-based whale watching trips are available. Hoyt (2001) conducted surveys of whale watching enterprises in the United States to determine how much money people spent on whale watching tickets and packages. Based on these surveys and information collected regarding the number of whale watchers and ticket prices, the author estimates that more than $158 million in expenditures were generated annually by whale watching businesses in the United States at the end of the twentieth century (with a 2005 value of over $185 million). In total, the annual regional expenditures of whale watchers on charter trips and related expenditures may be many millions of dollars. For instance, annual expenditures on whale watching trips in Stellwagen Bank National Marine Sanctuary in Massachusetts were nearly $26.7 million (Hoagland and Meeks 2000). Per trip expenditures on whale watching trips in the United States have been estimated for New England (Hoagland and Meeks 2000), California (Kaza 1982 and Krauss 1989), and Hawaii (Utech 2000). In the literature, recent estimates of per trip expenditures range from nearly $30 to almost $70 for whale watching trips.

In California, whale watching generates significant gross revenues. During summer 2005, we found that the cost whale watching trips in Monterey, California ranged between $35 and $75 depending on the duration of the trip. Older studies of whale watching in California (Kaza 1982 and Krauss 1989) estimated annual total expenditures associated with whale watching at $5million and $9.4 million respectively, but both the price and participation rate of whale watching in California has increased substantially since this time. In a study of the economic impact of marine protection in the Channel Islands National Marine Sanctuary, Leeworthy and Wiley (2003) estimate that whale watching was the top non-consumptive recreational activity among visitors, accounting for 62% of all non-consumptive recreation activity in the CINMS in 1999. The average per person per trip expenditure for a whale watching ticket in the Channel Islands was between $62 and $70 (depending on the origin of the trip), while the total expenditures by whale watchers (including food, beverage and accommodations) exceeded $195. Based on Hoyt's estimates of gross revenues in 1999, an annual increase in participation of 4% (the average rate of increase in whale watching for the United States from 1991 to 1997 as estimated by Hoyt), and the rate of inflation[6], we estimate that total annual

[6] We use the Bureau of Labor Statistics' consumer price index inflator. For the period 1999 to 2005, the inflation adjustment is 17%.

expenditures on whale watching in California in 2005 should be over $20 million (US$2005)[7].

Table 5: Expenditures Associated with Wildlife Viewing and Whale Watching

	Author	Location	Species	Expenditures (per person per day, $2005)	Annual Expenditures[8]
WILDLIFE VIEWING	Colt (2001)	Alaska	Various	Primary purpose: $845 Secondary purpose: $586	
	Aldrich et al. (2001)	California	Sea otters		
	Duffus (1993)	Canada	Killer whales	1986: $472 1989: $530	
	Hoagland and Meeks (2000)	Stellwagen Bank, New England	Humpbacks, and others	$29.76	$26 million
	Kaza (1982)	California	Gray Whales	$19.92	$5 million
	Krauss (1989)	California	Not stated		$7-9 million
WHALE WATCHING	Leworthy and Wiley (2003) **	Channel Islands, California	Gray, blue, minke and humpback whales	$62.50 - $70.40	$2 million
	Utech (2000)	Hawaii	Humpbacks	Whale watching tours only $34.78 Including snorkeling $50.60	
	Parsons et al. (2003)	West coast of Scotland	Harbor porpoises, minke and killer whales	$92.50	$3 million

As mentioned earlier, gross revenues are important because they indicate the contribution of an industry to jobs, wages, and taxes. Net revenues, however, are a better measure of the economic value of an industry to the economy overall. Hoyt (2001) estimates the net revenues of a typical whale watching business with a capital investment of $2 million to be roughly 20% of gross revenues per year. A similar study by Parsons et al. (2003) found that whale watching businesses in western Scotland generated a net revenues of

[7] Current value = (1999 value*CPI Inflator)*(1.04)[6] It seems weird to footnote a footnote. Maybe combine them? Also, maybe say that 1.04 represents Hoyt's estimated annual growth rate?
[8] Values are rounded to the nearest million $2005.

nearly 47% of total revenues annually. Using these figures, we estimate the net revenues of whale watching in the California to be between $4 million and $9 million annually (i.e. 20% and 40% of the estimated $20 million in gross expenditures on whale watching trips).

Non-Market Values

Wildlife viewing generally, and whale watching specifically, contributes to the wellbeing of coastal users worldwide. Rare and charismatic wildlife (e.g. coastal grizzly bears and whales) generate sizeable non-market values even when the cost of access is high (see Table 6). Colt (2001), for example, estimates that wildlife viewing in Alaska generates per trip non-market values between $143 and $229 per person per trip. Leeworthy and Bowker (1997) use a travel cost model to estimate the non-market value of a wildlife viewing in the Florida Keys to be just over $108 per person per trip and Johnston et al. (2002) estimate the value of wildlife viewing on the Peconic Sound at $63 per person per trip. Bosetti and Pearce (2003), using a contingent valuation tool, find much smaller values for viewing gray seals in southwest England, while Hall et al. (2002), using a similar method, find the non-market value of tide pooling to be just under $7 per family per visit. Of course, even small values can represent large total non-market values when the number of users is large. For instance, the large number of visitors to the Florida Keys means that the total non-market value of wildlife viewing exceeds $286 million (Leeworthy and Bowker 1997). With more than 83 million person days of bird-watching and 49 million person days of wildlife viewing expected for California in 2005 (from Leeworthy et al. 2005), the non-market value of coastal wildlife viewing in the state could easily be in the tens or hundreds of millions of dollars annually.

Non-market values for whale watching are also important . Hoagland and Meeks (2000) use travel cost analysis to estimate the non-market value of whale watching in Stellwagen Bank at more than $32 per person per trip. In California, Loomis and Larson (1994) conducted a contingent valuation of whale watchers and found that on average, whale watchers would be willing to pay? $32.75 per person per year in order for whale populations to increase by 50% and $38.95 for whale populations to double; both scenarios would presumably increase the probability of seeing whales. The authors found that households in California generally would pay an average of $21.20 and $23.76 for similar changes. Because most of these households did not actually see or plan to see whales that year, the result suggests that part of the non-market value held by California whale watchers may include an existence value[9] for whales, beyond the direct non-market value of seeing whales. Leeworthy and Wiley (2003) use results from both contingent valuation and travel cost studies to estimate that the non-market value of whale watching in the Channel Islands was over $42. If we assume that whale watching in California increased steadily by 4% annually from 1999 until 2005, we can use Hoyt's estimate of the number of boat-based whale watchers in California in 1999 and Leeworthy and Wiley's estimate of $42 to estimate a current total non-market value for whale watching in the state to be more than $40 million for boat-based whale watchers.

[9] Existence values capture the economic willingness of people to pay to protect whales, even if they never plan to see them.

Table 6: Non-market Values Associated with Wildlife and Whale Watching

	Author	Method	Location	Species	Consumer surplus per person per trip ($2005)	Annual Non-market Value[10]
WILDLIFE VIEWING	Colt (2001)	unreported	Alaska		Min: $143 Max: $229	
	Hall et al. (2002)	Contingent Valuation	California	Tide pools	$6.78/family visit	
	Bosetti and Pearce (2003)	Contingent Valuation	England	Gray seals	For seeing seals in the wild: $14.5	
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IV. Discussion

Marine protected areas often are designed first and foremost to protect marine wildlife, and then secondly to do so in a way that meets important social goals. While MPA regulation usually is aimed at protecting fish and shellfish species, many other marine species benefit from well-designed MPAs. Numerous studies have demonstrated the economic value of wildlife viewing, especially whale watching. In this brief paper, we highlight the range of values that have been estimated for wildlife viewing and whale watching in the United States. Not surprisingly, whale watching contributes to local economies both in direct revenues (and the jobs these revenues support) and in the overall economic wellbeing of coastal users. We estimate that whale watching in California alone probably generates on the order of $20 million in gross revenues annually and net

[10] Values are rounded to the nearest million $2005.

revenues of between $4 million and $9 million. Whale watching and wildlife viewing also generate non-market benefits for the millions of people lucky enough to see marine wildlife along the California coast. Many of the best opportunities for viewing marine wildlife, especially from land, occur along California's central coast – where the Pacific Coast Highway, that connects the large metropolitan areas of Los Angeles and San Francisco - runs along much of the rugged coast line. We estimate the non-market value for whale watchers alone at more than $40 million annually. While sufficient data do not exist to determine the non-market value of wildlife viewing generally in California, we estimate the value to be on the order of tens to hundreds of millions of dollars annually. Clearly, the economic value of protecting and enhancing near shore marine wildlife populations in California is significant.

V. References

Aldrich, K., J. Curtis, and S. Drucker. 2001. "A Cost-Benefit Analysis of Public Law 99-625: Sea Otter-Shellfishery Conflicts in Santa Barbara and Ventura Counties" Master Thesis, University of California at Santa Barbara.

Bosetti, V. and D. Pearce. 2003. "A study of environmental conflict: the economic value of Grey Seals in southwest England" Biodiversity and Conservation. 12:2361-2392.

Colt, Steve. 2001. "The economic importance of healthy Alaska ecosystems" Institute of Social and Economic Research University of Alaska Anchorage. Alaska Conservation Foundation.

Duffus, David. 1993. "Recreational Use, Valuation, and Management of Killer Whales (*Orcinus orca*) on Canada's Pacific Coast" Environmental Conservation Journal. 20(2): 149-156.

Hall, D.C., Hall, J.V., and S.N. Murray. 2002. "Contingent Valuation of Marine Protected Areas: Southern California Rocky Intertidal Ecosystems". Natural Resource Modeling. 15(3): 335-368

Hoagland Porter and Andrew 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.

Hoyt, E. 2001. "Whale Watching 2001:Worldwide tourism numbers, expenditures, and expanding socioeconomic benefits." International Fund for Animal Welfare, Yarmouth Port, MA, USA, pp. i–vi; 1–158.

Johnston, R.J., Grigalunas, T.A., Opaluch, J.J., Mazzota, M., and J. Diamantedes. 2002. "Valuing estuarine resource services using economic and ecological models: the Peconic Estuary System study". Coastal Management Journal, 30:47-65.

Kaza, Stephanie. 1982. "Recreational Whalewatching in California: A Profile" Whalewatcher Journal. 16(1):6-8.

Krauss, Scott. 1989."Whales for Profit". Whalewatcher Journal. 23(2):18-19

Leeworthy, V.R. and J.M., Bowker. 1997. "Non-market Economic User Values of the Florida Keys/Key West" In: Linking the Economy and the Environment of Florida Keys/Florida Bay." NOAA, SEA Division, National Ocean Service, 41 pp

Leeworthy, V.R. and P.C Wiley. 2001. "Preliminary Estimates from Versions 1-6: Coastal Recreation Participation" National Survey On Recreation And The Environment 2000. US Department of Commerce. National Oceanic and Atmospheric Administration. National Ocean Service. Special Projects. Silver Spring, Maryland .

Leeworthy, V.R., Bowker, J.M., Hospital, J.D., and E.A. Stone. 2005. "Projected Participation in Marine Recreation: 2005 & 2010" National survey on recreation and the environment 2000. US Department of Commerce. National Oceanic and Atmospheric Administration. National Ocean Service. Special Projects. Silver Spring, Maryland.

Leeworthy, V,R. and P.C. Wiley. 2003. "Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary" Silver Spring, MD, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects. 118pp

Loomis, J.B. and D.M. Larson. 1994. "Total Economic Values of Increasing Gray Whale Populations: Results from a Contingent Valuation Method". Marine Resources Economics. 9:275-286

Parsons, E.C.M., Warburton, C.A., Woods-Ballard, A., Hughes, A., and P. Johnston. 2003. "The value of conserving whales: the impacts of cetacean related tourism on the economy of rural West Scotland" Aquatic Conservation: Marine and Freshwater Ecosystems. 13:397-415.

Utech, Dan. 2000. "Valuing Hawaii's Humpback Whales: The Economic Impact of Humpbacks on Hawaii's Ocean Tour Boat Industry". In The economic contribution of whale watching to regional economies: perspectives from two national marine sanctuaries. Marine Sanctuaries Conservation Series MSD-00-2.