NaturalEquity

THE OCEAN FOUNDATION
Coastal Ocean Values Center

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The California Coast Online Survey: Southern California Module

Draft Report to the Santa Monica Bay Restoration Foundation

based on a similar report prepared for funders of
the application of the method to the Central Coast Region, sponsored by
Resources Legacy Fund Foundation (RLFF),
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INTRODUCTION

More than half of California residents visit the California Coast at least once per year. Private coastal recreation generates values for residents and results in substantial economic impacts for coastal communities. Indeed, California is branded as a place of surf, sun, abundant marine life, coastal vistas, long beaches, rocky headlands, coastal forests, piers and jetties. For Californians, most of whom live near the coast, the coastal environment is an extraordinary natural asset that delivers a steady flow of services integral not only to the economy, but also to a multitude of lifestyles and cultural norms. Many things "Californian" are deeply rooted in the coastal environment and the activities enjoyed by residents.

Policy makers and managers in California need reliable, cost-effective, and spatially-explicit information on human-marine environment interactions, to contribute to ecosystem-based and area-based monitoring and management. We have developed a tool that leverages the internet and Google Earth/maps technology to randomly sample California residents and collect the data needed to: a) develop a quantitative baseline of visitation to coastal sites and regions (including annual coastal "trips," the activities people undertake when they visit the coast, and demographic information about visitors), b) estimate the economic impacts (expenditures) associated with these visits, c) understand the significance of private coastal use in the context of area based management, and d) cost-effectively update that information for monitoring purposes. In this brief report, we summarize our effort to develop and test the methodology, and present data and our initial quantitative baseline of coastal visitation[1].

Using funds from contracts with RLFF and the Santa Monica Bay Restoration Commission (SMBRC), we have developed an online survey that elicits information in four areas:

- Participation in consumptive and non-consumptive activities by coastal visitors (e.g., fishing, wildlife viewing, diving, beach going)
- Basic demographic information about coastal visitors (e.g., ethnicity, gender, place of residence, income, and education)
- Spatial information on coastal access points used (uses Google Earth/Maps in "hybrid" mode)
- Detailed information from the most recent trip to the coast, including expenditure data

Thus far, two survey "waves" have been completed, resulting in 3,865 completed surveys from residents of eleven counties:

1. San Mateo County
2. Santa Cruz County
3. Santa Clara County
4. San Benito County
5. Monterey County
6. San Luis Obispo County
7. Santa Barbara County
8. Ventura County
9. Los Angeles County
10. Riverside County

[1] We have not yet secured the funding necessary to use collected data to estimate economic values and the economic impact of private coastal use, which should be viewed as a separate effort.

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11. San Bernardino County

A third and final survey wave will be implemented in early 2009, thus finalizing the baseline. At the present scale, the survey captures use of the coastline from Half Moon Bay to Long Beach, broken down into six coastal regions (note: for ease of working with the Marine Life Protection Act Initiative in the South Coast Region, we have combined regions 5 and 6 into one region, now labeled Region 5). See Figure 1 below for a map of our study area.

Our geo- survey is unique in that it allows respondents to select a coastal access site on a Google map in response to questions about where the respondent visits the coast generally and on their last trip. In one question, respondents are asked about their total annual visits to regions of the California coast (see Figure 1) and in a later question the respondent is asked to pin-point the exact location of their most recent trip to the coast. Using the Google map interface, respondents can either select one of 225 pre-defined sites or designate and name their own site using the geo-spatial module developed for the survey. (In all cases, latitude and longitude information is recorded.) This Google interface and the internet survey allows us to collect combined and detailed information both about the respondent and about their coastal visit and to do so in a way that permit the inclusion of large stretches of coast (and potentially the entire state).

Figure 1: Coastal area surveyed, by survey region

Summary of accomplishments to date

1. Convened a two-day meeting o f survey professionals, economists, and staff from the Marine Life Protection Act Initiative (MLPAI), the California Department of Fish and Game (CDFG), and the National Marine Sanctuary Program (NMSP) to solicit input and comments. See Appendix A for a list of participants and meeting agenda.
2. Designed and tested for review a comprehensive survey instrument that collects data from consumptive and non-consumptive users on participation in various coastal activities, e.g.,

fishing, diving, wildlife viewing, the coastal access points used, coastal trip-related expenditures, and demographics, e.g., level of education, place of residence, income, and ethnicity.

3. Contracted Skytruth (www.skytruth.org) to create a web interactive, geo-spatial survey module that allows respondents to use Google Earth and Google Maps to show us where they go on the California coast.
4. Worked with CDFG staff (John Ugoretz) and University of California marine scientists (Milton Love and Robert Warner) to create a recreational angler module of the survey that allows respondents to tell us what species were targeted, caught, and kept during the most recent fishing trip.
5. Contracted Connecticut-based Internet survey firm Insight Express (http://www.insightexpress.com/index.asp?core=2&pageid=9) to host the online survey and direct web users who are CA residents to our survey.
6. Conducted the first two survey "waves", each of which resulted in approximately 2,000 responses from CA residents.
7. Successfully developed an online tool that enumerates fine-scale spatial data
8. Worked with the MLPAI to create a spatial data layer using our data, for the South Coast Regional Profile.
9. Conducted primary data analysis to determine how well our samples represent the population of CA residents.
10. Analyzed the samples further to estimate total annual trips to each coastal region and proportion of consumptive and non-consumptive activities by region and for selected sites in Southern California from Point conception to Point Fermin.

The need for data on private coastal use

While tourism (overnight stays) often is the focus of much coastal management and development, coastal recreation in the United States, and particularly in populous ocean states like California and Florida, is estimated to generate tens of billions of dollars in local expenditures and similar magnitudes of value in terms of the economic wellbeing of local coastal visitors (see Pendleton 2007 and Pendleton and Kildow 2005 for reviews and three papers prepared for the Marine Life Protection Act by Pendleton 2005a, 2006a, and 2006b). Despite the substantial economic value of coastal recreation, there has been little effort invested in collecting rigorous, consistent, spatially widespread and time series data on private coastal recreational uses.

About 70% of all Californians will visit the coast each year (Public Policy Institute of California, 2003), yet there has never been an attempt to collect yearly data statewide on the number of coastal users, the activities they undertake, their demographic make-up, or their contribution to local economies. Even when beach and coastal attendance records have been maintained, they have not been collected consistently over time and place (for instance, many California coastal state parks do not collect attendance data or fail to do so when budgets are constrained, beach attendance data usually are rough estimates taken solely for the purpose of allocating life guard effort.) Despite the high use of the coast by private users and the recreational importance of the coast for Californians, there is very little data on where Californians go, what they do, and how much they spend when they go to the coast. As a result, decisions about coastal management have been made largely without information on the effects of management actions on Californian coastal visitors.

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METHODS

Recruiting survey respondents

An online survey of private coastal users was developed that randomly samples California residents using a web platform and 'eRDD' methodology supported by Insight Express (www.insightexpress.com), a Stamford Connecticut-based Internet survey firm (Figure 2). Using the eRDD protocol, respondents from selected coastal and inland counties of California are recruited to the online survey in two ways: (i) drawing from a standing Internet panel maintained by Insight Express (~100,000 California residents are members of this panel), and (ii) by way of more than 200 unique advertisements that are maintained by Insight Express on more than 20,000 websites. Insight Express randomly presents advertisements on these sites to Internet users, then recruits and directs respondents to a variety of surveys using a set of short screener questions (only CA residents from a list of prescribed counties, 18 years and older, for example, are offered this survey). See Figure 2 below for a schematic of this process and examples of the banner ads used by Insight Express. The advertising and offering of surveys is random across this large number of sites; moreover, respondents are randomly directed to surveys for which they are positively screened and are not financially compensated for taking surveys. Consequently, respondents can neither self-select for any of these surveys, nor are they financially induced to complete surveys hosted by Insight Express, including the California Coast Online Survey described here.

The internet survey collects survey data from randomly sampled internet users in eleven coastal counties. Data are collected on the demographics of respondents, whether or not the respondent has visited the coast in the last 12 months, coastal activities (e.g., beach-going, wildlife viewing, fishing, spear-fishing, kayaking, and diving), the spatial distribution and frequency of such activities across a set of coastal access points, and financial expenditures from the most recent coastal visit. Demographic data about visitors are directly comparable to US Census data. At present, demographic information is collected for all respondents and detailed data on coastal activities are collected for the California coastline from Half-Moon Bay to the Palos Verdes peninsula.

Spatially-explicit data on coastal use are collected using a geospatial survey module developed by Sky Truth (www.skytruth.org). The geospatial module presents digital images of the coast, supported by Google Maps, that incorporate satellite imagery with street and basic infrastructure overlays (the so-called 'hybrid' mode of Google Maps). These digital images are spatially dynamic in that they allow respondents to move up and down the California coast and change the spatial resolution as desired until a specific coastal access point is identified. Thus, the geospatial module allows respondents to effectively "drill-down" to the exact coastal access point used during their most recent coastal visit. Respondents are asked to either select from a set of pre-labeled sites or, by clicking on a point on the coast to create their own site, which they can then name, if they choose. The set of pre-labeled sites was primarily defined using the California Coastal Access Guide (University of California Press). In either case, the output is a latitude/longitude position, with or without a name, that corresponds to a coastal access point. We do not ask respondents to construct spatial polygons that correspond to the areas used during site visits, although this feature is being contemplated and could be developed later.

Survey data are collected in three successive "waves" that are temporally distributed across a calendar year to capture seasonal effects.

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Figure 2: Schematic of the "e-RDD" process developed by the Internet survey firm Insight Express

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Source: Insight Express

Overcoming obstacles to collecting data on coastal visitors

One reason good data on coastal recreation is scarce is that these data are hard to collect. In Los Angeles and Orange Counties alone there are more than 50 named public beaches with hundreds of additional access sites available to bird watchers, tidepoolers, kayakers, divers, and others. With so many access sites across the state, the costs of collecting good attendance data using on site methods would be staggering. The large number of sites also makes phone and mail-back surveys difficult. It would be extremely time consuming to ask potential phone respondents about their visits to all relevant sites. A paper mail-back survey would quickly become very long if we attempted to collect yes/no site visitation data for all relevant sites.

Collecting data on coastal visitors tend to be complicated further by the fact that coastal visitors tend to use the coast at all hours from just before dawn for surfers and fishers, to after dusk for beachcombers and divers. The long duration of coastal use make on-site intercept surveys difficult; failure to collect representative data at all times during the day could mean important user groups (e.g. surfers in the morning, divers in the evening) might be missed. (See Chapman and Hanneman 2001 and Nelsen et al. 2007) for a discussion of this problem as it relates to surfers.)

Finally, many coastal uses are undertaken by small numbers of highly avid users (e.g. scuba diving, surfing, kayakers, and hoopnetters). While these visitor may represent a significant number of visits (because of the high frequency of coastal visitation) and also local spending (especially when the activity

requires gear), these visitors are hard to intercept using traditional phone methods because their occurrence in the general population is so small. We refer to this issue as the uncommon activity problem. To adequately encounter a sufficient number of respondents for these uncommon activities requires that there are a large number of survey respondents in a randomly chosen sample pool or that targeted methods are used to identify potential respondents from these groups.

Similar to the uncommon activity problem is the fact that the majority of visits occur at a relatively small number of coastal access sites. This infrequent use problem means that on-site intercept surveys result in only a small number of responses per unit of survey effort. Random methods, including mail-back and phone surveys, would require large numbers of sample respondents in order to get adequate coverage of these relatively infrequently used coastal sites. The infrequently used site problem plagues many of the smaller pocket beaches and hard to access coastal sites along the California coast.

Using internet surveys to collect data on private coastal uses

Internet-based surveys may hold promise as a cost-effective way of collecting data on private coastal users. Internet surveys already have been employed for political surveys (see Berrens et al. 2003), health surveys (see Couper et al. 2007 and Schonlau et al. 2004 for a California-based survey), for attitudes about watershed management (Kaplowitz et al. 2004), and to collect information on environmental values (Fleming and Bowing 2007, Marta-Pedroso 2007, and Rudd 2006). Internet surveys have a number of key advantages over other surveys that make them particularly attractive for collecting data on private coastal uses.

First, the low cost per response means many more internet survey responses can be collected for the same price as a smaller number of intercept or telephone surveys. Bids from phone companies and internet survey companies were acquired. The least expensive phone company bid was $32.4/response (for a set of 1500 completed surveys) compared to $16.9/response paid to InsightExpress (for a set of 2000 responses).

Large samples provide three important advantages. All things being equal, the larger the sample the smaller the statistical error of the estimated responses (the common +- X% seen in polling results). Large samples also help address the problems of uncommon activity choice (Berrens et al. 2007) and infrequent site use.

Internet surveys also have the advantage that complicated data, interactive visuals, and branching patterns of questions. For coastal visitors in California, this means an internet survey can be used to ask detailed questions about specific activities (e.g. when you went to the coast, did you intend to catch fish? If so, what gear did you use? For each gear type what species did you intend to catch? Etc.). While such branching is potentially possible using phone surveys, it cannot be done easily in mail-back or intercept surveys (except where intercept surveys use computers).

Internet surveys also can be used to show respondents maps about potential coastal sites. In our survey, we worked with Skytruth.org to develop familiar Google Map-based interfaces that would allow users to choose potential sites for their last visits from among hundreds of potential choices. Unlike phone surveys which can only provide long lists of sites, some of which have similar or identical names, the interactive Google Map interface allows the respondent to identify sites by name, geography, or proximity to streets and highways. Using the “hybrid” satellite feature, the respondent can even see an aerial photograph of the site.

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From the perspective of the coastal analyst, internet surveys offer the advantage of allowing the survey respondent to collect data at any time of the day (Madge 2006, Manfreda 2001, and Marta-Pedroso et al. 2007 for a discussion). This means survey respondents can start, stop, or re-start a survey at their leisure – obviating the need for the surveyor to be on site at all hours of the day (and night).

Finally, online surveys provide anonymity for the respondent – which may be particularly important if certain coastal activities may be subject to public scrutiny (e.g. the taking of live organisms from tidepools.)

Like all survey methods, internet surveys have their limitations. Above, we discussed some of the administrative difficulties associated with the application of mail-back, intercept, and random telephone surveys for collecting data on coastal visitation. In addition to administrative and technical issues, all surveys face certain limitations regarding their representativeness:

- the coverage of the sample frame may be different than the population of interest, due to due to uneven access to the survey mode (e.g. certain parts of the relevant population may not have access to the internet or land-line telephone service).
- There may be biases in who chooses to
    - undertake surveys (the opt-in problem or self-selection bias)
    - complete surveys (sample completion bias)

The key thing to consider when weighing the potential advantages and disadvantages of internet surveys is not the degree to which internet surveys are perfectly representative, but how their advantage and disadvantages compare to other survey modes. Mail-back surveys always have suffered from relatively low-response rates (Fleming and Bowden 2007) and telephone surveys are increasingly affected by declining response rates (Curtin et al. 2005) the trend nationwide in which households replace landline telephones with exclusively mobile phone usage.

While the application of internet surveys is still relatively new, a number of studies have attempted to compare internet surveys with other modes of survey administration including on-site intercept surveys (intercept surveys), random digit dial (RDD) telephone surveys, mail back surveys, and combinations of these.

Our internet survey is most similar to random digital dial (RDD) or random mail-back surveys. Like RDD telephone surveys or random mail-back surveys, a number of commercially available internet survey companies offer some form of survey population that is intended to reflect the public at large. Internet panel surveys use random sample of a large, pre-selected group of volunteer respondents who have agreed to participate in surveys. Several private services (notably Knowledge Networks, Harris Interactive, and InsightExpress) offer panels that are supposed to be representative of the general population. Web-advertised surveys use advertisements or links on commonly used websites to recruit voluntary participation in the survey. All of these methods are challenged with representativeness of the general population.

While the important question from the coastal policymaker's perspective ought to be "how do internet responses compare to the responses of a truly representative sample of respondents", the literature has focused on trying to determine whether Internet-based surveys include respondents and yield responses that are statistically different than those from traditional survey modes.

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There is little agreement in the small number of Internet-based environmental valuation and preference studies regarding the demographic similarilty of Internet-based respondents compared to other survey modes (See Berrens et al. 2007, Marta-Pedroso 2007, and Fleming and Bowden 2007). Fleming and Bowden (2007) found respondents to internet and mail-back surveys to have similar response rates and respondents had similar demographic profiles. There was no observable difference (at the %5 level of significance) between gender, mean age and education of the respondents. Respondents from the mail survey report higher mean household income. They conclude that Internet-based survey is a promising method for economic valuation (Fleming and Bowden 2007).

Marta-Pedroso et al. (2007) compare "in person" interviews with an Internet-based survey using the contingent valuation method to estimate willingness to pay for the preservation of the cereal steppe in Southern Portugal. They found the Internet-based survey respondents to be younger, better educated and reported higher incomes than the "in person" surveys. Contrary to expectation given the demographic differences, however, they found that respondents surveyed through the Internet were more likely to state a lower willingness to pay that those interviewed in person. They conclude that Internet-based surveys are promising for contingent valuation but that further research is needed (Marta-Pedroso, Freitas et al. 2007).

Berrens et al. (2003) compare telephone surveys with Internet surveys that used panels of pre-selected and willing respondents in a contingent valuation study of the willingness to pay of the U.S population for ratification of the Kyoto protocol. They find the gender and mean age similar across modes. Respondents from the telephone survey are more educated. Contrary to the common finding that Internet users tend to have higher incomes, Berrens et al. (2003) found that the Internet panel respondents reported lower household income than either the telephone respondents or the general population.

The literature on other applications of internet surveys reveals similar findings. Seth et al. (in their undated and unpublished working paper from the UCLA Department of Political Science) find that while a nationwide internet panel appeared to be mildly-biased compared an RDD telephone survey, the bias was a small tradeoff compared to the benefit of greatly reduced sample bias due to the large number of responses obtained using the internet survey. Schonlau et al. (2004) found mixed results when comparing an internet survey with an RDD survey – for certain factual questions, there was no difference in responses between the two survey types, but certain differences did occur for preference based questions. The authors find that a method known as propensity scoring is a promising way of improving the representativeness of internet surveys.

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RESULTS: SURVEY WAVES 1 AND 2

In this section we compare our data to US Census Bureau data to assess its representativeness, summarize our estimates of total annual trips, and report on the relative incidence of consumptive vs. non-consumptive coastal trips.

We highlight several key findings detailed below:

1. Our data appear to well represent the California population with the exception of female overrepresentation and Latino underrepresentation
2. With the current sample size, we can extrapolate at a site-specific level for Southern California, but only at the regional level for the Central Coast.
3. The data show that the vast majority of trips (>90%) are purely non-consumptive, which is entirely relevant to area-based management tools that constrain consumptive activities such as hook and line fishing and spear fishing

Representativeness

As mentioned earlier, a PPIC survey found that in 2003, 72% of all Californians made at least one trip to the California coast annually. Our results are similar. For our first two waves, we find that 66% of our respondents visited the California coast in the past twelve months. We also find that the ethnicity and gender of our respondents are roughly similar to 2006 projections by the US Census Bureau for the populations of the counties surveyed. In general, our data are well matched with Census findings, with two prominent exceptions:

1. Females are overrepresented and,
2. Persons of Hispanic and Latino origin are underrepresented.

As an example see Table 1 for waves 1 and 2.

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Table 1: Comparing Survey Demographic Data to US Census Data

	Los Angeles			Ventura			Riverside County Census			San Bernardino		
	2006 Census (projected)	Wave 1	Wave 2	2006 Census (projected)	Wave 1	Wave 2	2006 Census (projected)	Wave 1	Wave 2	2006 Census (projected)	Wave 1	Wave 2
Total Completed Responses		828	1257		93	109		162	234		132	111
1) Female %,	50.5	59	69.3	49.9	65.6	70.6	50	66		49.9	66.7	80.5
2) White %	74.2	69.7	65.2	87.5	87	85.2	84	76.3	81.6	80.5	76	73.9
3) Black %	9.6	12	10.4	2.1	4.3	0.9	6.6	9.4	6	9.4	12.4	13.5
4) American Indian/Alaska Native %	1	2.5	1.6	1.1	0	1.9	1.4	5	1.3	1.4		0.9
5) Asian %	13.1	9.3	16.8	6.7	5.4	10.2	5.4	5.6	7.3	5.9	4.7	4.5
Native Hawaiian/Other Pacific Islander %	0.3	1.2	0.9	0.3	2.2	1.9	0.3	1.9	1.3	0.4	0.8	1.8
6) Hispanic or Latino origin%	47.3	15.6	14.3	36.5	7.5	11	42.2	11.1	13	46	14.4	13.4

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Coastal activities estimates

The survey allows us to estimate the total number of trips taken to coastal regions in California by residents we surveyed. In Table 2, we show our estimates of the total number of day trips made to the California coast by residents of the eleven counties surveyed. The data are categorized by the region of coastal visit (where regions correspond to those in Figure 1.) Note, that our confidence in these estimates depends on how many survey responses were completed. Because we have only one wave of responses for our Central Coast and Northern California counties, we generally have a small number of responses for these counties. The total number of responses per county also depends on the total population of that county. As a result, counties that have smaller populations generate fewer survey responses. The total number of responses, by county, are given in Table 2 along with our assessment of our initial confidence in the extrapolated visit estimates. Increased survey effort would increase the number of responses and the confidence of our findings.

Table 2: Estimated Total Trips to Each Region, Residents from Southern California

	Los Angeles	Riverside	San Bernardino	Ventura	Santa Barbara
Region 1	2,614,356	231,832	187,758	118,778	264,012
Region 2	3,043,958	176,125	171,012	150,605	272,611
Region 3	2,996,254	292,581	310,100	229,634	1,247,479
Region 4	3,880,180	221,627	253,205	538,267	1,470,761
Region 5	11,701,718	852,331	596,013	9,284,017	10,301,397
Region 6	88,940,882	3,287,424	3,182,773	2,268,437	443,745
Sample Size	2115	402	245	202	138
	Excellent	Very Good	Good	Good	Good

Consumptive vs. non-consumptive use patterns

We also can use the responses to our surveys to estimate the proportion of visits to a site or region that are consumptive or non-consumptive in nature. Table 3 provides weighted proportions of the number of consumptive vs. non-consumptive activities that were undertaken by survey respondents during their last coastal trip. We summarize these data by coastal region. In the southern California region, where we have large numbers of responses, we are able to provide similar proportional breakdowns (consumptive vs. non-consumptive) by coastal access site. (For a summary of data, by site for southern California, please visit http://covc.centraldesktop.com/santamonicabayhumanuses/).

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Table 3 Estimated Consumptive and Non-Consumptive Annual Trips by Region (Southern California Residents)

Latitude	Longitude	Site Name	% consump.	% non-consump.
34.47373	-120.2344	Gaviota State Park	16%	84%
34.46811	-120.1116	Tajiguas	0%	100%
34.46382	-120.0698	Refugio State Park	0%	0%
34.4617	-120.0256	El Capitan Beach	6%	94%
34.40847	-119.8795	Coal Oil Point Reserve	0%	100%
34.4091	-119.8666	Isla Vista County Park	0%	100%
34.4078	-119.8427	University of California Santa Barbara	0%	100%
34.41629	-119.8318	Goleta Beach County Park	13%	87%
34.4028	-119.7422	Arroyo Burro County Beach Park	5%	95%
34.39625	-119.723	La Mesa Park	0%	100%
36.62094	-119.7064	Shoreline Park	4%	96%
34.40135	-119.6993	Leadbetter Beach	0%	100%
34.41006	-119.6901	West Beach	3%	97%
34.41017	-119.6859	Stearns Wharf	0%	100%
34.41399	-119.6857	Chase Palm Park	0%	100%
34.41456	-119.6793	East Beach	0%	100%
34.4204	-119.6622	Andree Clark Bird Refuge	0%	100%
34.41764	-119.6475	Stairway to Beach Butterfly Ln.	0%	100%
34.41728	-119.633	Hammonds Beach	20%	80%
34.41919	-119.6296	Miramar Beach	0%	100%
34.42012	-119.6016	Lookout Park	0%	100%
34.39834	-119.5372	Carpinteria Salt Marsh Nature Park	0%	100%
34.39366	-119.525	Carpinteria City Beach	1%	99%
34.37477	-119.4739	Rincon Point	0%	100%
34.35598	-119.4389	Mussel Shoals Beach	9%	91%
34.31186	-119.3603	Solimar Beach	22%	78%
34.27981	-119.3162	Emma Wood State Beach	19%	81%
34.27449	-119.2983	Surfer's Point	0%	100%
34.2724	-119.2925	Ventura Pier	3%	97%
34.27105	-119.2828	San Buenaventura Beach	2%	98%
34.25404	-119.2692	Marina Park	10%	90%
34.24709	-119.2681	Peninsula Beach	10%	90%
34.22979	-119.2645	Santa Clara Estuary Nature Preserve	50%	50%
34.22082	-119.2599	McGrath Beach	32%	68%
34.20043	-119.2493	Mandalay Beach Park	13%	87%
34.18327	-119.2406	Oxnard Beach	21%	79%
34.16672	-119.2314	Hollywood	0%	100%
34.15591	-119.2233	Silver Strand	19%	81%

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Table 3 Estimated Consumptive and Non-Consumptive Annual Trips by Region (Southern California Residents)

Latitude	Longitude	Site Name	% consump.	% non-consump.
34.0443	-118.9333	Leo Carillo Beach	2%	98%
34.03939	-118.8942	Robert Meyer Beach (El Pescador La Piedra and El Matador)	0%	100%
34.0309	-118.8465	Trancas Beach	5%	95%
34.0151	-118.8202	Zuma Beach County Park	0%	100%
34.00771	-118.8147	Westward Beach (Free Zuma)	0%	100%
33.99974	-118.8062	Point Dume State Park	4%	96%
34.005	-118.8017	Dume Cove (Little Dume)	0%	100%
34.02115	-118.7851	Paradise Cove	0%	100%
34.02528	-118.7631	Escondido Beach	0%	100%
34.03285	-118.7396	Corral Beach	0%	100%
34.03161	-118.7047	Malibu Bluffs State Park	0%	100%
34.03106	-118.6814	Malibu Lagoon State Beach	10%	90%
34.03591	-118.6776	Malibu Beach	0%	100%
34.03581	-118.6756	Malibu Pier	0%	100%
34.03772	-118.6749	Zonker Harris Accessway	0%	100%
34.0392	-118.5907	Las Tunas State Beach	0%	100%
34.03815	-118.582	Topanga Beach	2%	98%
34.03893	-118.5476	Sunset	0%	100%
34.03161	-118.5285	Will Rogers Beach	0%	100%
34.02051	-118.5098	Santa Monica Beach	0%	100%
34.00785	-118.4993	Santa Monica Pier	1%	99%
33.44147	-118.4975	Isthmas Catalina Island	61%	39%
33.99682	-118.4846	Venice Beach 1	0%	100%
33.97682	-118.4707	Venice Pier	13%	87%
33.97134	-118.4612	Venice Beach 2	0%	100%
33.95974	-118.4526	Del Rey Lagoon Park	5%	95%
33.94204	-118.4415	Vista Del Mar	1%	99%
33.93517	-118.4384	Dockweiler State Beach	1%	99%
33.92812	-118.4354	El Segundo Beach	1%	99%
33.77041	-118.4215	Lunada Bay	32%	68%
33.90134	-118.4212	El Porto Beach	0%	100%
33.88972	-118.4153	Manhattan Beach 1	0%	100%
33.8836	-118.414	Manhattan Pier	5%	95%
33.74165	-118.4107	Pt. Vicente Park Fishing Access	31%	69%
33.87993	-118.4103	Manhattan Beach 2	0%	100%
33.79712	-118.4076	Path Flat Rock Pt.	0%	100%
33.79224	-118.4065	Bluff Cove	9%	91%

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Table 3 Estimated Consumptive and Non-Consumptive Annual Trips by Region (Southern California Residents)

Latitude	Longitude	Site Name	% consump.	% non-consump.
33.86967	-118.4059	Hermosa Beach 1	1%	99%
33.86154	-118.404	Hermosa Pier	9%	91%
33.85787	-118.4013	Hermosa Beach 2	0%	100%
33.73726	-118.3978	Long Point	4%	96%
33.80276	-118.3968	Malaga Cove	0%	100%
33.8444	-118.3937	Sea Side Lagoon	0%	100%
33.80862	-118.3927	Torrance County Beach	13%	87%
33.84126	-118.3927	Redondo Sportfishing Pier	36%	64%
33.83937	-118.3924	Redondo Municipal Pier	5%	95%
33.73974	-118.3923	Vanderlip Park	0%	0%
33.82918	-118.3908	Redondo Beach	5%	95%
33.83763	-118.3897	Veterans Park	34%	66%
33.7424	-118.38	Abolone Cove	0%	100%
33.73876	-118.3663	Portuguese Bend	1%	99%
33.34487	-118.3262	Avalon Catalina Island	25%	75%
33.71552	-118.3183	Royal Palms Count Beach (White's Point)	11%	89%
33.70556	-118.2937	Point Fermin	8%	92%
		Anacapa Island	25%	75%
		Beecher's Bay	42%	58%
		Cuyler's Harbor	50%	50%
		Placemark 132	50%	50%
		Prisoner's Harbor	0%	100%
		Smuggler's Cove	5%	95%

Similarly, we can examine the exact activities undertaken during the last trip. Table 4, below, shows sample unweighted data for respondents from LA County, broken down according to the 5 consumptive and 14 non-consumptive activities queried in the online survey.

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Table 4 Sample of Activity Data, LA County Coastal Sites, Wave 1 and 2

	N	%
	897	100.00
Non-consumptive Activities		
Beach going	646	72.018
Sitting in your car watching the scene	390	43.478
Swimming in the ocean	378	42.140
Watching birds and/or other marine life from shore	350	39.019
Watching whales and/or other marine life from a private or non-commercial boat	120	13.378
Tide Pooling	116	12.932
Sailing	82	9.142
Surfing	74	8.250
Kayaking in the ocean or estuary/slough	49	5.463
Power boating	48	5.351
Free diving/snorkeling	45	5.017
Using a personal water craft (PWC)	30	3.344
SCUBA diving	23	2.564
Kite boarding or windsurfing	20	2.230
Consumptive activities		
Collecting other types of sea life (e.g. clams)	83	9.253
Hook and line fishing	62	6.912
Hoop netting (fishing)	13	1.449
Lobster diving	13	1.449
Spear fishing	8	0.892

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WHAT HAS BEEN ACCOMPLISHED AND WHAT CAN BE FURTHER DEVELOPED

We have successfully demonstrated a cost-effective, internet-based tool that provides an estimate of overall private coastal use, by type and by access site, at a fine spatial scale. Furthermore, our samples appear to reflect the population in terms of race, people freely participated in the survey, and respondents were not discouraged by the geo-spatial module we used to collect data on coastal access points.

The basic survey platform can be easily expanded to other parts of California and the West Coast with relatively little extra time for design or implementation. The costs of expansion involve the development of new maps, increasing the sample size, and the cost of additional web-hosting and data acquisition.

We count several overall benefits of the demonstrated tool:

1. It provides an estimate of overall private coastal use (quantity of trips to the coast), by use type and by coastal access site
2. It provides an estimate of overall demographic influences on coastal use
3. It collects data on highly dispersed and difficult to measure coastal uses including casual wildlife viewing, birdwatching, beach going, private kayaking and diving.
4. Data collection is easy to replicate and spatially scale
5. Coastal users cannot self-select for the survey
6. Results are statistically comparable over time
7. It costs less than comparable RDD phone and certainly much less than an intercept (in-person) survey approach
8. It covers a large area of user residency and use
9. The data from it can be used to estimate economic impacts to coastal communities and random utility models of the non-market value of coastal use, which have particular relevance to learning about how changes in the marine and coastal environment affect human well-being.

We also count several general limitations of this approach:

1. It clearly under-represents populations of coastal users with relatively low internet penetration rates, e.g., the Latino community
2. It provides use data at infrequently visited sites that have low statistical confidence
3. At present it does not collect spatial area data; thus, it cannot (yet) collect on-the-water data that correspond to a marine activity. We do, however, collect lat/long data for coastal access points. Furthermore, we believe that the geospatial tool could be further developed to also collect spatial area data that correspond to human use patterns (i.e., we think we can further develop the tool to collect spatial polygons).

Planned development

Future development of this approach will focus on two key areas:

1. Further refinement of the survey instrument and interpretation of results, and
2. Assessing options for combining this approach with supplementary or complementary efforts, e.g., targeted intercept survey efforts to collect data from under-represented populations and poorly represented places that are acutely relevant to policy or management decisions.

As we start to formulate plans for estimating economic impacts or values, for example, we realize that we can reduce the level of detail from the set of expenditure questions. Thus, we can refine the survey so that it allows us to estimate robustly with a reduced burden on respondents (and probably an improved completion rate). We will further analyze the data to see how our data compare to US Census, in terms of income and education for example. We can also analyze the recreational fishing data and make comparisons with the State of California's recreational fishing data, which should provide additional cross-referencing[2]. After completion of survey wave three, we can also develop a GIS-based

[2] One key difference is that our approach can be used to estimate the size of the recreational fishing population, the distribution of avidity across that population, and the spatial distribution of fishing effort, across a set of targeted species.

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spatial “model” of private recreation that can elucidate the spatial use and intensity of use across the study area.

In 2009 we will begin exploring options for combining existing data and information from other emerging sources with our findings to create an increasingly robust understanding of spatial use and intensity, and variation across space and demographic characteristics. We also plan to explore options for designing and testing targeted intercept survey efforts to fill critical gaps in our understanding of how private recreational users are affected by management and policy interventions. This could entail drawing from methods used previously on the California Central Coast (see LaFranchi and Tamanaha).

Expansion for use by the MLPAI

We are currently in discussions with MLPAI staff about the possibility of expanding the effort spatially so that we can begin acquiring data for the remainder of the California Bight (from Palos Verdes to the Mexican Border).

This tool could also be used to establish baseline data for the South Coast Region and support monitoring efforts. Use of this tool for monitoring would enable us to eventually detect three important aspects of the human dimension of marine and coastal policy and management:

1. market and non-market value changes over time and space
2. Changing economic impacts in coastal communities
3. 1 and 2 linked or correlated with changes in the marine and coastal environment, notably ecological or institutional changes that result, wholly or in part, from the designation of marine protected areas or similar policy and management interventions.

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Appendix A

Workshop on Economic Evaluation of MPAs in Southern California

September 9-11, 2007

Agenda

Invitee/Participants:
Michael Hanemann, UC Berkeley
Chris LaFranchi, National Marine Sanctuary Program, West Coast Region
Walter Milon, University of Central Florida
Linwood Pendleton, Coastal Values/The Ocean Foundation (host)
Murray Rudd, Memorial University, Canada
Rebecca Studebaker, California Department of Fish and Game
John Ugoretz, California Department of Fish and Game
Michael Weber, Resources Law Group
Peter Wiley, NOAA National Ocean Services, Special Projects
Ken Wiseman, California MLPA/Resources Agency

Facilitator: To be confirmed

Sunday, Sept. 9

2:00 pm-8:00 pm (including dinner): Tour of Santa Monica Bay (optional)

Monday Sept 10

8:00 am:	Welcome by SMBRC staff and Linwood Pendleton (hotel)
8:15am – 9:00 am	Introduction to the Workshop: Collecting Private Use Data for Marine Life Protection in Santa Monica Bay (hotel)
9:00 – 11:45am	Introduction to the Draft Telephone Survey for SM Bay What are the core questions? What is the geographic level of detail? (hotel)
12:00 noon	Leave Hotel for Catalina Express Terminal in San Pedro. Arrive Two Harbors on Catalina Island at 2:30 pm.
3:00pm – 4:00pm:	Designing questions about frequency of use for coastal activities – Last trip vs. seasonal or annual trips

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4:00pm – 5:30 pm:	Designing questions about expenditures
6:00 pm:	Wine and cheese Reception
7:00pm:	Dinner

Tuesday Sept 11

7:00am - 8:00 am:	Breakfast
8:15am – 10:45am:	Designing Questions about non-market value – original research or leveraging the literature
10: 45am – 12:30pm	Survey repeatability and comparability to other types of economic data used in MPA analysis
Noon- 2:00pm:	Box Lunch and Free Time on the Island
2:00 pm:	Prompt departure from WMSC to go to Two Harbors*
2:30 pm:	Leave Catalina Express Terminal in Two Harbors. Arrive San Pedro at 5:00 pm

* Except for people who choose to stay on the island one more night. Those who leave on Wednesday, Sept. 12 can take Catalina Express from Two Harbors to San Pedro at 2:30pm.

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