

## Chapter 5

### Conclusions

In California, and elsewhere, decision makers are forced to make difficult decisions on coastal issues in order to balance conservation and development interests. These decisions are often driven by economic arguments. Arguments for development can use known market forces such as the value of their development, increased tax revenue and the creation of jobs. These decisions result in trade-offs that impact the coastal environment, and the flow of recreational and ecosystem services that are supported by a healthy and accessible coastline. The economic impacts of coastal tourism are well known and are one of the most important drivers of the coastal economy in California and elsewhere (Kildow and Colgan 2005). Like other open access public resources, much of the economic value of coasts and oceans lies outside of traditional markets and less is known about the non-market values of coastal recreation or how coastal management decisions will impact these values. Information that accounts for both the market and non-market values associated with coastal conservation and recreation are required to make decisions regarding public resources that are best for the welfare of the public.

Research on non-market valuation has evolved over the last 30 years. There is a growing body of research on coastal recreation, but most of it is centered on beach going (Atiyah 2009). Coastal recreation is a diverse set of activities that include beach going, surfing, walking, swimming, shore fishing,

kayaking, snorkeling, diving and many other niche uses. Most research on the economics of coastal recreation has grouped all of these participants as beach goers. However, these groups make choices regarding their recreation based on different beach attributes, have distinct behavior patterns, and different economic impacts and values associated with their recreational choices. See Nelsen, Pendleton et al. (2007) and Chapter 2 for an example regarding surfing. As a result, management decisions affecting coastal resources will impact these users differently.

Methods to better understand coastal recreation and determine the non-market values require the capture of data on the visitation and behavioral patterns, demographics and spending habits of coastal recreation by interviewing individual users either on-site or offsite (Haab and McConnell 2002). Compared to the large category of general beach goers, many of these niche activities attract a small population of highly avid visitors (e.g. scuba diving, surfing, standup paddle boarders) that represent a disproportionately high number of visits, local spending and non-market values for the size of the user group.

In some cases entire users groups may be missed when assessing the value of coastal recreation or not studied at all, which is the case with most niche uses. This can occur because the subset of users is too small to be captured via traditional population-wide surveys (e.g., phone or mail) or they use the coast differently than typical beach goers (different times, locations and seasons) and

are missed by on-site surveys (Chapman and Hanneman 2001; Nelsen, Pendleton et al. 2007). To adequately intercept a sufficient number of respondents of these activities requires that there is 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.

In these circumstances, coastal zone managers are faced with a trade-off between developing a survey methodology that captures a large, random population of users that is representative but may not capture important niche uses (i.e., surfing) or developing a targeted survey (e.g., opt-in Internet-based survey instrument) that may not be perfectly representative but will still capture important recreational, demographic and economic data that can aid decision making. When weighing potential advantages and disadvantages of Internet-based surveys, it is not the degree to which the survey is perfectly representative, but how those disadvantages compare to other alternatives (e.g., other survey methods or no data at all) or if information collected will address the management questions that the information is designed to answer.

Traditional survey modes such as Intercept surveys, Random Digital Dialing (RDD) or mail-back survey instruments are more widely accepted and well vetted in the academic literature and provide the ability for extrapolate to the larger population (Dillman, Smyth et al. 2009). They also have disadvantages. They are expensive and time consuming to implement, especially when considering large areas with numerous access points. They may require a

prohibitively large sample size to capture small but avid users groups or capture a sub-sample too small to provide statistically robust results.

Internet-based survey modes also have clear advantages and disadvantages. Internet-based surveys used for economic valuation are not yet common in the literature and therefore less accepted by academics or agencies. They often suffer from lack of repetitiveness because the survey frame is not known and therefore cannot be extrapolated to the larger population of users (Couper 2000). Internet-based surveys may also be biased because the demographics of Internet users may be different than the general population.

Despite these disadvantages, the detailed information provided from Internet-based survey instruments may still answer important questions that can aid coastal zone decision-making. For example, Internet-based survey methods can aid in revealing the spatial extent of specialized coastal uses. In turn, this data could be used to identify specific locations for intercept surveys. Internet-based surveys can also provide targeted demographic and economic information on the users captured, which has value even if not expanded to a larger population. Further, Internet-based surveys may provide insights and raise questions that motivate further research using expanded Internet-based research (e.g., representative Internet panels) or traditional methods.

For example, two previous decisions that affected surfing resources did not benefit from empirical research on the consumer surplus values of surfing, likely because surfers are difficult to survey. Surfers are hard to capture because

their population of surfers is relatively small, their distribution is clustered, and they can be difficult to intercept (Nelsen, Pendleton et. al. 2007). In 1990, the American Trader oil spill closed access to popular beaches and surfing areas in Huntington Beach, California. It was possible to transfer empirical consumer surplus values from previous studies to determine the appropriate mitigation fee for the lost value for beach going, but surfing proved more difficult. Although surfer visits were counted using extended survey hours to capture their use (6:30 a.m. to 6:30 p.m.), surfers were not intercepted or surveyed to determine the consumer surplus of surfing. Instead, the consumer surplus of a surf visit was first estimated as equivalent to a nearby water park (\$16.95 in 1990 dollars) and then later as 25 percent higher than an individual beach visit (\$18.75 in 1990 dollars) (Chapman and Hanneman 2001). Neither of these values was based on empirical data. Second, when seeking mitigation for impacts to a popular surfing area in El Segundo that was degraded by the construction of a groin and beach fill, the Coastal Commission referred to Chapman and Hanneman's (2001) water park entrance fee to value surfing when determining the lost consumer surplus. In both cases, the consumer surplus values of surfing was likely undervalued due to lack of research on the economic values associated with surfing.

In contrast, when the Coastal Commission was considering a toll road project that could impact surfing at Trestles, in San Onofre State Park, an Internet-based survey was used to quickly and inexpensively gather data on surfers visiting Trestles to show that Trestles is used by an relatively small (compared to beach goers) group of highly avid surfers who are willing to travel

long distances and generate annual economic impacts to the City of San Clemente ranging from \$8-12 million [\$2006] (Nelsen, Pendleton et al. 2007). In this case, the non-market values of surfing at Trestles that are discussed in chapters 2 and 3 were not included because that research had not been completed. Inclusion of the consumer surplus values would have provided more insight into the value of surfing at Trestles during the decision making process. The results on economic impacts, not economics values, were provided to the California Coastal Commission and were considered during their consistency determination regarding the construction of a toll road that would likely impact the quality of the waves at Trestles. In this case, the economic impacts associated with the surfing resource at Trestles were considered in the decision making process and played a role in the denial of the project (CCC 2007).

In other circumstances, decision makers face tight permitting deadlines and lack the resources and expertise to conduct original economic research. In these cases, the best available existing research must be used to make decisions. Even when studies are available for use, coastal managers often lack the expertise to develop economic valuations consistently and based on accepted practices in the literature so that their estimations will stand up to academic or legal scrutiny.

The Coastal Commission's efforts to estimate in-lieu mitigation fees for the adverse impact of shoreline armoring on beaches, subject of Chapter 4, is a clear example. For each permit where a shoreline protective device is permitted,

the Coastal Commission must estimate the consumer surplus of a beach visit, estimate the loss of consumer surplus as the beach erodes and narrows over the lifetime of the project, and also consider values for lost non-recreational ecosystem services. Although consumer surplus values for beach going are well studied, the Coastal Commission has not accurately and consistently used benefit transfer methods to estimate the consumer surplus and as a result consumer surplus estimates for a beach visit are consistently lower than those found in the literature (Figure 4.12).

The Coastal Commission has applied inconsistent models to estimate the loss of consumer surplus on an eroding beach. Pendleton, Mohn et al. (2011) provide the only empirically-based model, using a RUM, to show that consumer surplus and attendance are lost as beaches narrow. The direct application of Pendleton, Mohn et al (2011) to individual shoreline armoring permits is limited because it is too complex, expensive and time consuming. As a practical matter the Coastal Commission is limited to applying simple models such as the area-based or the amenity-based models. However, the legal case at the Ocean Harbor House shows that a reasonable model can withstand legal scrutiny (OHH 2008). King's (2006) amenity-weighted model, improved upon in Chapter 4, provides a reasonable and consistent method to transfer benefits from a study site to a policy site and estimate lost recreational value as the beach narrows if additional study was conducted to empirically value and weight beach amenities. It is recommended that this model be standardized through the development of a procedural guidance document (PGD). This approach has

proven successful for the Coastal Commission to determine the value of sand impounded by shoreline armoring. This approach could be extended to include procedural guidance on benefit transfer and modeling consumer surplus lost on beaches adversely impacted by shoreline protective devices.

The lack of research on beach ecosystems and their values limits the Coastal Commission's ability to estimate values for non-recreational ecosystem services and provides a clear need for additional research on characterizing beach ecosystem services and the values associated with them. That said, the Coastal Commission has not consistently acknowledged that its mitigation estimates have been conservative because all beach ecosystem services are accounted for. The conceptual model of beach ecosystem services provided in Chapter 4 provides a framework to better understand which values are being captured and which services are being assigned zero value. Following this conceptual model would add consistency to the approach used by the Coastal Commission and make explicit those values that are not being considered.

The use of non-market values for beach recreation by coastal zone decision makers would benefit from additional research in a few key areas. First, additional economic research and valuation on niche coastal recreational activities would enable the decision makers to better understand how a decision may affect different types of coastal uses and also better value those uses for decision making or mitigation. Additional research using representative and opt-in Internet-based surveys will also aid our understanding of the value and

drawbacks these survey instruments provide to reach these difficult to survey groups. Research is needed on beach ecosystems and their values in order to establish a baseline for ecosystem service conditions and how those services change when beaches are affected by erosion will aid not only valuations using demand-based consumer surplus methods but could also provide the baseline information necessary to apply a supply-based approach, such as the Habitat Equivalency Analysis.

Everyday coastal zone managers are making decisions that impact the coastal ecosystems that are used for recreation. Many of these decisions have economic information on the benefits of coastal development, but few have information on the non-market economics of coastal recreation. In California, efforts by the Coastal Commission lack non-market values of coastal resources and recreation, which has the effect of tilting decision making towards the benefits of development instead of toward conservation of public resources. This is shown in cases in California involving surfing (e.g., Pratte's Reef and the American Trader Oil Spill), the adverse affects of shoreline armoring on beach going and the lack of valuation for beach ecosystems.

Coastal management decision makers lack economic experience compared to planning, policy, physical science and legal expertise. Additional research on the economics of coastal recreation and, more importantly, academic work that provides practical tools for coastal decision makers will provide a more level playing field when making trade-offs between conservation and development of

coastal resources. Most importantly, improved understanding of non-market values associated with the coast will help ensure that public coastal resources do not continue to be undervalued in decision making in the future.

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