Non-market valuation of private recreational boating in the Channel Islands National Marine Sanctuary

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Who Visits the Sanctuary?
Each year, over 60,000 people travel to the Channel Islands National Marine Sanctuary, which encompasses the waters around five of the Channel Islands. Those who come often visit multiple sites and participate in activities that fall into two categories:

• Consumptive - involve the “take” of marine resources (e.g., fishing, lobster diving)
• Non-consumptive - are “no take” activities (i.e. SCUBA, diving, kayaking)

The Mission
Currently there is a lack of information on non-consumptive use of the Sanctuary, specifically by private recreational boaters. This study aims to address this data gap by answering the following:

1. What value do boaters receive from a trip to the Sanctuary and what is the total annual value of all boat trips?
2. What biological and physical characteristics affect boaters’ decisions when choosing a site, and what are the values of these attributes?

The Need
Boaters spend a lot of effort to get to the Channel Islands. Considering the cost of buying a boat, slip fees, etc., they must receive some sort of benefit from this pastime. To quantify this benefit, we used non-market valuation.

Non-market Valuation
Quantifies the value of goods/services not bought or sold in the market.

Example: Boater decides to go SCUBA diving on Santa Cruz Island

$250

Willingness to pay – how much the individual values the experience
consumer surplus – benefit received over and above what was paid for the experience

$10

total cost – fuel and maintenance
$200

1 Trip

In asking what is the value of a trip to the Sanctuary, we are really looking for the consumer surplus.

How do Private Boaters Value the Sanctuary?

Consumer Surplus per Trip and per Year

<table>
<thead>
<tr>
<th>Activity Group</th>
<th>Consumer Surplus per Trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwater non-consumptive</td>
<td>$14.72</td>
</tr>
<tr>
<td>Surface non-consumptive</td>
<td>$26.34</td>
</tr>
<tr>
<td>Consumptive</td>
<td>$24.63</td>
</tr>
<tr>
<td>Land-based</td>
<td>$26.29</td>
</tr>
</tbody>
</table>

• The consumer surplus of a trip to the Sanctuary for all activity groups was positive and ranged from about $10 - $83 per hour.

• There were 4,621 non-consumptive trips taken in 2007. Therefore, the total annual value for non-consumptive private boating is about $86,323.

Key Point:
• The non-market value of private recreational boating can be considered when evaluating policies that affect this stakeholder group.

• $86,323 should be considered a conservative estimate due to limitations of the data and the model.

Importance and Value of Site Characteristics

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Relationship</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological index</td>
<td>+</td>
<td>Boaters prefer sites with higher biological quality</td>
</tr>
<tr>
<td>Expense</td>
<td>-</td>
<td>Boaters are willing to pay less to go to sites with higher expenses</td>
</tr>
<tr>
<td>Kel% Cover</td>
<td>No statistically significant</td>
<td>No effect</td>
</tr>
</tbody>
</table>

| Activity Group | Biological Index | Key Point:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwater</td>
<td>High</td>
</tr>
<tr>
<td>Surface</td>
<td>Medium</td>
</tr>
<tr>
<td>Consumptive</td>
<td>Low</td>
</tr>
<tr>
<td>Land-based</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

Modeling Boater Decisions

Step 1: Individual Choice of Site and Activity

110 private boaters were surveyed at Santa Cruz Island in May - December of 2006 and 2007.

Passengers reported visiting various sites around Anacapa, Santa Cruz, and Santa Rosa islands.

For the model, we defined boundaries for these sites as seen below:

- Boaters also identified participation in 15 different activities. We categorized these into a hierarchy of 4 activity groups.

- Boaters’ decisions about where to go and what activity to do are often shaped by different attributes associated with a site.

- Attributes included in the model are:
  - Biological index (fish and invertebrates richness and abundance)
  - Exposure to wind and swell
  - Distance to site
  - Kel% cover

Step 2: Cost of Traveling to the Sanctuary

- Boaters reported fuel costs and time/effort spent traveling to the Sanctuary.

- Time and expenses were monetized into dollar values per trip for each respondent. This is referred to as the travel cost.

Step 3: Site Characteristics

- Boaters’ decisions about where to go and what activity to do are often shaped by different attributes associated with a site.

- Attributes included in the model are:
  - Biological index (fish and invertebrates richness and abundance)
  - Exposure to wind and swell
  - Distance to site
  - Kel% cover

Step 4: Random Utility Model (RUM)

- Random Utility Model (RUM)

Step 5: Model Outputs

- Value of Boating in the Sanctuary: Consumer Surplus per trip and per year

- The per trip value is the consumer surplus received from one trip to the Sanctuary.

- Multiplying this number by the total number of trips taken per year, we can obtain the total annual consumer surplus of non-consumptive boating in the Sanctuary.

Relevance of Findings

- The results may be used for coastal and marine recreation worldwide to determine how changes in biological quality result in changes in value.

- Our research highlights data gaps that, when addressed, will improve the design of future studies of this nature.

Recommendations for Future Research

- Incorporate additional site attributes (i.e. congestion, scenic view)
- Test alternative activity hierarchies to see if results change
- Determine the effect of boaters expenditures on the local economy

Acknowledgements

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Thought Experiment: What would happen to the total value of boater trips if we doubled fish abundance in a popular site?

1. We multiply the change in biological index by the number of annual visitors
2. Ar...