The Economic Value of Recreation and Coastal Water Quality in New England

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The Problem

• Many coastal waterbodies have water quality issues
  • Bacteria
  • Nutrients

The Question

• How is recreation affected?
Pieces of the Puzzle

- Where?
- How many?
- Who?
- What is it worth to them?
Research Efforts

1. Visitation

2. Economic Value and Beach Closures

3. Survey
1. Visitation

2. Economic Value and Beach Closures

3. Survey

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**Estimated Car Counts for Season (2015)**

- Craigville
- Kalmus
- Keyes Memorial
- Veteran’s Park

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**New England Coastal Water Quality and Recreation Survey**

This survey seeks your opinions on coastal water quality in New England and how any changes might affect your recreation. Your participation in this survey will help inform decisions to improve and protect coastal water quality.

We need feedback from everyone. Even if you do not use beaches, please take a few minutes to complete the survey for your local beach. The survey only takes about 15 minutes to complete. Your responses are anonymous and will only be used for this survey. Thank you for your help!
• How many people use Three Bays for recreation?
Visitation: Three Bays (Cape Cod, MA)
Visitation: Three Bays (Cape Cod, MA)

Three Bays Public Access Activities:
- Spending time by the shore
- Kayak/SUP/Rowing
- Kayak/SUP/Rowing and Fishing
- Fishing from shore
- Shell-fishing from shore
- Boating (general)
- Boating and Fishing
- Walk-by
- Other (including Yacht Club and commercial fishing)
Average Stock and Flow of Visitors for All Sites

- **Stock** $s(t)$
- **Arrivals** $a(t)$
- **Departures** $d(t)$

Visitation: Three Bays  (Cape Cod, MA)
Visitation: Three Bays

- User-friendly process to estimate daily visitation to many access points
- Deployable by partners and in other locations
- Working on a guide
Research Efforts

1. Visitation

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Value of a Beach

- **Non-Market Value**: What is it worth to people past what they paid for it?
  - “consumer surplus”, “net willingness-to-pay”

- **Market Value**: How much $ was paid and what is its impact on the economy?
  - Expenditures, economic impact, tourism $
Value of a Beach

- Non-Market Value- What is it worth to people past what they paid for it?
  - “consumer surplus”, “net willingness-to-pay”
  - Lyon, Sarina F.; Merrill, Nathaniel H.; Mulvaney, Kate K.; and Mazzotta, Marisa J. (2018) "Valuing Coastal Beaches and Closures Using Benefit Transfer: An Application to Barnstable, Massachusetts," Journal of Ocean and Coastal Economics: Vol. 5: Iss. 1, Article 1. DOI: https://doi.org/10.15351/2373-8456.1086

- Market Value- How much $ was paid and what is its impact?
  - Economic impact, tourism $

- National Ocean Recreation Expenditure Survey
Value of a Beach

- Modeled daily visitation based on car counts and weather
- $22 per person per day based on literature review
- Clean beaches worth twice as much to the public

### Table 4: Total beach attendance and consumer surplus for the bathing season

<table>
<thead>
<tr>
<th>Beach Name</th>
<th>Total Visitation</th>
<th>Season Value (2016$)</th>
<th>Value(a)</th>
<th>Season Value (2016$)</th>
<th>Value(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craigville</td>
<td>90,354</td>
<td>$1,986,884</td>
<td>$4,299,043</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalmus</td>
<td>40,505</td>
<td>$890,705</td>
<td>$1,927,228</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyes Memorial</td>
<td>13,506</td>
<td>$296,997</td>
<td>$642,615</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veteran's Park</td>
<td>50,115</td>
<td>$1,102,029</td>
<td>$2,384,472</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194,481</td>
<td>$4,276,637</td>
<td>$9,253,406</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: (a) Indicates value using a policy application of consumer surplus of $21.99, the value of a beach with past closures. All four beaches had closures between 2011 and 2015. (b) Represents the value if all beaches were considered “pristine,” meaning no closure was posted from 2011 – 2015 due to bacterial contamination. This scenario uses the consumer surplus value of $47.58 to estimates aggregated value for the season.
• 60% fewer people go on closure days

• Lost value to the public + lost town revenue

• These beaches in Barnstable close rarely, but method transferrable

### Table 5: Value lost per day due to a beach closure

<table>
<thead>
<tr>
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<th>Beach Name</th>
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<tr>
<td></td>
<td>Craigville</td>
</tr>
<tr>
<td>May</td>
<td></td>
</tr>
<tr>
<td>Memorial Day weekend</td>
<td>-$17,481</td>
</tr>
<tr>
<td>Weekday</td>
<td>-$7,097</td>
</tr>
<tr>
<td>Weekend</td>
<td>-$10,056</td>
</tr>
<tr>
<td>June</td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>-$10,847</td>
</tr>
<tr>
<td>Weekend</td>
<td>-$15,270</td>
</tr>
<tr>
<td>July</td>
<td></td>
</tr>
<tr>
<td>Fourth of July weekend</td>
<td>-$37,534</td>
</tr>
<tr>
<td>Weekday</td>
<td>-$15,610</td>
</tr>
<tr>
<td>Weekend</td>
<td>-$22,060</td>
</tr>
<tr>
<td>August</td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>-$13,999</td>
</tr>
<tr>
<td>Weekend</td>
<td>-$19,177</td>
</tr>
<tr>
<td>September</td>
<td></td>
</tr>
<tr>
<td>Labor Day weekend</td>
<td>-$16,038</td>
</tr>
<tr>
<td>Weekday</td>
<td>-$6,685</td>
</tr>
<tr>
<td>Weekend</td>
<td>-$9,197</td>
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Note: See Supplementary Materials Table 5 for the breakdown of the lost value between consumer surplus and parking revenue. These values were calculated using 2015 visitation predictions. Holiday weekend estimates are presented as a single day within the weekend based on 2015 and when holidays happened to occur that year.
• 60% fewer people go on closure days

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New England Recreation Survey

- Web and Mail Survey
- Activities and effort
- $/day for coastal activities
- $/day change with change in water quality (including nutrients)
- Mailed to 9k+ households in New England
- Closed at the end of November
Places with BEST & WORST water quality

WORST (1)

HarborWalk, Boston, MA
(smell, visual appearance)

Revere Beach, MA
(smell)

Sabin Point, Riverside, RI
(sewage treatment plant upstream)

Oakland Beach, Warwick, RI
(bad odor)

BEST (10)

Crane Beach, Ipswich, MA
(beautiful beach, well cared for)

Parker River National Wildlife Refuge, Newbury, MA
(no trash, smells fresh & clean)

South Shore Beach, Little Compton, RI
(Water is clear. No seaweed, sea lice. Sand is clean)
Do people travel longer distances for better water quality?
Summary

Visitation
- Created and tested simplified methods for use in coastal and estuaries

*Output: EPA how-to report and worksheets*

Economic value
- Combined visitation and existing research to value beaches and beach closures

*Output: Regional $/beach day values, method to combine with visitation records (JOCE)*

Survey
- General population survey

*Output: Provides region and activity specific $/day values. Estimate changes in value with changes in WQ*
Thank you!

Please feel free to contact us with any questions:
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