# A Comparative Analysis of the Multi-Mode Chesapeake Bay Menhaden Survey

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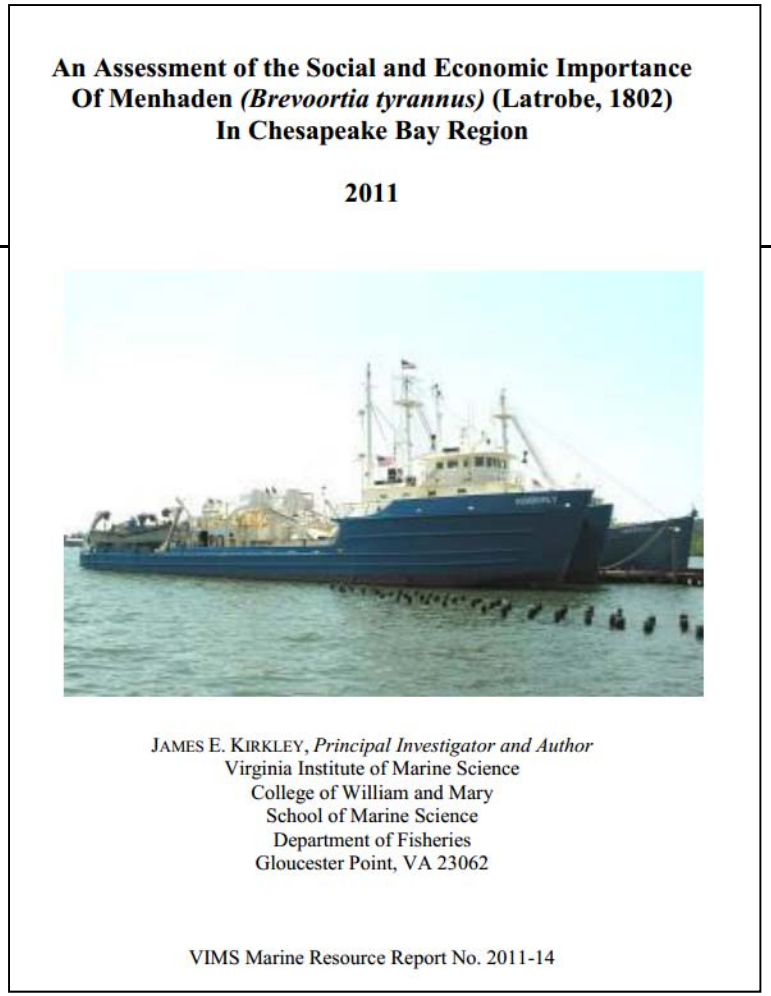

**An Assessment of the Social and Economic Importance Of Menhaden *(Brevoortia tyrannus)* (Latrobe, 1802) In Chesapeake Bay Region**

**2011**

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VIMS Marine Resource Report No. 2011-14

- http://web.vims.edu/GreyLit/VIMS/mrr11-14.pdf

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# Survey Modes

| | Advantages | Disadvantages |
|---|---|---|
| Mail | Visual aids | Time, lack of control over skip patterns |
| In-person | Visual aids, Control over skip patterns | Interviewer effects |
| Telephone | Control over skip patterns | No visual aids, Interviewer effects |
| Internet | Visual aids, time, control over skip patterns | Self-selection |
| Hybrids | All of the above | |

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# SP Survey Mode Literature

| | phone | mail | in-person | internet |
|---|---|---|---|---|
| Ethier et al. Land Econ (2000) | x | x | | |
| Berrens et al., JEEM (2004) | x | | | x |
| Hudson et al. AEL (2004) | | x | | x |
| Marta-Pedrosa et al., Ecol. Econ. (2007) | | | x | x |
| Olsen, ERE (2009) | | x | | x |
| Nielsen, REE (2011) | | | x | x |
| Lindhjem and Navrud (2011) | x | x | x | x |

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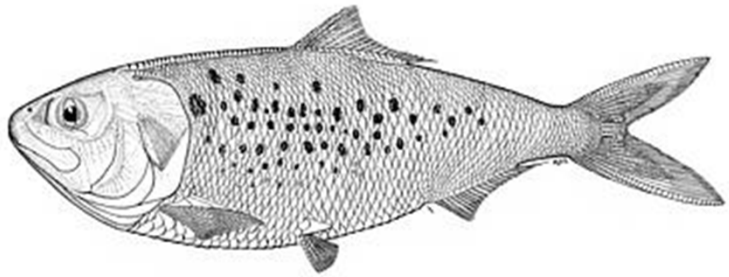
# This Study

- Compare (inexpensive) mail, internet and telephone surveys
  - Response rates
  - Item nonresponse
  - Sample composition
  - Attitudes
  - Behavior
  - Willingness to pay



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# Data Collection

- “tailored design method” where the budget allowed (Dillman, Smyth and Melani, 2008).
- Samples: Maryland and Virginia
- Time in the field
  - Mail: 4 months
  - Telephone: 52 days
  - Internet: 4 days

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# Survey Response

| Mode | Response Rate | Item Nonresponse Rate | Sample Size |
|---|---|---|---|
| Mail | 10% | 57% | 434 |
| Telephone | 36% | 50% | 766 |
| Internet | --- | 22% | 831 |

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# Virginia Sample

| | Census | Combined | Mail | Phone | Internet |
|---|---|---|---|---|---|
| Persons 65 years old and over, 2009 | 12% | 11% | 14% | 11% | 8% |
| Female persons, 2009 | 51% | 50% | 71% | 46% | 44% |
| High school graduates, age 25+, 2000 | 82% | 91% | 96% | 92% | 88% |
| Bachelor's degree or higher, age 25+, 2000 | 30% | 29% | 39% | 32% | 22% |
| Median household income, 2008 | $61.2 | $62.5 | $62.5 | $42.5 | $62.5 |

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# Maryland sample

| | Census | Combined | Mail | Phone | Internet |
|---|---|---|---|---|---|
| Persons 65 years old and over, 2009 | 12% | 9% | 12% | 9% | 8% |
| Female persons, 2009 | 52% | 44% | 70% | 36% | 37% |
| High school graduates, age 25+, 2000 | 84% | 92% | 97% | 92% | 89% |
| Bachelor's degree or higher, age 25+, 2000 | 31% | 33% | 47% | 31% | 27% |
| Median household income, 2008 | $70.5 | $62.5 | $62.5 | $42.5 | $62.5 |

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# Experimental Design

- 3 scenarios
  - “Maintenance” – avoid a 10% decrease
  - Decrease harvest by 10%
  - Decrease harvest by 50%
- 4 tax amounts
  - $10, $30, $60, $90

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# Attitudes: “Concern” (decrease)

- To decrease the harvest of the menhaden “reduction” fishery in the Bay by **10% (50%)** will require more rigorous monitoring. This approach could decrease the total sales of menhaden by about **$6 ($30)** million, wages and salaries paid to fishermen and processor employees by about **$1.1 ($5.7)** million, employment by **30 (150)** individuals and taxes paid to Virginia by approximately **$340,000 ($1.7 million)**. The impact on the Maryland economy would be minimal.

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# How concerned are you about the decrease of menhaden harvest on the Virginia economy?

| | Mail | Phone | Internet |
|---|---|---|---|
| Very concerned | 15% | 23% | 17% |
| Somewhat concerned | 38% | 41% | 45% |
| Not too concerned | 38% | 23% | 28% |
| Not concerned at all | 11% | 13% | 10% |
| $\chi^2 = 36.09$ (df = 6) | | | |

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# Ordered Logit: Dependent variable = Concern

| | Mail | Phone | Internet |
|---|---|---|---|
| Distance | **Positive (p=.10)** | **Positive (p=.01)** | |
| State | **Negative (p=.05)** | **Negative (p=.01)** | **Negative (p=.01)** |
| Decrease | | **Negative (p=.01)** | |
| Scope | | **Positive (p=.01)** | **Positive (p=.07)** |
| Model $\chi^2$ | 13.12 | 58.91 | 27.90 |
| LR Test: $\chi^2 = 52.17$ (df = 7) | | | |

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# Visited

| | Mail | Phone | Internet |
|---|---|---|---|
| Visited | 77% | 74% | 56% |
| Trips | 11.39 | 11.82 | 4.99 |
| Day trips | 9.08 | 9.88 | 3.84 |
| Distance | 64.18 | 57.89 | 87.43 |
| $\chi^2 = 77$ (df = 2) | | | |

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# Logit: Dependent variable = Visited

| | Mail | Phone | Internet |
|---|---|---|---|
| Travel cost | **Negative (p=.05)** | **Negative (p=.01)** | **Negative (p=.01)** |
| VA | **Positive (p=.05)** | **Positive (p=.05)** | |
| Income | **Positive (p=.01)** | | **Positive (p=.01)** |
| Model $\chi^2$ | 42.17 | 58.91 | 60.13 |
| LR Test: $\chi^2 = 88$ (df = 4) | | | |

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# Truncated Negative Binomial: Dependent variable = Day trips

| | Mail | Phone | Internet |
|---|---|---|---|
| Travel cost | **Negative (p=.01)** | **Negative (p=.01)** | **Negative (p=.01)** |
| VA | **Negative (p=.01)** | **Positive (p=.01)** | **Positive (p=.01)** |
| Income | | **Positive (p=.01)** | **Positive (p=.01)** |
| CS/trip | $37 | $44 | $54 |
| LR Test: $\chi^2 = 624$ (df = 5) | | | |

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# Payment vehicle

- The program for enforcing the restriction on catch and monitoring is costly and will require additional state taxes. We estimate that a typical Virginia and Maryland household would pay about $10 in higher state taxes each year for the next 10 years.

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# Referendum vote

- Suppose that the proposal is put to a referendum vote. If a majority of all households in Virginia and in Maryland voted for the proposal it would pass, the menhaden harvest would be decreased and you would have about $10 less to spend each year for the next 10 years.

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# Continued …

- If a majority of all households in Virginia and Maryland voted against the proposal then it would fail, commercial fishing of menhaden would remain at current levels and it would cost you nothing.

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# If the vote were held today would you vote for or against the proposal?

| | Mail | Phone | Internet |
|---|---|---|---|
| For | 42% | 51% | 31% |
| Don’t Know | 30% | 39% | 31% |
| Against | 31% | 10% | 37% |
| $\chi^2 = 166$ (df = 4) | | | |

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# How sure are you about your vote on the proposal?

| | Mail | Phone | Internet |
|---|---|---|---|
| Very sure | 44% | 57% | 32% |
| Somewhat sure | 29% | 28% | 30% |
| Not too sure | 15% | 11% | 18% |
| Not at all sure | 12% | 4% | 20% |
| $\chi^2 = 145$ (df = 6) | | | |

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# Ordered Logit: Dependent variable = Vote

| | Mail | Phone | Internet |
|---|---|---|---|
| Tax | | **Negative (p=.01)** | **Negative (p=.05)** |
| Decrease | | | |
| State | | | |
| Scope | **Negative (p=.10)** | | |
| Concern | | | **Negative (p=.01)** |
| Income | | | |
| Visited | **Positive (p=.05)** | | **Positive (p=.01)** |
| Model $\chi^2$ | 16.21 | 28.10 | 46.45 |
| LR Test: $\chi^2 = 140.64$ (df = 10) | | | |

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# Conclusions

- We find differences in:
  - Response rates
  - Item nonresponse
  - Sample composition
  - Attitudes
  - Behavior
  - Willingness to pay
- Combined modes reduce sample bias and may increase accuracy

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