SOCIOECONOMIC CHARACTERIZATION OF BISCAYNE BAY

M. Shivlani, PhD, principal investigator
S. Dowdell, co-principal investigator
Need for the socioeconomic characterization

- The study evaluates the condition of and changes in the value of Biscayne Bay since the last major study conducted on the bay
  - *Hazen and Sawyer (2005) conducted a comprehensive economic valuation of Biscayne Bay*

- The study also considers how bay-dependent stakeholders use the bay and perceives its overall condition
  - *With a focus on past and present water quality*
Hazen and Sawyer conducted an economic valuation of Biscayne Bay, using 2004 as the base period and focusing on the following four sectors:

1. Bay-related recreation
2. Commercial fishing
3. Port of Miami and Miami River shipping
4. Marine-related industries

The study used a combination of visitor and resident surveys, fishery harvest and participation data, shipping revenues and totals, and the type, number, and location of marine-related industries to complete the valuation.
Hazen and Sawyer (2005) economic valuation study – main findings

- **Recreational use**
  - 65.5 million person-days of recreation of bay-related activities
  - Viewing the bay from shore (25%), swimming from shore (17%), fishing from a boat (13%)
  - $2.11 billion income and 57,000 jobs in Miami-Dade County

- **Shipping**
  - $3.87 billion income from the Port of Miami shipping, and $339 million from Miami River shipping

- **Commercial fishing**
  - $13.2 million in sales, and $17 million income (in 2002)

Source: http://www.redfishgrill.net/location
2017 socioeconomic characterization: Main focus areas and approaches

The 2017 socioeconomic characterization consisted of the following activities:

- 1. Updating (and assessing) estimates of bay-related recreation
- 2. Determining bay-related commercial fisheries’ participation, landings, and value
- 3. Estimating the revenue and shipping totals of local ports (Port of Miami and Miami River)
- 4. Comparing changes in marine industry participation by sector from 2005 to 2015
2017 socioeconomic characterization: Bay-related recreation

- This study used the 2004 bay-related recreational use from the 2005 study as a benchmark to extrapolate use through 2016
  - The 2005 study had used visitation rates from Biscayne National Park, and the Barnacle, Bill Baggs, and Oleta River State Parks to extrapolate recreational use from 2004 back to 1981
  - Rates in overall county visitation (43.4%) mirrored increases in park use (44%)

- The extrapolated increase in use for 2016 was 88.1 million visitor days, compared to 65.5% million visitor days in 2004

- An important caveat to the extrapolation of 2004 benchmark for bay-related recreation is that the extrapolation cannot account for changes in demand, negative effects (such as environmental quality decline, congestions, preferences, etc.)
2017 socioeconomic characterization: Bay-related recreation

- Other indicators of increased bay-related recreation
- Several factors strongly suggest that there has likely been an overall growth in bay-related recreation and the bay’s economic contribution since 2004
  - **62.5%** of the 15.7 million overnight visitors to Miami-Dade County in 2016 identified beaches as the main reason to visit the county, and **74.5% reported visiting beaches over their visit**, and **6.2% participated in water-based activities**
  - The county’s population increased by **14.3%** from 2004 to 2016, to 2.37 million, and growth rates in the county were amongst the highest along bay-facing zip codes
    - **8.2%** growth in 13 zip codes facing the bay from 2011-2015
  - **Total vessel registration in the county increased from 57,256 in 2004 to 63,319 in 2014**, or an increase of **10.6%** over the decade long period
2017 socioeconomic characterization: Bay-related commercial fisheries’ participation, landings, and value

- **Approach**
  - The present study evaluated the bay’s commercial fishery in terms of total participation and landings and value by area and by selected bay-dependent species
  - Relevant bay areas were selected as per FWC fishing areas, from FWC trip ticket data
2017 socioeconomic characterization: Bay-related commercial fisheries’ participation, landings, and value

- Participation
  - Participants in the fishery consist of trap fishers, roller (bait) and wingnet shrimpers, hook and line fishers, and divers
  - Participation in Miami-Dade commercial fishing operations has witnessed a steady decline since when the Saltwater Product License (SPL) holder program commenced
  - From 1989 to 2016, the fishery has lost 54% of its participants
    - Commercial fishing docks and slips are now only located in parts of larger marinas

2017 socioeconomic characterization: Bay-related commercial fisheries’ participation, landings, and value

- Landings
  - Landings consist of a variety of fin fish and invertebrates
  - Bay-related species dominate landings and value, and include spiny lobster, bait shrimp, bait fish, and stone and blue crabs
  - The most valuable species in the fishery are spiny lobster and bait shrimp
  - Both species are bay-dependent and caught in the bay

<table>
<thead>
<tr>
<th>Species</th>
<th>Landings</th>
<th>Trips</th>
<th>Average price</th>
<th>Value</th>
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<tbody>
<tr>
<td>LOBSTER, SPINY</td>
<td>326238</td>
<td>1520</td>
<td>7.71</td>
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<td>SHRIMP, BAIT</td>
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<td>SQUID</td>
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<td>CRAB, BLUE (HARD)</td>
<td>68741</td>
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<td>BAIT FISH</td>
<td>47614</td>
<td>397</td>
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<td>CRAB, STONE, ALL CLAWS</td>
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<td>Varies</td>
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<td>SNAPPER, YELLOWSHARK</td>
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<td>SWORDFISH</td>
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<td>MULLET, SILVER</td>
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<td>SCAD, BIGEYE</td>
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<td>(GOOGLE EYE)</td>
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<td>JACK, CREVALLE</td>
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<td>GROUNDER, BLACK</td>
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<td>DOLPHIN</td>
<td>3012</td>
<td>31</td>
<td>3</td>
<td>$9,046</td>
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</tbody>
</table>

Bay-dependent and bay-caught species are in bold
2017 socioeconomic characterization: Bay-related commercial fisheries’ participation, landings, and value

- **Landings**
  - Harvest totals have fluctuated somewhat but shown mainly declining (Miami-Dade County landings) or flattened (Biscayne Bay) trends
  - Landing for selected species have varied
    - Spiny lobster catches actually peaked in 2014 at 418,000 pounds but have since declined
    - Bait fish catches showed a steady decline from 2004-2013, when landings dropped to just over 100,000 pounds; however, catches have picked up since then
2017 socioeconomic characterization: Bay-related commercial fisheries’ participation, landings, and value

- **Value**
  - Other than participation, value is the major issue facing the fishery (which in turn makes it vulnerable to non-fishery competition for waterfront space)
  - Value for Miami-Dade County fisheries has shown a consistent decline since peaking at almost $10 million (2016$) in 1991
  - While there have been ‘good’ years in between poor ones (ex., 2010, 2014), value has not recovered to the peak period of the 1990s
2017 socioeconomic characterization: Port shipping and revenues

- Port of Miami
  - The port has seen a consistent increase in total revenue since the end of the last recession
  - Cruise wharfage and dockage remains the most important sector
    - A record five million cruise passengers went through the port in 2016, representing a consistent increase since the recession
  - Tonnage has shown a recovery since the recession as well
    - 8.8 million tons in cargo in 2016
  - In 2016, the port is estimated to generated $41.4 billion of total economic activity in the State of Florida and supported 21,897 direct jobs, 14,127 induced jobs, and 8,942 indirect jobs in the county, and that these activities also supported 279,386 jobs (user jobs) in the state of Florida
  - By contrast, the Miami River’s shipping operations have declined considerably
    - 354 tons in 2015 from 657 tons in 2005
2017 socioeconomic characterization: Marine related businesses

- **Approach**
  - Use of NAICS (industry) codes to identify marine-related business in Miami-Dade County
  - Comparison of NAICS codes over a decade: 2005-2015
  - Determination of changes in number of businesses by code, number of employees, changes in payroll

**NAICS codes**
- 1141 – Fishing, hunting, and trapping
- 3117 – Seafood product preparation and packaging
- 3366 – Ship and boat building
- 42446 – Fish and seafood merchant wholesalers
- 441222 – Boat dealers
- 4831 – Deep sea, coastal, and Great Lakes water transportation
- 4832 – Inland water transportation
- 4872 – Scenic and sightseeing transportation, water
- 4883 – Support services for water transportation
- 71393 – Marinas
### 2002 NAICS code

<table>
<thead>
<tr>
<th>2002 NAICS code</th>
<th>Meaning of 2002 NAICS code</th>
<th>Year</th>
<th>Number of establishments</th>
<th>Number of employees</th>
<th>First-quarter payroll ($1,000)</th>
<th>Annual payroll ($1,000)</th>
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<tr>
<td>1141</td>
<td>Fishing</td>
<td>2015</td>
<td>8</td>
<td>9</td>
<td>113</td>
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<td>31171</td>
<td>Seafood product preparation and packaging</td>
<td>2015</td>
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<td>154</td>
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<td>4950</td>
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<td>336611</td>
<td>Ship building and repairing</td>
<td>2015</td>
<td>14</td>
<td>102</td>
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<td>336612</td>
<td>Boat building</td>
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<td>20</td>
<td>350</td>
<td>2806</td>
<td>10863</td>
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<td>424460</td>
<td>Fish and seafood merchant wholesalers</td>
<td>2015</td>
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<td>539</td>
<td>6645</td>
<td>26848</td>
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<td>441222</td>
<td>Boat dealers</td>
<td>2015</td>
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<td>483112</td>
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<td>488320</td>
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<td>488330</td>
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<td>488390</td>
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<td>2015</td>
<td>44</td>
<td>287</td>
<td>2255</td>
<td>10429</td>
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</tbody>
</table>

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### 2017 Socioeconomic Characterization: Marine Related Businesses

- **Results**
  - Growth in the total number of marine-related businesses from 2005 to 2015 by 17%:
    - Growth in the total number of employees by 5.5%
    - Most growth in deep sea water transportation and boat building sectors
  - Net decline in marinas, but with an increase in payroll
  - Annual payroll has shown the greatest increase over the period (41%),
    - $1.1 billion in 2015, compared to $780 million in 2005
Main results from the 2017 socioeconomic characterizations

- The economic value of the bay is very likely much higher than it was when last measured in 2004
  - *The Port of Miami has increased its cruise operations and passenger totals (and revenues), as well as its shipping operations*
  - *Marine-related businesses have increased in total and revenues, measured over a 10-year period (from 2005-2015)*
  - *Bay-related recreation has likely increased, especially if estimated by extrapolating selected park visitation statistics, but also by evaluating visitor totals and preferences and increased population (especially along the coastal corridor)*

- Commercial fishery landings have remained stagnant, due likely to a combination of competition (especially imports), waterfront scarcity, and resource abundance
  - *Bay-related (caught and dependent) species account for a very small percentage of the overall economic value of the bay*
What does an economic valuation tell us about ecological health?

- Bay-related visitation and demand
  - The rate of visitation from 2004 to 2016 increased by 44% in Biscayne National Park and Oleta River, Bill Baggs, and the Barnacle State Park
    - 312% for the Barnacle and 135% for Oleta River
  - The number of persons who recreated along the shoreline increased from 15.9 million in 2004 to an extrapolated 21.3 million
  - 13 zip codes that abut the bay equaled or outperformed Miami-Dade County median home values in 2016
    - On average, the zip codes were higher by 10.8%

- So, can the bay increase in economic value even as its ecological function is impaired, and if so, then how can these almost opposing values be reconciled?
Socioeconomic indicators to track economic conditions related to the bay’s ecological health

- There are a series of cost-effective and readily available data that could be accessed to track economic conditions that provide information on the bay’s ecological conditions (or perceived health)
- These indicators should not be used instead of broader studies and should instead complement the other findings
- Indicators also serve intermediate steps in between benchmark (comprehensive) studies and could be used to track conditions or work as triggers for a more detailed examination of an issue
Indicator 1: Measuring visitation totals and trends

- All visitation rates, although not necessarily related to bay conditions, measure the overall attractiveness of the county and its resources to visitors
  - Especially since recent data show the importance of beaches and nature visits to overnight visitors
- Other rates and trends that could be monitored are visitation rates to coastal parks, especially Biscayne National Park and the state and local bayfront parks
Indicator 2: Measuring use rates of bay access points (marinas, ramps)

- Vessel-based recreation is very important in the region, as measured by the growth in the number of recreational vessels over the past few decades.

- Boaters utilize one of the many marinas in the county, as well as one of six public boat ramps, to access the bay.

- Changes in boat ramp use or marina occupancy rates can be compared with ecological conditions to determine the effects of bay health on boating and related in-water activities.

Source: http://www.miamiandbeaches.com/boating-and-water/black-point-marina/101548
Indicator 3: Tracking fishery data from creel surveys and FWC landings data

- While largely specific to the lower bay, Biscayne National Park’s creel survey program data extends back to 1979
  - The park has included questions since the early 2000s on trip satisfaction, and these could be used as an indicator on species as a proxy for bay health, ex., species sensitive to changes in sea grass, water quality

- FWC trip ticket data could be tracked for bay-dependent species in general and for those landed in trip-ticket areas located in the bay

Fishery information for area 744.3
Indicator 4: Coastal median zip code to county median zip code values

- A simple indicator to measure and track the attractiveness of the bay as a viewshed is to determine the relative value of coastal properties versus all county properties, in terms of their median values.
  - While there are sundry factors influencing value, a median property value ratio can provide a simple indicator on the difference in relative values.
  - Shifts in the ratio can be used to explore factors influencing the changes and if these (if the ratio shifts in favor of the county value) are related to changes in bay quality.

Source: [https://www.pinterest.com/explore/miami-zip-code/](https://www.pinterest.com/explore/miami-zip-code/)

Indicator 5: Tracking marine activity licenses

- Various licenses are required to operate in the bay, ranging from:
  - *Boater registration, for all vessels based in that county*
  - *Recreational fishing license, for most recreational fishers (with some age, military, and other exceptions) fishing*
  - *Saltwater Products License (SPL), for commercial fishers and wholesalers*

- These trends, like those related to others, may be influenced by a number of factors
  - *However, the trends can be tracked to be explored if there are threshold level shifts in participation that may be related to bay conditions*
Indicator 6: Comparing changes in marine-related businesses

- NAICS codes, which are readily accessible via the US Census Bureau, provide county-level information on various marine industries
  - *It should be noted that marine-related businesses may fall outside the codes*
  - *But, the codes can work as indicators to track those businesses that are accounted for*

- One approach may be to develop a composite index of codes, based on all available codes that could be weighted based on pre-determined criteria (income, employees, etc.)

- Another approach may be to develop activity-specific composites, such as codes related to extractive industries, recreation, and construction are separately accounted for