Spring 3-25-2013

Understanding the Ocean Economy within Regional and National Contexts

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Understanding the Ocean Economy within Regional and National Contexts

Abstract

- Extending discussion of the ocean economy beyond “How Big”
  - Changes in the U.S. related to the Great Recession
  - Decomposing changes to major types of change
  - Finding relative sizes
    - Exploring the expanding attention to the ocean economy in other parts of the world
- Likenesses and differences in:
  - Definitions
  - Measures
  - Geographies
  - Purposes

Where do we go from here?

2
Understanding the ocean economy within regional and national contexts

Charles S. Colgan
University of Southern Maine

Judith Kildow
Center for the Blue Economy
Monterey Institute for International Studies

CN REP
New Orleans
March 25, 2013
Overview

• Extending discussion of the ocean economy beyond “How Big”
  – Changes in the U.S. related to the Great Recession
  – Decomposing changes to major types of change
  – Finding relative sizes

• Exploring the expanding attention to the ocean economy in other parts of the world
  – Likenesses and differences in:
    • Definitions
    • Measures
    • Geographies
    • Purposes

• Where do we go from here?
What is the Ocean and Great Lakes Economy?

**SIX SECTORS**

- Living Resources
- Marine Construction
- Marine Transportation
- Offshore Mineral Extraction
- Ship and Boat Building
- Tourism and Recreation

**8 Regions**

**30 Coastal States**

**448 Coastal Counties**
## The Ocean Economy of the U.S.

<table>
<thead>
<tr>
<th>Ocean Economy Sector</th>
<th>Ocean Economy Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Marine Construction</td>
</tr>
<tr>
<td>Living Resources</td>
<td>Fish Hatcheries &amp; Aquaculture</td>
</tr>
<tr>
<td></td>
<td>Fishing</td>
</tr>
<tr>
<td></td>
<td>Seafood Processing</td>
</tr>
<tr>
<td></td>
<td>Seafood Markets</td>
</tr>
<tr>
<td>Minerals</td>
<td>Sand &amp; Gravel</td>
</tr>
<tr>
<td></td>
<td>Oil &amp; Gas Exploration and Production</td>
</tr>
<tr>
<td>Ship &amp; Boat Building and Repair</td>
<td>Boat Building &amp; Repair</td>
</tr>
<tr>
<td></td>
<td>Ship Building &amp; Repair</td>
</tr>
<tr>
<td>Transportation</td>
<td>Boat Dealers</td>
</tr>
<tr>
<td></td>
<td>Eating &amp; Drinking Places</td>
</tr>
<tr>
<td></td>
<td>Hotels &amp; Lodging Places</td>
</tr>
<tr>
<td>Tourism &amp; Recreation</td>
<td>Marinas</td>
</tr>
<tr>
<td></td>
<td>Recreational Vehicle Parks &amp; Campsites</td>
</tr>
<tr>
<td></td>
<td>Scenic Water Tours</td>
</tr>
<tr>
<td></td>
<td>Sporting Goods</td>
</tr>
<tr>
<td></td>
<td>Amusement &amp; Recreation Services</td>
</tr>
<tr>
<td></td>
<td>Zoos, Aquaria</td>
</tr>
<tr>
<td>Transportation</td>
<td>Freight Transportation</td>
</tr>
<tr>
<td></td>
<td>Marine Passenger Transportation</td>
</tr>
<tr>
<td></td>
<td>Marine Transportation Services</td>
</tr>
<tr>
<td></td>
<td>Search and Navigation Equipment</td>
</tr>
<tr>
<td></td>
<td>Warehousing</td>
</tr>
</tbody>
</table>
New

2011 Commercial Seafood Landings data now available!

2012 Cargo & Ports Data are now available!

About NOEP

The National Ocean Economics Program (NOEP) provides a full range of the most current policy-relevant economic and demographic information available on changes and trends along the U.S. coast, Great Lakes, and coastal waters. NOEP will soon expand to international datasets to support the broader mission of its new host, the Center for the Blue Economy (CBE) to “promote ocean and coastal sustainability.”

Data Menu

Market
- Ocean Economy
- Coastal Economy

Natural Resources
- Living Marine Resources
- Offshore Mineral Resources

Non-Market
- Valuation Studies
- Value Estimates
- References & Tools

Ports & Cargo
- Ports & Cargo Data
- About the Data

Population & Housing

Government Expenditures
- OMB Ocean Budgets
- Ocean Time Time Series

Market

Ocean and coastal economic data for the U.S. coastal states, counties, and coastal regions.

Natural Resources

Commercial fisheries information and economic data of the offshore oil and gas production of the U.S.

Population & Housing

Population and housing statistics for the coastal states and shoreline regions.

Non-Market

Non-Market valuation research studies about the coastal regions and waters.

Ports & Cargo

Marine based foreign trade shipping volume and values.

Government Expenditures

Historical data of federal marine expenditures for ocean and coastal activities collected from the U.S. Office of Management and Budget.

updated 13-Mar-2013
To obtain data for oil & gas, start by selecting one or more states, regions, or areas, then select one or more oil and gas measures, and any pricing options from the checkboxes, and click the **Start Search** button.

<table>
<thead>
<tr>
<th>Select State(s) Region(s)</th>
<th>Select Area(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>All Areas</td>
</tr>
<tr>
<td>Louisiana</td>
<td>Louisiana State Offshore</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Louisiana Federal Offshore (OCS)</td>
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</table>

<table>
<thead>
<tr>
<th>Select Production Measure(s)</th>
<th>Options</th>
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<tbody>
<tr>
<td>Crude Oil</td>
<td>Show Production Values</td>
</tr>
<tr>
<td>Condensate Oil</td>
<td>Show Price Per</td>
</tr>
<tr>
<td>Total Oil</td>
<td>Convert to 2005 $</td>
</tr>
<tr>
<td>Natural Gas</td>
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<table>
<thead>
<tr>
<th>Select Year(s)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2010 2009</td>
<td>Display in Window</td>
</tr>
</tbody>
</table>

**Start Search**
Origins of Cargo Sent to the Port of Tampa

Destinations of Cargo Distributed from the Port of Tampa

Economics: National Ocean Watch (ENOW)

$112 Billion

$94 Billion
Environmental & Recreational (Non-Market) Values - Valuation Studies Search

Valuation Studies Search

The Non-Market library provides a listing of Non-Market research papers regarding the ocean and coastal resources.

Use this map to view our Non-market studies from around the world. Place your cursor over a marker to see a brief description of the related study. Click on the marker to get the study's details shown in a separate window.

Or, enter your search preferences into the form below to select from the library by publication or study types, authors, assets, methodologies, and other options. The search results list the publications' titles, authors, years, source information, and any available abstracts or download links, or asset valuations.

To search the Non-Market library, start by entering words or names into the Title, Authors, or Keywords boxes, or select options from the many list boxes and click the Start Search button.
Ocean Economy outperformed the U.S. in the recession in both Employment and GDP.
Construction and Ship & Boat Building were most affected by the recession. Tourism & Recreation was stable; Living Resources were mixed. Transportation and Minerals grew in output.

![Graph showing employment and real GDP for different sectors](image_url)
The sector was relatively stable but employment fell significantly in non-cultured fish industries.

Boat building fell dramatically in employment and output.
Overall marine transportation activity was not greatly affected by the recession with the value of marine freight going up along with the output of search & navigation equipment.

High oil and gas prices kept offshore oil production up, while declines in construction severely affected sand & gravel.
Boat dealers with the most severely affected, along with scenic water tours, but other industries held up moderately well.
Shift/Share Analysis

Change in Employment = National Effect + Industry Effect + Local Effect

\[ e = N + I + L \]

Industry grows at overall national growth rate

\[ N = e^t \frac{E^t}{E^{t-1}} \frac{1}{1 + 1} \]

Industry grows at rate of national industry

\[ I = e^t \frac{E_i^t}{E_i^{t-1}} \frac{E^t}{E^{t-1}} \]

Industry grows at local factors

\[ L = e^t \frac{e_i^t}{e_i^{t-1}} \frac{E^t}{E^{t-1}} \]
Components of Employment Change
2005-2010
Employment Percent Change
2005-2010

Coastal States

<table>
<thead>
<tr>
<th>empch_pct</th>
<th>Change</th>
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<tbody>
<tr>
<td>-15%</td>
<td>-10.8%</td>
</tr>
<tr>
<td>-10.7%</td>
<td>-6.6%</td>
</tr>
<tr>
<td>-6.5%</td>
<td>-2.4%</td>
</tr>
<tr>
<td>-2.3%</td>
<td>0%</td>
</tr>
<tr>
<td>0.1%</td>
<td>6%</td>
</tr>
<tr>
<td>6.1%</td>
<td>10.3%</td>
</tr>
<tr>
<td>10.4%</td>
<td>14.5%</td>
</tr>
</tbody>
</table>
Ocean Economy Employment 2010

Gulf States Counties_Ocean
emp10_9
0 - 2,637
2,638 - 8,412
8,413 - 17,666
17,667 - 34,173
34,174 - 103,748
Ocean Economy Employment Change 2005-2010
Ocean Economy GDP Change 2005-2010

Gulf States Counties_Ocean
gdpch_pct3
-0.4270 - -0.1502
-0.1501 - 0.1444
0.1445 - 0.4723
0.4724 - 1.0723
1.0724 - 3.5773
Ocean Economy GDP per KM of Shoreline

Coastal States

GDP_per_km

- 0.2 - 0.3
- 0.4 - 1.2
- 1.3 - 2.8
- 2.9 - 3.3
- 3.4 - 5.4
- 5.5 - 8.1
- 8.2 - 10.7
- 10.8 - 13.8
- 13.9 - 24.5
- 24.6 - 50.1
Ocean Economy Employment per KM of Shoreline

Coastal States

Emp_per_km

- 2.2
- 2.3 - 41.1
- 41.2 - 63.4
- 63.5 - 77.4
- 77.5 - 95.7
- 95.8 - 109.3
- 109.4 - 137.5
- 137.6 - 181.3
- 181.4 - 236.4
- 236.5 - 688.6
Specialization Ratio
(Location Quotient)

\[
\frac{e^i_r}{e^t_r} \frac{e^i_r}{E^i_R} = \frac{E^i_R}{E^t_R}
\]

\(e^i_r\) = employment in industry i in state s

\(e^t_r\) = total employment in state s

\(E^i_R\) = employment in industry i in the nation

\(E^t_R\) = total employment in the nation
Construction
Living Resources
Ship & Boat Building
Tourism & Recreation
# The Top 5 counties by Ocean Economy Sector

<table>
<thead>
<tr>
<th>Rank</th>
<th>Ocean Economy</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aleutians West, AK</td>
<td>New York, NY</td>
</tr>
<tr>
<td>2</td>
<td>Bristol Bay, AK</td>
<td>Harris, TX</td>
</tr>
<tr>
<td>3</td>
<td>North Slope, AK</td>
<td>Los Angeles, CA</td>
</tr>
<tr>
<td>4</td>
<td>Keweenaw, MI</td>
<td>San Diego, CA</td>
</tr>
<tr>
<td>5</td>
<td>Jackson, MS</td>
<td>Cook, IL</td>
</tr>
</tbody>
</table>

## Living Resources

<table>
<thead>
<tr>
<th>Rank</th>
<th>Specialization</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aleutians West, AK</td>
<td>Aleutians West, AK</td>
</tr>
<tr>
<td>2</td>
<td>Bristol, MA</td>
<td>Bristol Bay, AK</td>
</tr>
<tr>
<td>3</td>
<td>Essex, MA</td>
<td>Valdez-Cordova, AK</td>
</tr>
<tr>
<td>4</td>
<td>King, WA</td>
<td>Pacific, WA</td>
</tr>
<tr>
<td>5</td>
<td>Los Angeles, CA</td>
<td>Hyde, NC</td>
</tr>
</tbody>
</table>

## Minerals

<table>
<thead>
<tr>
<th>Rank</th>
<th>Specialization</th>
<th>Size</th>
<th>Specialization</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aleutians West, AK</td>
<td>North Slope, AK</td>
<td>Harris, TX</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bristol, MA</td>
<td>Refugio, TX</td>
<td>North Slope, AK</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Essex, MA</td>
<td>Iberia, LA</td>
<td>Terrebonne, LA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>King, WA</td>
<td>Terrebonne, LA</td>
<td>Iberia, LA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Los Angeles, CA</td>
<td>Vermilion, LA</td>
<td>Nueces, TX</td>
<td></td>
</tr>
</tbody>
</table>

## Ship & Boat Building

<table>
<thead>
<tr>
<th>Rank</th>
<th>Specialization</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kitsap, WA</td>
<td>Portsmouth (city), VA</td>
</tr>
<tr>
<td>2</td>
<td>Portsmouth (city), VA</td>
<td>Kitsap, WA</td>
</tr>
<tr>
<td>3</td>
<td>San Diego, CA</td>
<td>York, ME</td>
</tr>
<tr>
<td>4</td>
<td>Jefferson, LA</td>
<td>Jefferson, LA</td>
</tr>
<tr>
<td>5</td>
<td>York, ME</td>
<td>Mobile, AL</td>
</tr>
</tbody>
</table>

## Tourism & Recreation

<table>
<thead>
<tr>
<th>Rank</th>
<th>Specialization</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kitsap, WA</td>
<td>Keweenaw, MI</td>
</tr>
<tr>
<td>2</td>
<td>Portsmouth (city), VA</td>
<td>Worcester, MD</td>
</tr>
<tr>
<td>3</td>
<td>San Diego, CA</td>
<td>Monroe, FL</td>
</tr>
<tr>
<td>4</td>
<td>Jefferson, LA</td>
<td>Maui, HI</td>
</tr>
<tr>
<td>5</td>
<td>York, ME</td>
<td>Mackinac, MI</td>
</tr>
</tbody>
</table>

## Transportation

<table>
<thead>
<tr>
<th>Rank</th>
<th>Specialization</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prince George, VA</td>
<td>Los Angeles, CA</td>
</tr>
<tr>
<td>2</td>
<td>Lafourche, LA</td>
<td>Harris, TX</td>
</tr>
<tr>
<td>3</td>
<td>Plaquemines, LA</td>
<td>Cook, IL</td>
</tr>
<tr>
<td>4</td>
<td>Suffolk, VA</td>
<td>Miami-Dade, FL</td>
</tr>
<tr>
<td>5</td>
<td>St. Mary, LA</td>
<td>Orange, CA</td>
</tr>
</tbody>
</table>
Ocean Economy Specialization

Gulf States Counties_Ocean
sr_9
0.00 - 0.31
0.32 - 0.96
0.97 - 1.65
1.66 - 2.56
2.57 - 3.95
Tourism & Recreation Specialization

Gulf States Counties_Ocean
sr_9
0.00 - 0.31
0.32 - 0.96
0.97 - 1.65
1.66 - 2.56
2.57 - 3.95

Gulf States Counties_Ocean
sr_9
0.00 - 0.31
0.32 - 0.96
0.97 - 1.65
1.66 - 2.56
2.57 - 3.95
Part II

International Perspective On National Accounts

Judith Kildow
Countries included in this comparison:

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Japan</td>
</tr>
<tr>
<td>Ireland</td>
<td>China</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Korea</td>
</tr>
<tr>
<td>European Union</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Australia</td>
<td>Malaysia</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Philippines</td>
</tr>
<tr>
<td>Thailand</td>
<td>Singapore</td>
</tr>
<tr>
<td>Vietnam</td>
<td></td>
</tr>
</tbody>
</table>
Elements of Ocean Economy Definition Common to All Countries

• Sectors fully identifiable in the statistical classification (e.g. shipbuilding and shipping);
• Sectors partly identifiable in the classification (fishing and seaports)
• Sectors only indirectly identifiable, i.e. whose outlets are partly maritime, partly non maritime (e.g. marine equipment and a range of services);
• Coastal tourism, including a diversity of small local businesses and sectors, certain of which are identifiable on the basis of their coastal location, and certain others (e.g. travel agencies) are indirectly identifiable.
Different Approaches

Japan:

Type A Industries: Execute business activities in the ocean – fisheries, transportation, oil development, pollution control.

Type B: Supply type A industries with products and services, e.g. ship builders, electronics, steel makers.

Type C: Receive output of type A industries and convert to own products and services, e.g. fishery processing.
Approaches to Defining the Ocean Industry: 
1. Common Industry Categories

- Fishing – (aquaculture, etc)
- Marine Transportation
- Marine Mining
  - Marine Aggregate exploitation (sand and gravel)
  - Offshore oil and gas production
- Ship and boat building, maintenance and repair
- Coastal and Marine Construction
- Coastal Tourism and Recreation/Leisure
Approaches to Defining the Ocean Industry: 2. Differences in Goods Production Industries

• Marine Energies
  – Alternative: wind, tidal, wave, etc
• Saltwater products
• Seaweed
• Submarine Cables
• Marine Chemical industry
• Marine Biotech/Pharmaceuticals
• Maritime aggregate exploitation- diamonds
• Marine/Manufacturing/Technology/ Equipment
  – navigation
  – communications
  – telecommunications
Approaches to Defining the Ocean Industry: 3. Differences in Services Industries

- Engineering
- Consulting
- Real Estate
- Equipment Rentals
- Business activities
- Marine Communications/Telecommunications
- Maritime Insurance and Financing
- Maritime Legal and arbitration services
- Seawater utilization – China
- Mapping
- Surveying
Approaches to Defining the Ocean Industry:
4. Differences in Publicly Provided Services

• Defense: Navy
• State intervention at sea
• Coastal/ocean environment protection
• Marine science research
• Marine education.
• Inland navigation and construction
Geographic Coverage

European Union: Maritime Basin Approach:

– analyses of wealth yielded by each sea region of the EU zone, i.e. by
  • marine resources (energy, non-energy, living)
  • diversity of industries located and operating in this sea region.

• Thailand: Valuation Categories
  – Natural Resources
  – Marine Economic Activities
  – Environmental Impacts
Economic measures used

Common Measures in Standard Economic Accounts

- GDP or Value Added
- Number of people Employed
- Wages

Varied Measures in Economic Account

- No. of establishments
- Full time Employees
- Labor Turnover (Hiring and Separations)
- Trade
  - Export Value of Fish Products - Asia
- Regional Multipliers
  - Employment
  - Income
- Tourism Expenditures
Ocean Economic Outputs Not Included in National Economic Accounts

**Common**
- Natural Resource Production and Values
  - Oil and gas
  - Aggregates
  - Fisheries
- Shipping Tonnage, Value, Destination
- Population/Demographics
- Length of coastline

**Unique**
- Environmental Damage costs
- Costs of environmental restoration
- Costs of Beach Nourishment
- Beach visits
- Housing
Sustainability Indicators

• Natural Capital (Thailand)
  – Protective value and cost of damage to the coastal ecosystems after the India Ocean tsunami
  Thailand

• Other (E.U.)
  – Pressure for road travel near the coast,
  – Pressure for coastal and marine leisure,
  – Bathing water quality
### National Estimates of Marine Economies and % of GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>Author</th>
<th>Date</th>
<th>Date of Data in Study</th>
<th>Ocean Economy GDP (Billions of native currency)</th>
<th>Ocean Economy GDP (Billions of US Dollars)</th>
<th>Percentage of national GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Allen</td>
<td>2004</td>
<td>1996 - 2003</td>
<td>A$ 26.70</td>
<td>$17.00</td>
<td>3.60%</td>
</tr>
<tr>
<td>Canada</td>
<td>RASCL</td>
<td>2004</td>
<td>1988-2000</td>
<td>C$ 22.70</td>
<td>$15.98</td>
<td>1.50%</td>
</tr>
<tr>
<td>France</td>
<td>Kalaydjian et al.</td>
<td>2006</td>
<td>2003</td>
<td>€ 18.90</td>
<td>$16.69</td>
<td>1.40%</td>
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<tr>
<td>France</td>
<td>Kalaydjian et al.</td>
<td>2008</td>
<td>2005</td>
<td>€ 21.50</td>
<td>$17.27</td>
<td>1.20%</td>
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<tr>
<td>NZ</td>
<td>Statistics NZ</td>
<td>2006</td>
<td>1997-2002</td>
<td>NZ$ 3.30</td>
<td>$2.14</td>
<td>2.00%</td>
</tr>
<tr>
<td>UK</td>
<td>Pugh &amp; Skinner</td>
<td>2002</td>
<td>1999-2000</td>
<td>£ 39.0</td>
<td>$61.10</td>
<td>4.90%</td>
</tr>
<tr>
<td>UK</td>
<td>Pugh</td>
<td>2008</td>
<td>2005-06</td>
<td>£ 46.0</td>
<td>$84.27</td>
<td>4.20%</td>
</tr>
<tr>
<td>USA</td>
<td>Colgan</td>
<td>2004</td>
<td>2000</td>
<td>US$ 118.0</td>
<td>$118.00</td>
<td>1.20%</td>
</tr>
<tr>
<td>USA</td>
<td>Kildow &amp; Colgan</td>
<td>2009</td>
<td>2004</td>
<td>US$ 138.0</td>
<td>$138.00</td>
<td>1.20%</td>
</tr>
</tbody>
</table>

Kildow and McIlgorm, 2009
Contribution of Marine Economy to National Economy
Differences in Purposes for Which Measures of the Ocean Economy are Developed

• Extend official national statistics to ocean-related economic activity
• Specific Policy Purposes (e.g. MPAs, program investments)
• Track the health of ocean and coastal sectors
• Meet Marine Spatial Planning needs for detailed databases, especially economic ones to value multiple and competing activities.
• Show whether current environmental protection measures are working.
• Provide clear evaluation of progress towards a vision: clean, healthy, safe, productive and biologically diverse oceans and seas.
Recession Effects

• All nations with ocean accounts suffered losses
• Hardest hit sectors: tourism, shipbuilding, transportation, construction.
• Least affected: oil and gas production due to rise in prices.
Summary and Conclusions

• Ocean economy is a major sector which needs both measurement and analysis, but...

• Measurement and analysis of the ocean economy is still in its early stages
  – Industry and geographic elements
  – Time series

• Future Needs
  – Better measurements of industries
  – More consistent geographies
  – Create models of the ocean economy
  – Cross-national comparisons
    • Benchmarking
    • Develop a global ocean economy measurement
www.OceanEconomics.org

Questions?