Ocean Uses Atlas:
Informing Comprehensive Coastal and Marine Spatial Planning

NOAA National Marine Protected Areas Center

Charles Wahle
Mimi D’Iorio
Nicholas Hayden
Jordan Gass
Cheryl Butner

Marine Conservation Biology Institute

Lance Morgan
John Guinotte
Fan Tsao
Larissa Sano

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Oceans Are Becoming Crowded Places: 

*Fishing Uses*
Oceans Are Becoming Crowded Places: *Industrial and Military Uses*
Oceans Are Becoming Crowded Places:

*Non-Consumptive Uses*
Emerging Uses
Spreading Out from Florida Keys NMS
CMSP is Comprehensive and Requires Planning for All Ocean Uses

Ocean Management Approaches

- Marine Spatial Planning
- Marine Protected Areas
- Ecosystem + Area Based Management
- Regional Ocean Governance

Management Target

OCEAN USES: pattern, conflicts, compatibility

Desired Ecosystem + Societal Outcomes

- Ecosystem Integrity
- Social, Cultural + Economic Benefits
- Reduced User Conflicts
The Missing Puzzle Piece of CMSP: Comprehensive, Continuous and Consistent Spatial Data on Current and Planned Ocean Uses

Aquaculture

Alternative Energy

Fishing

Non-Consumptive Uses

Underwater cables
Filling the CMSP Knowledge Gap: The California Ocean Uses Atlas

- **Purpose** – to enhance California’s ocean management and CMSP by filling key data gap on the full range of human uses

- **Approach** – participatory GIS mapping of 30 ocean uses in 3 sectors by regional ocean experts

- **Partners** –
  - NOAA Marine Protected Areas Center
  - Marine Conservation Biology Institute
  - *Gordon and Betty Moore Foundation*
  - *Resources Legacy Fund Foundation*

- **Status** – All regions mapped; data being packaged for distribution

- **Timeline** – Jan 2008 – Nov 2009
# 30 Significant Human Uses Mapped by the CA Ocean Uses Atlas Project

<table>
<thead>
<tr>
<th>Industrial and Military (8)</th>
<th>Fishing (12)</th>
<th>Non-Consumptive (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore oil and gas</td>
<td>Recreational pelagic fishing from boats</td>
<td>Swimming</td>
</tr>
<tr>
<td>Offshore alternative energy</td>
<td>Recreational benthic fishing from boats</td>
<td>Surface water sports</td>
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<tr>
<td>Mining + mineral extraction</td>
<td>Recreational fishing from shore</td>
<td>Paddling</td>
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<tr>
<td>Underwater cables</td>
<td>Recreational dive fishing</td>
<td>SCUBA and snorkeling</td>
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<tr>
<td>Maritime shipping</td>
<td>Kayak fishing</td>
<td>Motorized boating</td>
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<tr>
<td>Cruise ships</td>
<td>Commercial pelagic fishing</td>
<td>Sailing</td>
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<tr>
<td>Military operations</td>
<td>Commercial fishing w/ benthic fixed gear</td>
<td>Tide pooling</td>
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<tr>
<td>Aquaculture</td>
<td>Commercial fishing w/ benthic mobile gear</td>
<td>Beach use</td>
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<td></td>
<td>Commercial dive fishing</td>
<td>Wildlife viewing from charter boats</td>
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<td></td>
<td>Hunting</td>
<td>Tribal spiritual/cultural places</td>
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<td></td>
<td>Commercial algae harvesting</td>
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<td></td>
<td>Shore-based recreational harvest</td>
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Workshop Design and Technology

**Process**

Participants in 3-4 balanced groups based on expertise

Groups are paired with a facilitator and GIS specialist

Provided orientation to technology, basemap

**Software**

ESRI ArcGIS 9.2
ESRI ArcSketch 1.2 Extension

**Hardware**

E-Beam Electronic Whiteboard
Sympodium Digital Tablet

**Data**

Basemap – bathymetry, cities, coastal access points, underwater features, kelp, shipwrecks, etc.
Post-workshop Steps

**GIS Processing**
- Systematic edits of raw workshop files
- Data normalization
- Boundary Issues

**Distributed Products**
- Individual Use and Sector maps for each region of California
- Geodatabase for end-user analysis and cartography
- Analytical maps of potential applied uses of data
- Interactive web tool for public visualization

**Next Steps**
- Best Available Data to QC where applicable
- Repeat (or update) to assess changes in use patterns
Sample Product: Single Use, SoCal Region
Sample Product: Aggregated Sector, Zoomed In

Ocean Uses Atlas: North Central California Region
Dominant Use Areas: Non-Consumptive Sector

October 2009
Sample Product: Alternative Energy Siting

Ocean Management Issues: Alternative Energy

This map illustrates how patterns of ocean use can inform decisions on siting offshore renewable energy facilities. This example depicts two predicted high wind energy areas off Southern California (see citation below). The text box on the left describes the degree to which each of these two potential wind farm areas overlaps, and potentially conflicts, with other co-occurring ocean uses mapped by the CA Ocean Uses Atlas project. Of the two, Area B clearly presents the fewest potential conflicts with other ocean uses.


Potential Wind Energy Area A
Minimum # of Uses affected: 1
Maximum # of Uses affected: 11
Potential Dominant Uses affected:
- Commercial dive fishing
- Commercial fishing with benthic fixed gear
- Commercial pelagic fishing
- Motorized boating
- Military operations
- Offshore oil and gas
- Recreation fishing from boats
- Recreation dive fishing
- Sailing
- SCUBA/snorkeling
- Wildlife viewing at sea

Potential Wind Energy Area B
Minimum # of Uses affected: 1
Maximum # of Uses affected: 2
Potential Dominant Uses affected:
- Military
- Recreational fishing from boats
Sample Product: Overlapping Uses in Channel Islands NMS
Nice Maps, But What Are They Good For?

- **CMSP**: ID areas of potential conflict or compatibility among uses (e.g. Rigs to Reefs)
- **MPA Design and Adptv. Mgmt.**: siting and restrictions addressing key threats tracked over time (e.g. CA MLPA)
- **Offshore Energy / Aquaculture**: Streamline infrastructure by targeting areas with compatible ocean uses (e.g. current project proposals)
- **Emergency Response**: planning for threats to human uses (e.g. NH/So. Maine)
- **Education, Outreach and Research Priorities**: ID key uses and threats and target relevant local user groups and demographics
- **Coastal Economic Development**: ID opportunities for developing coastal economies and infrastructure to support ocean uses
- **Strategic Conservation Targets**: ID important ocean areas that could be conserved w/out major stakeholder impacts
Lessons Learned

**Strengths:**
- Workshop setting
  - Explain uses and drawing methods in person
  - Group quality-checks the work of individuals
  - Typically get complete coverage of study area
  - Portability
- Ignore existing data that is of varying quality/currency, often hard to find, not continuous for entire region

**Challenges:**
- Workshop setting
  - Expensive travel and facility costs
  - Expected attendance not always met
  - Some uses are poorly known, might need to rely on existing data

**Alternative Approach = Web-based mapping tool:**
- Either as a stand alone or to augment workshop data
- Expensive to build, host, manage; need to keep technology current
- Hard to QC incoming data, bias towards computer-savvy individuals
Contact Information

NOAA Team
Nick Hayden, Atlas GIS Specialist
Charlie Wahle, Senior Scientist
Mimi D’iorio, GIS Manager
Jordan Gass, GIS Specialist
http://mpa.gov/science_analysis/atlas.htm

nicholas.hayden@noaa.gov
charles.wahle@noaa.gov
mimi.diorio@noaa.gov
jordan.gass@noaa.gov

MCBI Team
Lance Morgan, Vice President for Science
John Guinotte, GIS Specialist
Fan Tsao, GIS Specialist
http://www.mcbi.org/

lance@mcbi.org
john@mcbi.org
Fan.tsao@noaa.gov