

# Massachusetts Marine Economy

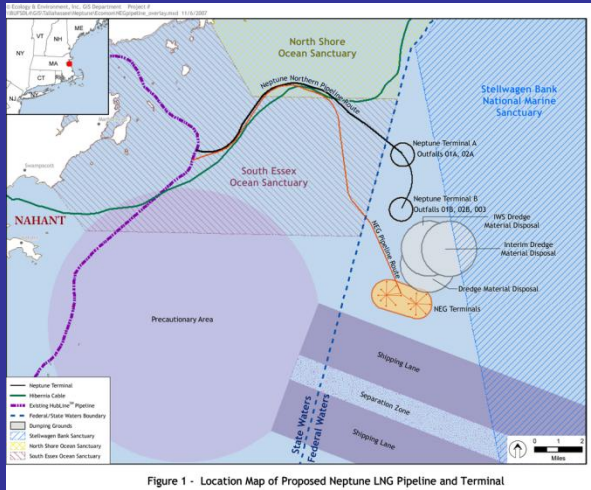
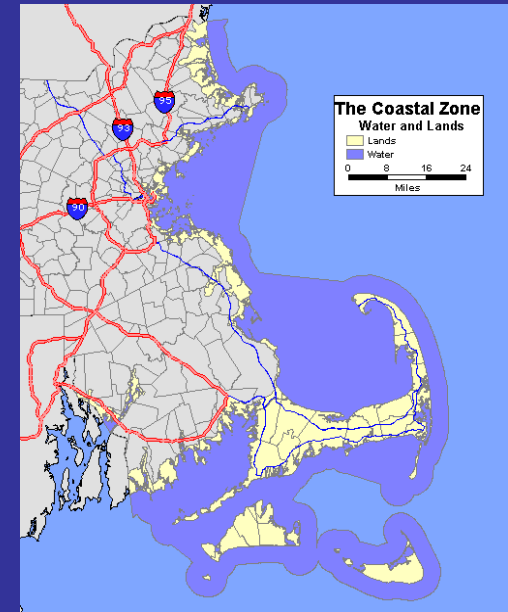


Figure 1 - Location Map of Proposed Neptune LNG Pipeline and Terminal

Ecology and Environment, Inc.



Mass GIS (April 1997)

Porter Hoagland

Marine Policy Center

Woods Hole Oceanographic Institution



<http://www.pbse.com/al309/image/56476294>

12 November 2008



<http://cache.daylife.com/imageserve/0clw2nE5GI9s0/610x.jpg>

# Outline

- Scale of Massachusetts marine economy
- Tradeoffs (IMUOM?)
- Understanding opportunity costs
- Ocean resources as unpriced inputs
- Economic valuation methods
- Two practical examples
- Summary

# Assessment of the Massachusetts Coastal and Marine Economies

- Business conditions in the marine economy are stable and generally positive
- Cost of real estate is by far the most significant issue facing marine and coastal tourism businesses
- Availability of suitable land for expansion is seen as a problem
- Example of a market allocation of a scarce resource
- Need for IMUOM  $\Leftrightarrow$  no market

## Report I

### An Assessment of the Coastal and Marine Economies of Massachusetts

RFR #: ENV 06 CZM 09

Massachusetts Office of Coastal Zone Management

(CZM)



Presented by

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# Massachusetts Marine Industry Output Impacts (\$million 2004)

|  | <u>Direct</u> | <u>Indirect</u> | <u>Induced</u> | <u>Total</u> | <u>Multiplier</u> |
|--|---------------|-----------------|----------------|--------------|-------------------|
| Coastal Tourism and Recreation                 | 5,070         | 1,706           | 1,943          | 8,719        | 1.72              |
| Marine-Related Construction and Infrastructure | 1,823         | 457             | 563            | 2,843        | 1.56              |
| Commercial Seafood                             | 917           | 330             | 308            | 1,555        | 1.70              |
| Marine Science and Technology                  | 590           | 258             | 310            | 1,158        | 1.96              |
| <u>Marine Transportation</u>                   | <u>290</u>    | <u>135</u>      | <u>104</u>     | <u>529</u>   | <u>1.82</u>       |
| TOTAL  | 8,690         | 2,886           | 3,228          | 14,804       | 1.70              |

Source: Donahue Institute (2006)

# Massachusetts Marine Industry Employment Impacts (000 Jobs 2004)

|  | <u>Direct</u> | <u>Indirect</u> | <u>Induced</u> | <u>Total</u> | <u>Multiplier</u> |
|--|---------------|-----------------|----------------|--------------|-------------------|
| Coastal Tourism and Recreation                 | 119           | 16              | 22             | 157          | 1.32              |
| Marine-Related Construction and Infrastructure | 15            | 5               | 7              | 27           | 1.82              |
| Commercial Seafood                             | 11            | 5               | 6              | 22           | 1.99              |
| Marine Science and Technology                  | 5             | 2               | 4              | 11           | 2.27              |
| <u>Marine Transportation</u>                   | <u>2</u>      | <u>2</u>        | <u>2</u>       | <u>6</u>     | <u>2.83</u>       |
| TOTAL  | 152           | 30              | 41             | 223          | 1.47              |

Source: Donahue Institute (2006)

# Tradeoffs

- Ocean management involves decisions about resource “conservation”: optimizing the pattern of uses over time to enhance human welfare

**“Yes-or-no lends itself to stalemate and confrontation; more-or-less lends itself to trade-offs”**

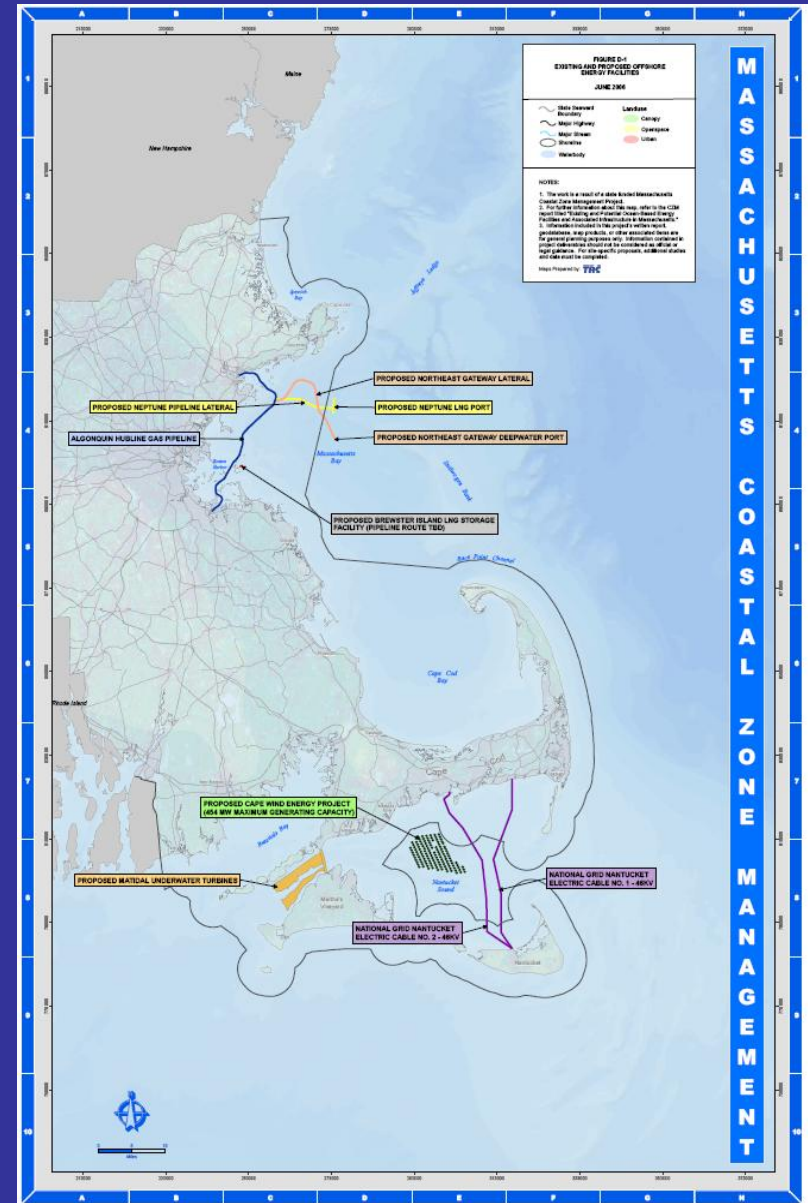
Robert Solow (1993)

- Conservation decisions may involve the choice of more of some uses and less of others  $\Leftrightarrow$  IMUOM
- Economics provides an objective method for comparing alternative choices with a single metric
  - fishery conservation vs. employment
  - sewage disposal vs. disease
  - dredged material disposal vs. habitat
  - renewable energy vs. unhindered views

# Existing & Proposed Facility Sitings

## Non-Transitory Uses of Ocean Space

- Pipelines, cables
- LNG Deepwater Ports
- Offshore Aquaculture (R&D)
- Wind Farms
- Tidal Power (?)



# Opportunity Costs

- Non-transitory ocean uses may be exclusive
- Opportunity cost is the net economic value of those uses precluded by others
  - Lost surpluses
  - Resource rents (a portion of producer surplus)
- If resource rents have been dissipated (*e.g.*, in overexploited commercial fisheries), then opportunity costs of siting non-transitory uses are small
- Conversely, if the ocean is poorly managed, opportunity costs of maintaining the *status quo* may be large

INPUTS → TECHNOLOGY → OUTPUT

Nets

Boats

Fishermen

Fish in the  
Ocean

**“Black Box”**

SEAFOOD



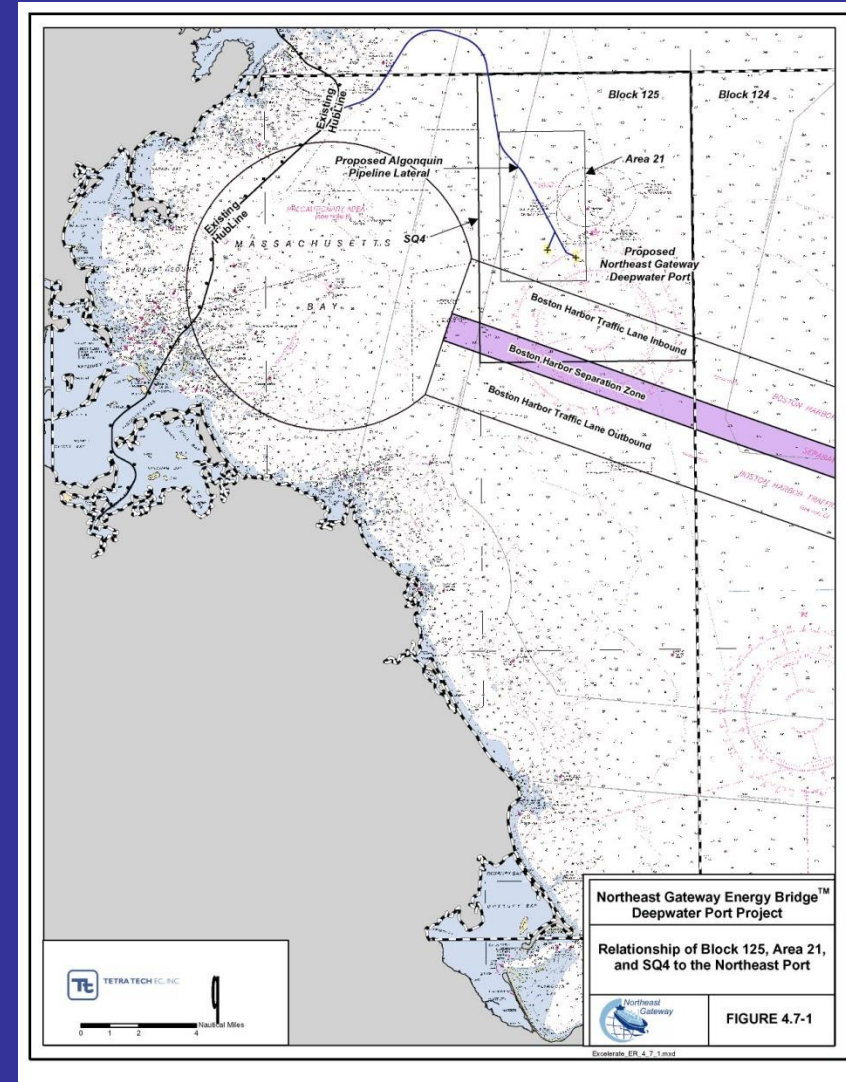
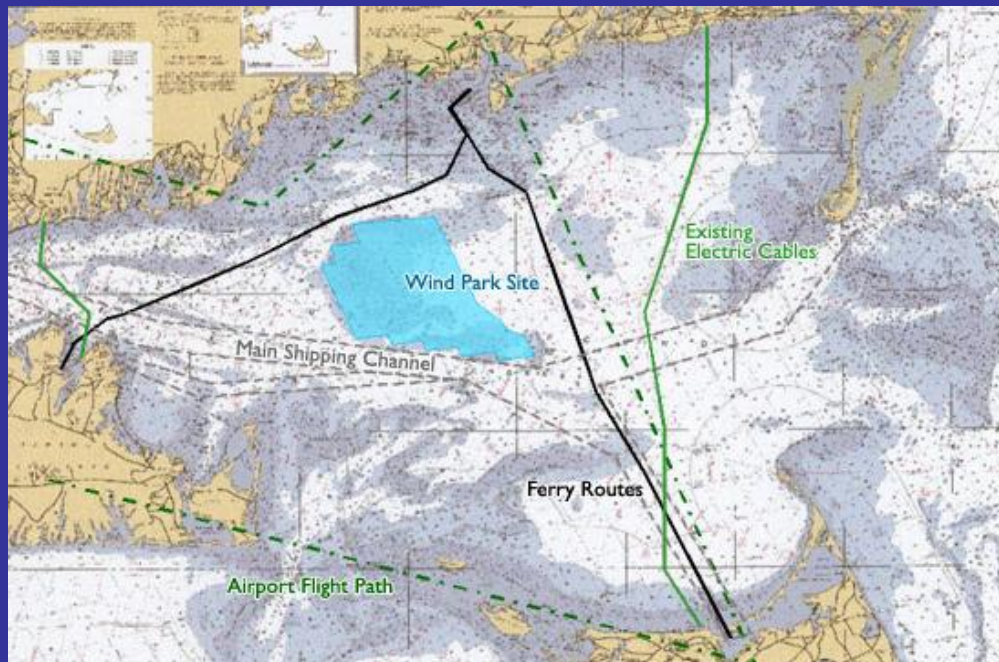
# An Historic Solution

“... [W]hosoever shall presume to saine aney of the sd alewive in or neere the Town brook shall pay Ten shillings per barrel for any barrel of sd fish soe caught . . .”

Records of the Town of Plymouth (1711)

# Facility Siting and Commercial Fisheries

- Cape Wind
- Excelerate, Neptune
- Non-transitory, exclusive uses?
- Statistics on existing uses?
- Rents in commercial fishery?



# Ocean Resources as Unpriced Inputs

- Ocean resources are an unpriced input in:
  - Seafood production; recreational fishing trips
  - Marine transportation
  - Waste disposal
- Implicit subsidy leads to overuse, degradation of ecosystem:
  - Overexploitation of fisheries
  - Oil spills, ship strikes, ocean noise
  - Excessive macro-nutrients, loss of habitat
- One solution is to charge a price for the use of the resource:
  - Individual transferable quotas in fisheries
  - Effluent taxes
  - Auction of submerged lands (bonuses and royalties)
  - Chapter 91 fees
- Economics can help:
  - Identify institutions for price discovery (a market?)
  - Estimate the “shadow” price of unpriced ocean resources

# Economic Valuation Methods

- Private goods (exclusive, consumptive)
  - Market models (seafood, shipping)
  - External effects?
- Ocean resources not always traded in markets
  - Seascapes, public beaches, salt marshes, rare species, habitats, historic shipwrecks
- Public goods (non-exclusive, non-consumptive)
  - Revealed preference techniques
    - travel cost (beach visits; whale watching)
    - hedonic prices (oceanfront property)
  - Stated preference techniques
    - contingent valuation (recreational fishing trips; seascapes)

# Summary

- Tradeoffs involve “more-or-less”
- “Yes-or-no” decision rules may be inefficient
- Ocean resources (including space) are typically unpriced, leading to overuse
- Economic analysis can help to estimate the price of ocean resources
- With properly priced resources, tradeoffs can be made more explicit
- => IMUOM!