# Applied use of Geographic Information Systems

Assessing Fishing Effort in the Maine
Lobster Fishery and Evaluating
Entanglement Potential for Large Whales in
the Gulf of Maine

The Maine Lobster Fishery

- Landing from the Maine lobster fishery brought in $205,754,390 in 2003.[i]
  [i] Maine Department of Marine Resources data, 8/11/2004
- 80% of lobster landings are estimated to come from within three miles of shore (AFMSC, 2000)
- 2003: 6,871 commercial lobstermen
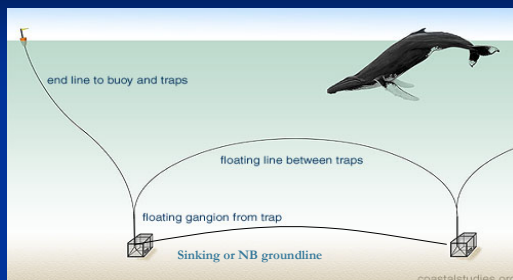

Management

2004 Maine Lobster Zones
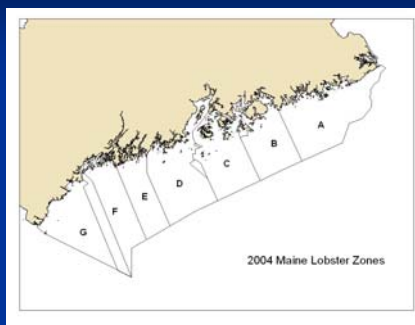
The Problem

- **Fishery Interaction Rates (per year)**
  - Right whale 1.0 *ENDANGERED*
  - Humpback whale 2.8 (US waters) *ENDANGERED*
  - Fin whale 0.4 *ENDANGERED*
  - Minke whale 2.4 *PROTECTED*
    (statistics from most recent NMFS Stock Assessment Reports)

Photographs:
Center for
Coastal Studies

How Entanglements Occur

end line to buoy and traps

floating line between traps

floating gangion from trap

Sinking or NB groundline

coastalstudies.org

Project Goals

- Identify high-use fishing areas
- Document spatial and temporal patterns in the Maine Lobster fishery (ground-truth the "traditional" patterns of movement)
- Perform a basic analysis of interaction potential for large whales and the Maine lobster fishery.
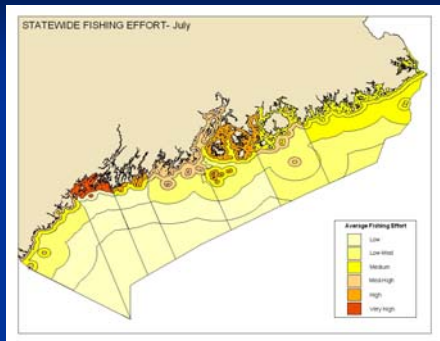
Survey

Miles from Shore	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0-1												
1-3												
3-12												
12-25												
25+												

Question 10 asked: "Where are your traps distributed each month"?
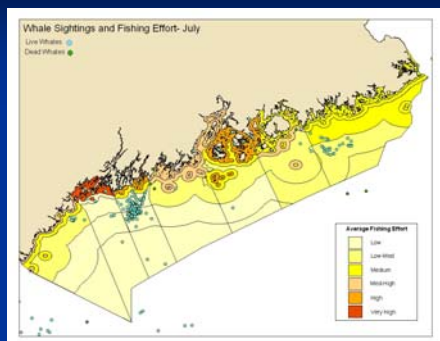

Data Mapping
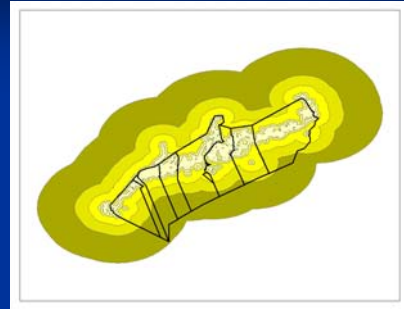
Fishing Intensity

Data Mapping Results

- Use of a survey to establish broad patterns is an effective method
- Overall, anecdotal patterns of movement were demonstrated quantitatively
- Exceptions:
  - Increased presence of fishermen offshore during winter months
  - Year round presence of offshore fishermen in some zones

Risk Assessment

Risk Assessment Results

- Majority of high risk areas are offshore (more than three miles from shore)
- Most inshore areas of high risk can be traced back to one of three sources:
  - Dead whales
  - Poco the Beluga whale
  - Minke whales

Conclusions

- Verify fishing intensity patterns
- Sightings Data issues:
  - Reporting bias (whale watch activity)
    - Resolve by re-analyzing data using only NMFS sightings reports (error corrected)
- Risk Assessment Accuracy
  - Perform statistical spatial analysis
- Make efficient policy decisions
  - Headland-headland exemption proposal

Questions?

Photographs- DMR (L) and NMFS (R)