Proposed Research:
Longlines and Highly Migratory Species: A Comparison of Four Closed Areas in the Northwest Atlantic and Central Pacific

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Introduction

Closed areas are becoming a widely-used tool in pelagic fisheries management in the absence of other available effort controls.

Several theoretical analyses have been done, but little empirical comparison of pre- and post-closure effects on the respective fisheries.
Planned Project Overview

Analysis of four closed area regimes:
- Gulf of Mexico Bluefin Tuna Closure
- Mid-Atlantic Bluefin Tuna Closure
- NWHI Monk Seal Area Closure
- NWHI Turtle Emergency Closure

Future analysis needs identification
Project Components:

- Description of fleets and history of management in each area
- Closed areas analysis – what was supposed to happen versus what actually happened
- Identification of future modeling characteristics and data needs
Definitions

- Closed area: prohibition on harvesting in normal fishing grounds; may be for gear, time, or species
- Target species: intended catch species
- By-catch: non-intended species; may be retained and/or sold
Closed area management

Currently in use in many U.S. fisheries of all types – pelagic and demersal, teleost and mollusc, federal and international waters.

Generally preferred to ITQs where monitoring, enforcement, and assessment costs are high.

Increasingly used for pelagic species and in international management strategies.
Closed area effects

Substitution effects generally assumed minimal, but may be very significant
- Limiting vessel characteristics, e.g., size
- Product quality issues
- Other economic issues, e.g., crew costs

May have unintended effects on by-catch species if resulting fishing effort redistributes to higher concentrations
Modeling of closed area effects

Economic:
- Chakravorty and Nemoto (2000)

Effort:
- Gracia (1997)
- NMFS-HMSD (1999)

Bycatch:
- Cadrin et al. (1995)
- Dalzell (1997)
- Goodyear (1998)
- Nitta and Henderson (1993)
NMFS – HMSD effort models

- **No-Displacement Model (NDM):**
  - Prohibited effort is not redistributed, but simply subtracted from total
  - Effort reductions are therefore always equal or less than zero

- **Displacement Model (DM):**
  - Prohibited effort is redistributed to other areas in proportions equal to pre-closure effort ratios
Longline Fishery Comparisons:

GOM and Atlantic
- 1999 Vessels: varies
- Main issues: ESA, resource limitation, juvenile by-catch
- Management:
  - NMFS - HMSD
  - ICCAT

Hawaii (EEZ)
- 1999 Vessels: 122
- Main issue: ESA
- Management:
  - NMFS - WPFMC
  - MHLC?
Gulf of Mexico Closure

- Species: Bluefin tuna
- Season: Year-round
- Rationale: Protection of spawning area

History:
- Increasing numbers of landed bluefin in 1980 by swordfish vessels suggested development of directed fishery
- GOM closure – a prohibition on directed fishing - implemented domestically in 1981, followed by a 1982 ICCAT Recommendation
Mid-Atlantic Closure

- **Species:** All pelagics (prohibition on longlining)
- **Season:** June
- **Rationale:** Decreasing dead bluefin discards
- **History:**
  - Increasing bluefin bycatch in Atlantic by U.S. vessels
  - Implemented in 1999 after cooperative discussion with fishermen to decrease size and time of closed area from original proposal
  - May be necessary to alter area parameters in future based on oceanographic conditions
NWHI Closure – Monk Seal

Species: Monk seal
Season: Year-round
Rationale: Endangered species

History:
- Previous fishing in NWHI targeted swordfish aggregations
- Implemented in 1991, this Protected Specied Zone prohibits longlining within 50 nm of the NWHI (and corridors between) to reduce interactions
NWHI – Turtles

Species: Turtles
Season: Year-round
Rationale: Endangered species

History:
- Suit against NMFS for NEPA violation by Earthjustice Legal Defense Fund
- Resulting preliminary injunction in 1999 by U.S. District Judge Ezra
- Current: NMFS to do new EIS by April 2001; three areas: one closed completely, two open only if observers on board vessel
Other areas for pelagics:

- Buffer zones around main HI to reduce inter-fishery interactions
- Longline closures in GOM, SE Atlantic coast for juvenile swordfish reductions
- Longline closure in NW Atlantic for turtle interaction reductions
Empirical Analysis

- Examine logbook data for specific fisheries and vessels
- Oceanographic Data
- Modeling with standard technique
- Comparison with actual results
- Identification of significant factors
Logbook data:

- Set characteristics
  - Location
  - Time
  - Bait
  - Gear configuration

- Vessel characteristics
  - Size
  - Crew
  - Home port

- Catch data
  - Species retained and discarded
  - Other interactions
Oceanographic (and other) Data

- Sea surface temperatures
- Cold/Warm core rings
- Seasonal weather effects
- Moon phase
Standard modeling

Will develop NDM and DM models for each area, separately and combined, for comparison purposes only.

Will use most recent data available, which will vary by closed area.
Comparisons

- NDM and DM results for:
  - Fleet effort by area and time
  - Total catch by area and time

- Other changes:
  - Change in target species
  - Change in fleet structure, e.g., number of vessels and home ports

- Also with pre-closure expectations
Identification of key factors:

- Will use NDM and DM results to determine main effects of area closures.
- Qualitative procedures will be used to identify most important factors for future analyses.
Project Components (review):

- Updated description of fleets and history of management in each area
- Closed areas analysis using standard NDM and DM models for comparison between closures and other techniques for between pre- and post-closures
- Identification of future modeling characteristics and data needs
Conclusions... ?

Very little empirical, post-closure data analysis conducted in pelagic fisheries.

Several possible complications with application of results:

- Option sets available to each affected fishing vessel may be very different.
- Oceanographic conditions variable over long time scales – similar time-area closures may have varying efficiency.
Thanks to:

- John Sibert, PFRP
- John Graves, VIMS
- Buck Sutter, NMFS
- Chris Rogers, NMFS