



# Regulatory Impact Analysis Framework for Hawaii Pelagic Fishery Management

---

Presented by: Keiichi Nemoto

PFRP Project 657863

PI: Sam Pooley



# Background

---

- Previous project: “A Multilevel Multi-objective Programming Model (MMPM) for the Hawaii Fisheries”
- It was useful to evaluate ...
  - Tradeoff: recreational fishing trips  
vs. profit of commercial fisheries
  - Inshore closure of longline fishing

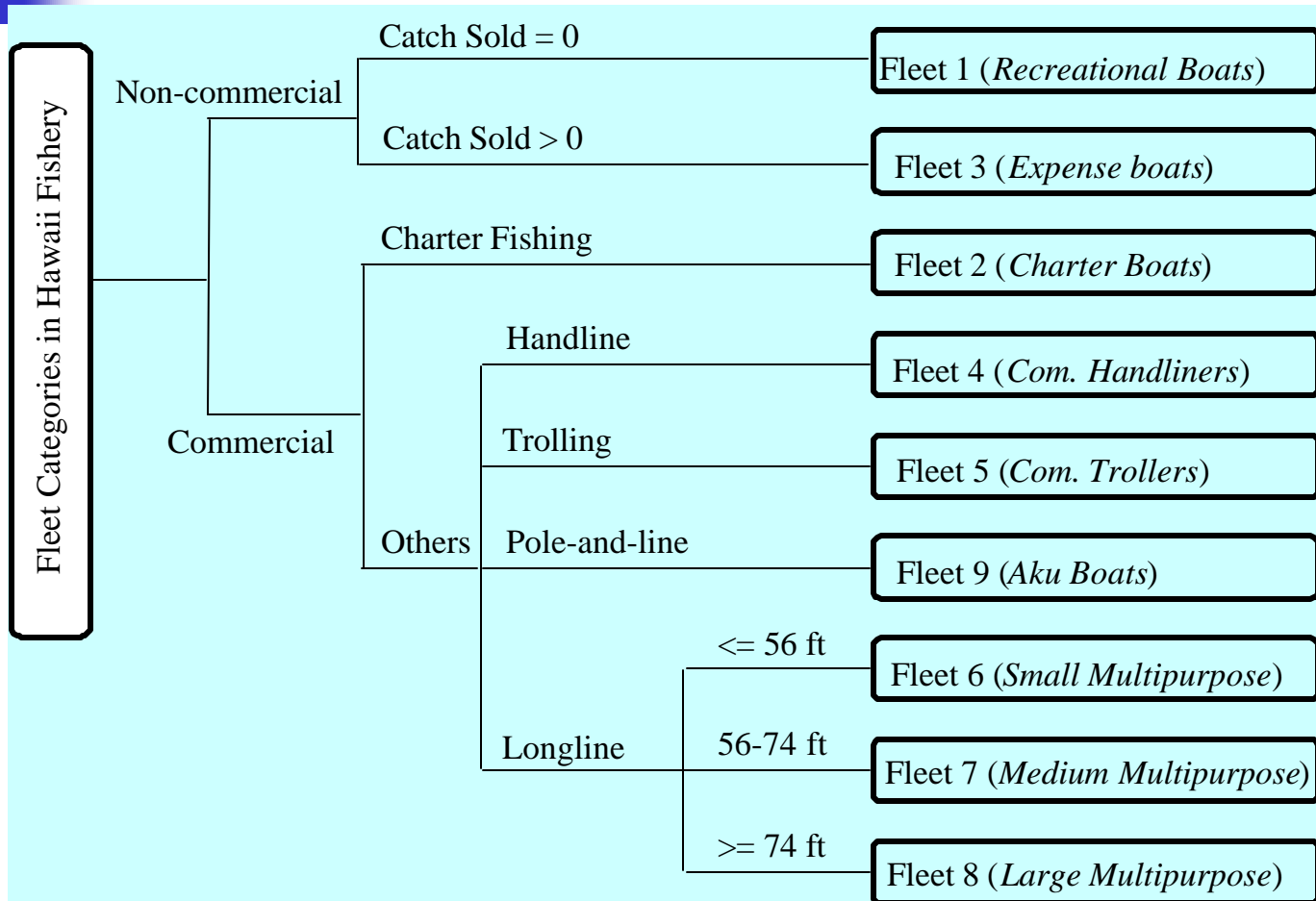


# Features of MMPPM

---

- Mathematical Programming (*impl. by GAMS*)
  - Objective function (Max fleet-wide profit)
  - Decision variables (effort)
    - # of vessels for each category)
    - # of trips of fleet  $i$  target  $j$  in area  $k$  during season  $l$
  - Constraints:
    - Vessel-owner, crew, trip entry conditions
    - Stock constraints (14 species  $s$ )

# Fleet Category



Focus



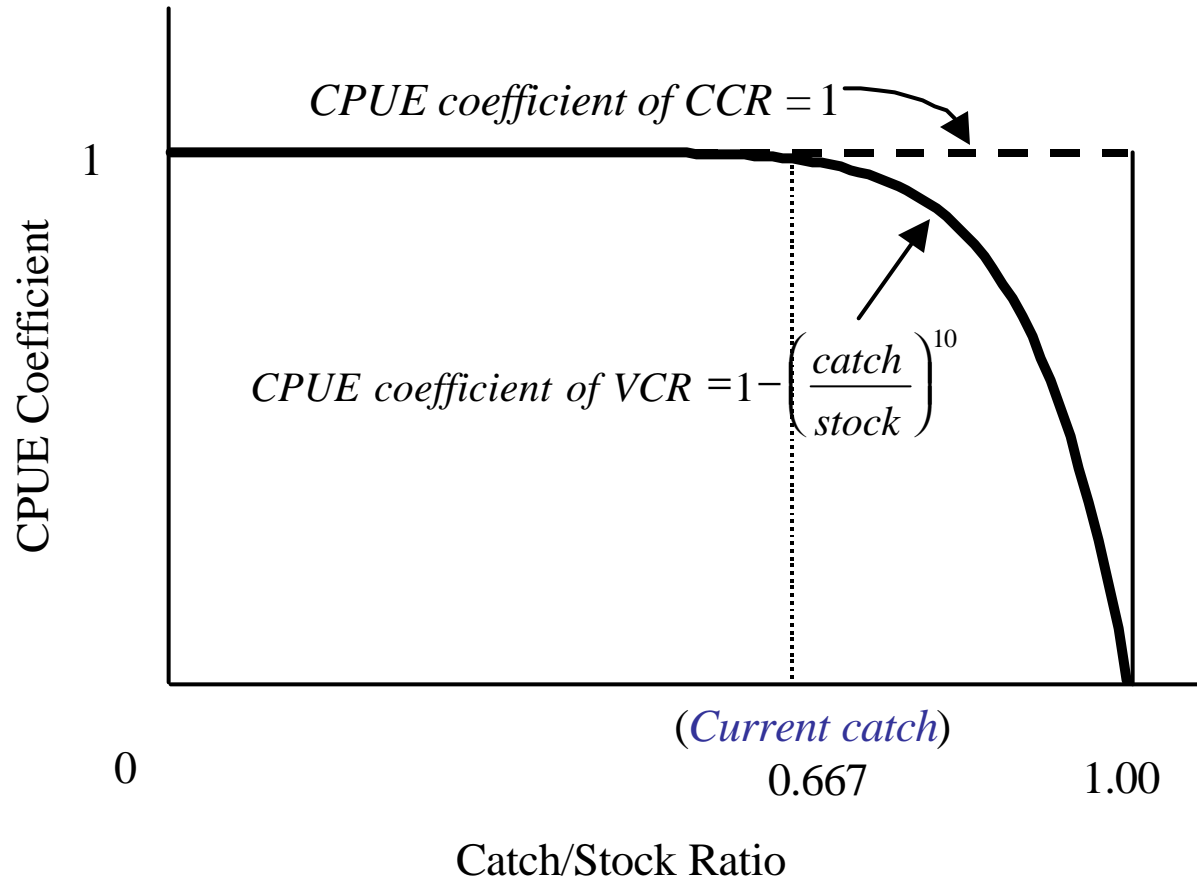


# Features of MMPPM (Cont'd)

---

- Other relationships: CPUE-Effort, etc.
- Input Data
  - Vessel cost data ← Survey data
    - fixed and operational
    - Fishing and traveling days / trip
  - Price ← Auction Data
  - Stock and CPUE ← Logbook

# CPUE profile





# Features of MMPPM (Cont'd)

---

- Other relationships: CPUE-Effort, etc.
- Input Data
  - Vessel cost data ← Survey data
    - fixed and operational
    - Fishing and traveling days / trip
  - Price ← Auction Data
  - Stock and CPUE ← Logbook

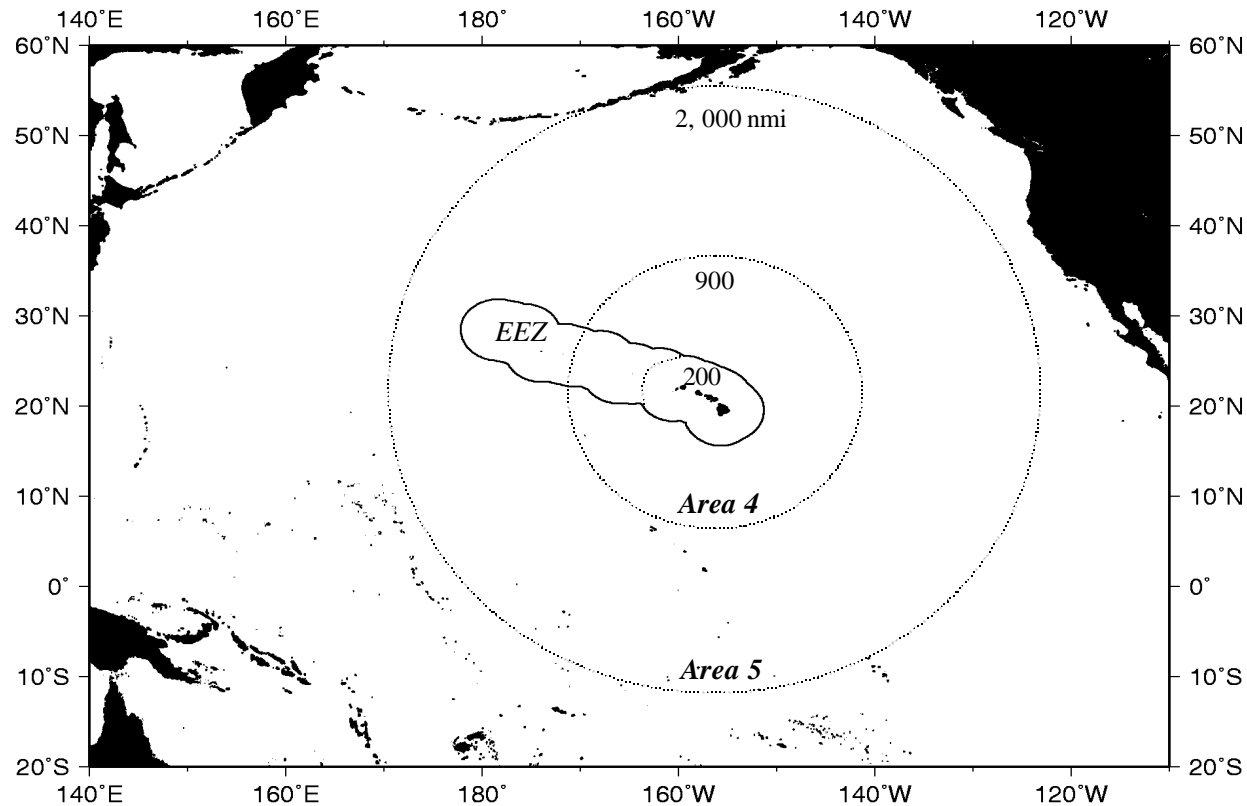


## Limitations:

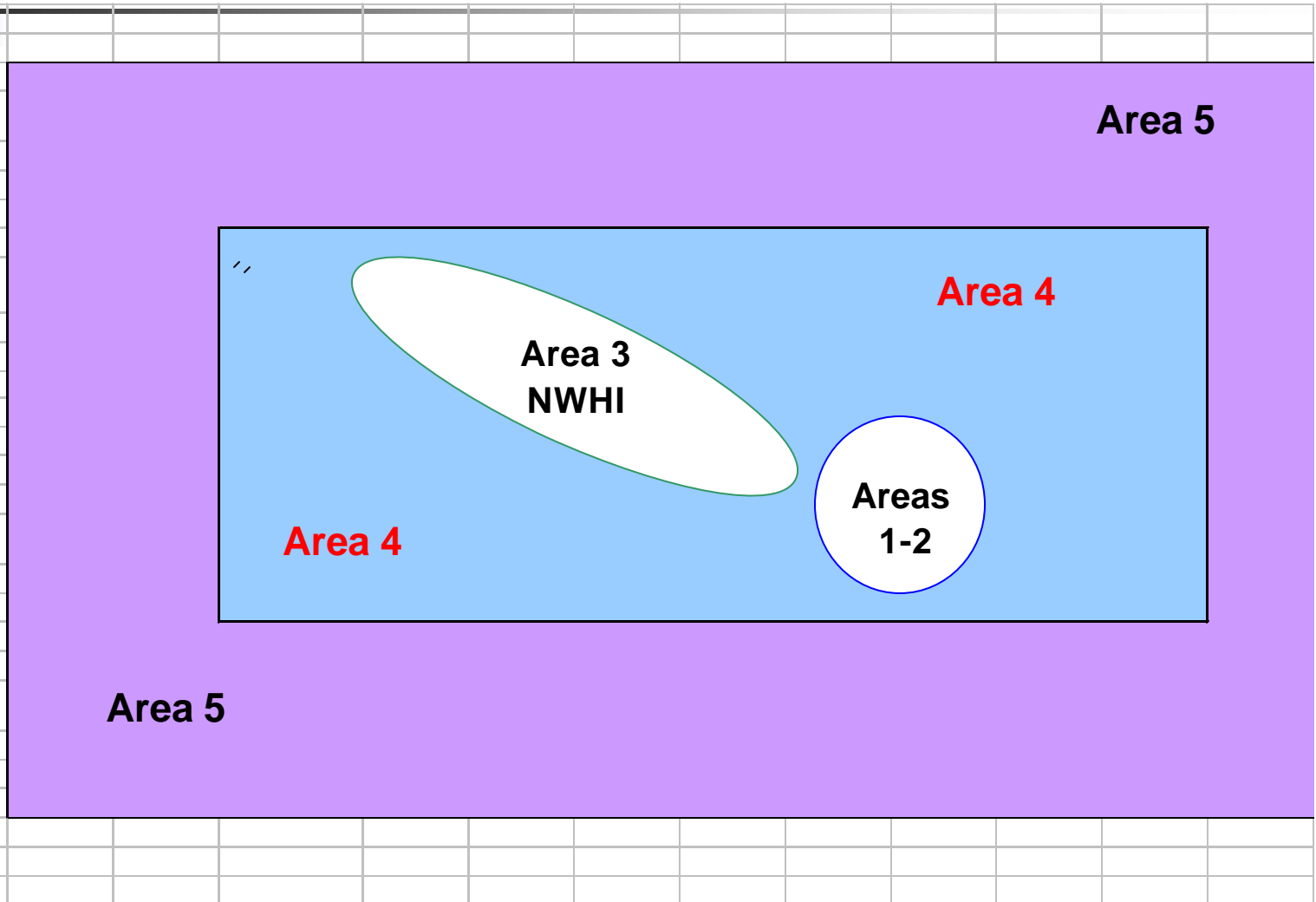
---

- Five concentric areas in MMPM is **not suitable** for recent and potential regulatory closures
- Difficult to update its data

# Previous Definition of Areas

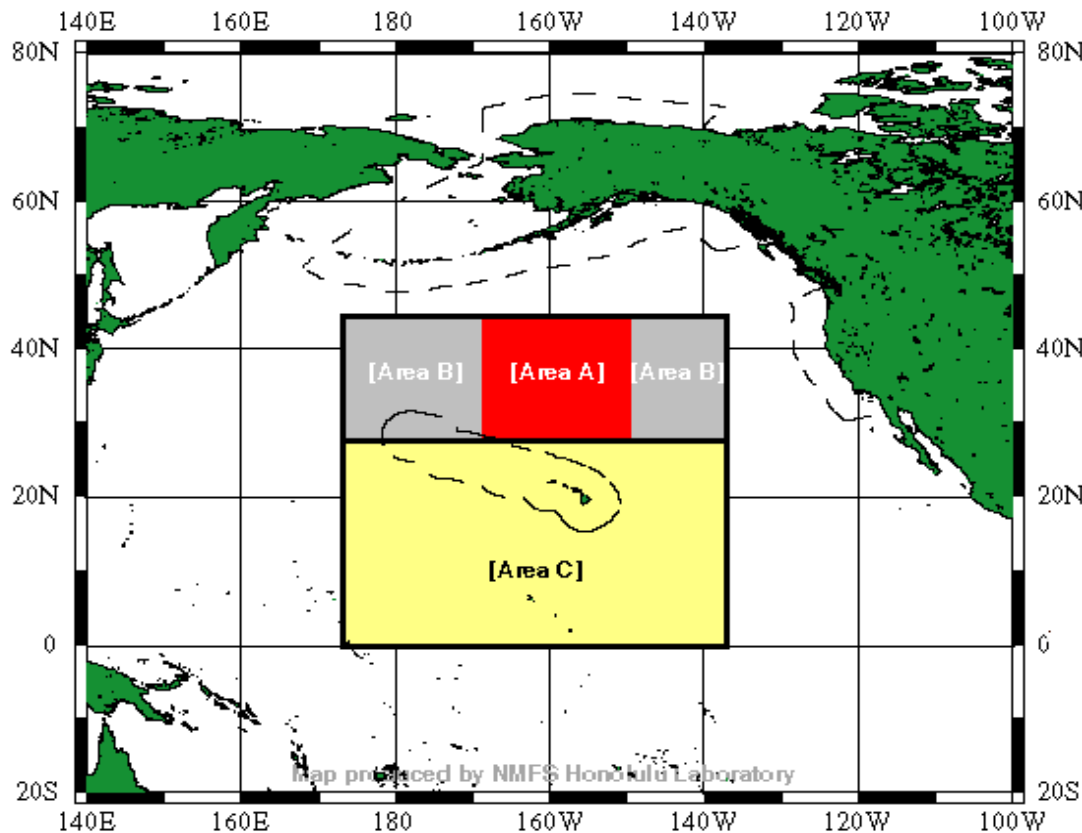


# Previous Definition of Areas (Illustrated)



# An Example for Recent Area Closure (Turtle Conservation)

## Court-ordered Closures 8/03/2000



Area A: 44 North – 28 North,  
168 West - 150 West

Area B: 44 North - 28 North,  
173 East - 168 West  
and 150 West - 137 West

Area C: 28 North - Equator,  
173 East - 137 West

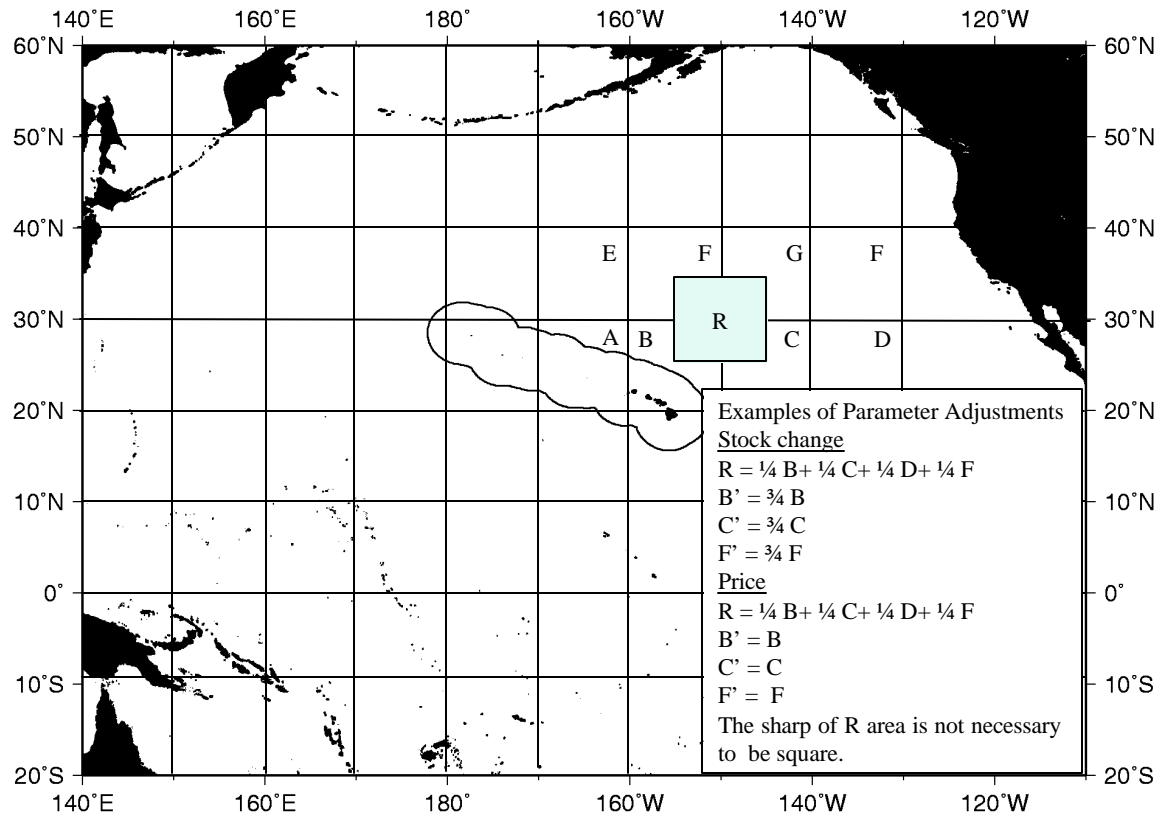


# Research Objective

---

- Make the previous model more **practical** and **comprehensive** to evaluate the impacts of existing and potential regulatory policies.
- Enable the model to incorporate more **flexibly-defined fishing areas**.

# Flexibly-defined Fishing Areas





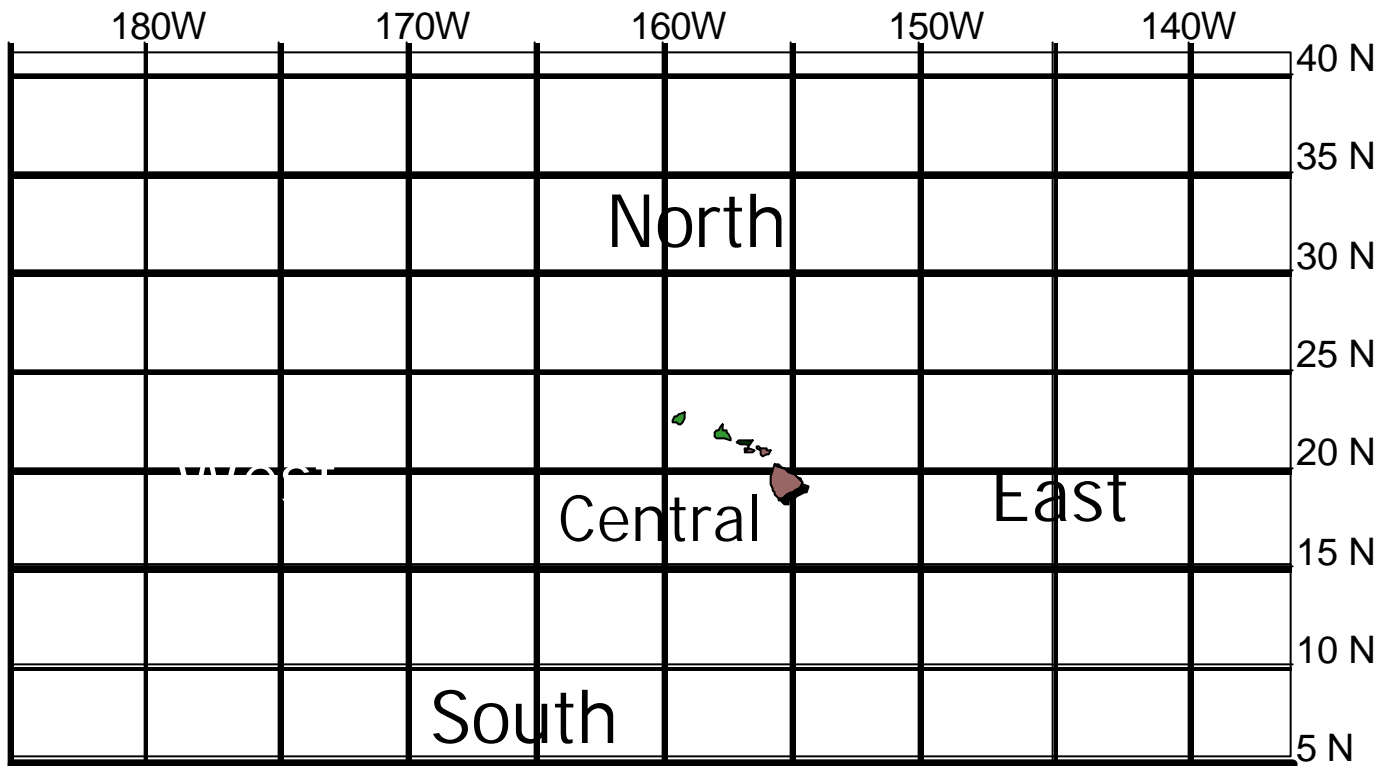
# Data Processing (longline)

---

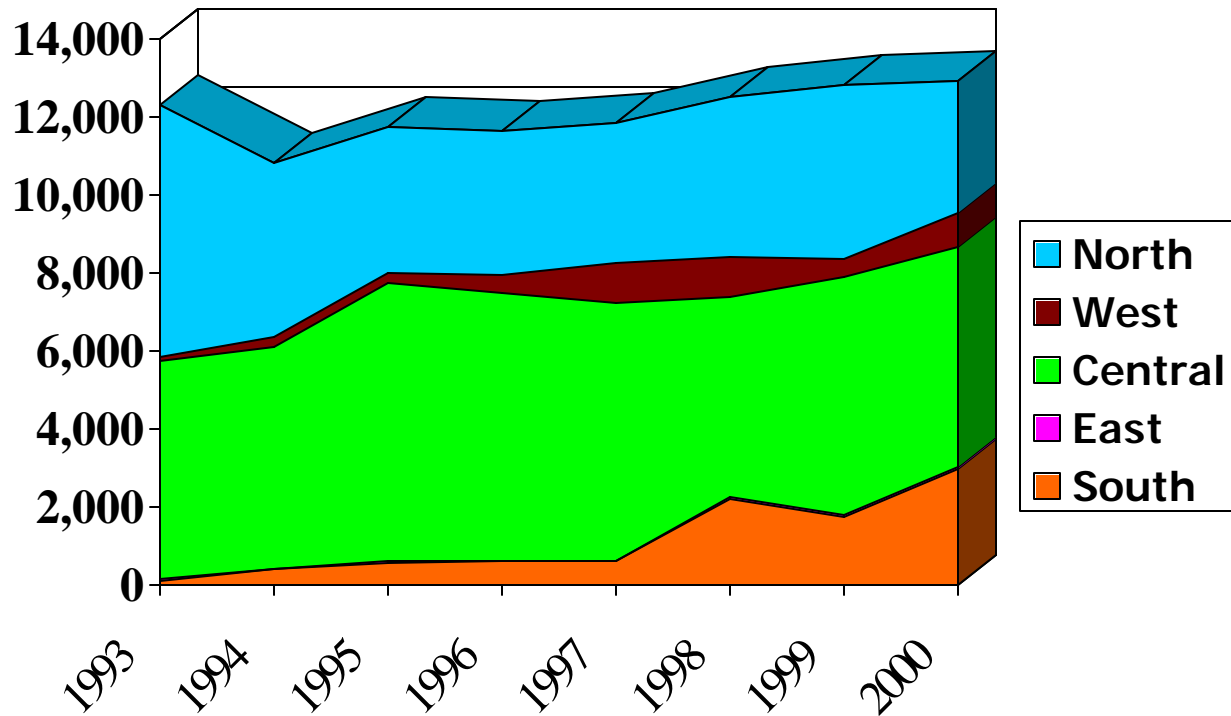
- Logbook data summarized by month, area ( $1^{\circ} \times 1^{\circ}$  square), fleet size (L/M/S), and target (B/M/T) - **already available**
- Summarize catch and effort data in the above into 3-9 areas and 4 quarters. (use FoxPro SQL)
- No details for other data yet:
  - Price and vessel costs for LL; Other fleets



# An Example (1 season = 1 quarter)



# Fishing sets by area and year





# Summary

---

- Reuse existing data in NMFS-HL
  - Reduce time and costs to analyze for different years
  - The updated model could more flexibly and quickly evaluate the impacts of regulatory policies.
- Solid policy analysis should be available till the next Tuna Conference.