Fisheries Management Law & Economics

Exam 2 Review

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Outline

- Exam This Week!
- Assessment Presentations
- Exam Review
- Study Hard!

Exam This Week!

- Study guide – Available NOW!
- Exam – Available NOW!
  - One week to complete
    - Due Wed 11/9 @ 5:00pm
- Exam Format
  - Multiple choice, fill in blank, short essay

Contact Student Services (Testing Support)

Sitka.testing@uas.alaska.edu

907-747-7717

- If you are in a small community You need to set up a proctor

Review

Intro to Fisheries Management - Cod

- What is Fisheries Management?
  - Fisheries management draws on fisheries science in order to find ways to protect fishery resources so sustainable exploitation is possible.
- Effective fishery management with regard to laws
  - Consistent with these laws & policies
  - Must be enforceable
- Need for fishery management
  - Distant-managed, cooperate fish traps, high seas Japanese harvests Industrial development in both Atlantic and Pacific
  - Cod Stocks (crashing)
- Fishery management is diverse and varies greatly depending on the fishiery

Atlantic Cod

- Most influential fishery ever!
  - Understand the basic biology of Cod
    - Age, maturity, type of spawning
- **Evolution of the Atlantic cod fishery**
  - 1500's Cod were incredibly pleantiful
  - Early Fishing – Longline, Gillnets
  - Early 1900's First signs of trouble
    - Steam Trawlers enter the scene
  - Bottom trawlers become the norm
  - 1950's Increased foreign fishing pressure
  - 1970's 200 mile EEZ established
  - 1992 Cod stocks Collapse!
- 2000's recovery is limited despite no directed fishery

Cod

Effects of fishing and collapse

- Life history - Spawn smaller and earlier
- Evolutionary response – smaller slow growing fish
- Trophic cascade – removal of top predator changes food web
- Habitat degradation – the effect of bottom dredging

What's preventing recovery

- Directed and non- directed fishing
- Bycatch from other fisheries
- Altered biological systems – more predators, less food
- Fishery-induced Changes To Life History
- Loss of Genetic Variability
- Habitat Modification by Bottom Trawling
- RE-opening of Closed Fisheries

Future of Atlantic Cod

- Relies on ecosystem based approaches

Traditional Fisheries Management

- Know why fisheries management is important

General Management Approaches (these are general ways fisheries are managed)

  - Maximum sustainable yield MSY
  - Quotas (Total Allowable Catches)
  - Legislation
  - Closures
  - Gear restrictions

Traditional Fisheries Management

- Ba able to define and use Species, Population, Stock, Recruitment
- Understand the Population growth curve and what it represents (Know this well)
- Know what carrying capacity is and what types of parameters determine it
  - This changes due to a lot of factors (climate change, habitat loss, etc)
- Know the difference between R and K strategist species and know examples of each
  - (R is for Rabbit)

Understand MSY and how it is calculated

- MSY is based on the inherent nature of fish populations to replenish themselves based on their "**surplus production**"
- Know the challenges associated with MSY management
- Remember the 1 fish 2 fish reading and some of the examples he pointed out (just very general)

Traditional Fisheries Management

- Ultimately we want to remove fish, How many?
  - Complex issue: Maintain healthy stocks, economic and social pressure, Habitat
- Surplus Production
  - Theory is that the surplus fish can be removed via fishing
  - Know what the strait line represents and what points above and below would mean.
- **Quotas** (total allowable catch)
  - A piece of the pie that is then allocated to different user groups
  - Numerous fisheries are managed this way

Traditional Fisheries Management

Legislation (you already know these, but might want to be generally familiar with them)

- United Nations Convention on the Law of the Sea UNCOLS (1982)
- Magnuson-Stevenson Fishery Conservation and Management Act (1976)
- Sustainable Fisheries Act (1996)
- National Environmental Policy Act (1970)
- Endangered Species Act (1973)
- Marine Mammal Protection Act (1972)

Closures

- An extreme measure aimed at restricting a fishery

Gear Restrictions

- What types of things can be restricted?

Traditional Fisheries Management

Market based solutions

- Certification/Labeling –like Organic - Alaska Responsible Fisheries Management (RFM) Certification
- Consumer based solutions – Seafood guides
- Purchase of fishing rights – buyback programs
- Aquaculture – rais fish
- Increased use of underutilized species – dogfish example
- Reduce government subsidies – propped up cod fishery in 80’s, this was bad

Stock Assessments

2 types of management, Data limited and informed

- Data limited
  - Why don’t we have data?
  - How do we manage if we don’t
- Informed
  - In many cases we manage based on a Yield model
  - Yield models need to define K
    - By collecting info on
      - Survival, mortality, habitat, etc

Stock Assessments

Assessing fisheries

- Know census vs index
  - Know what types of assessments will give you either (eg. weir = census)
  - Assessment varies based on species, habitat, life stage etc
- Have an idea how various fisheries assessments are made
  - Eg. Halibut – longline Urchins – dive survey
- Fisheries dependent data (on board fishing boat)
  - Less expensive, Typically not systematic Can be biased
- Fishery independent
  - Expensive, More systematic/Scientific, Repeatable and comparable, Allow for more biological information to be collected
- Catch per unit effort (CPUE)
  - Know what this looks like as a fishery booms and busts.

Stock Assessments

Know what information is collected

- Population size
  - Differs by species, habitat, life history, life stage
- Life History data
  - Size
  - Weight
  - Age – scales and otoliths
  - Age composition
  - Sex composition
  - Fecundity (how productive)
- Removals due to humans (catch)
  - Fish tickets

Stock Assessments

Salmon Assessment (know how these are collected)

- Estimation of escapement (how many escape the fishery Weirs etc)
- Estimation of harvest (also called “catch” fish tickets primarily)
- Estimation of age composition (scales and otoliths)
  - Know generally about aging (rings, cold-warm, fresh-salt)
  - Know that understanding the age structure of a fishery stock can help us determine how many fish (of what age class) are expected to return

Ecosystem Based Management

- Currently fisheries are trending towards decline
- Single species management - Ignore impacts on other species / habitat

Ecosystem-based management (EBM)

- Considers the interconnectedness of all components within an ecosystem, including fish, plants, marine mammals, climate, and humans.
- Ways we manage with an ecosystem perspective
  - Reduce bycatch
  - Marine reserves
  - Monitoring of population characteristics
  - Catch share programs
  - Ecologically sustainable yield

Ecosystem Based Management

- Bycatch reduction
  - Fishery closures – if too much bycatch things are closed
  - Improve selectivity – Gear changes, Behavior
    - Pingers, hydroscoop, TED, Medina panels, reverse haul, etc
- Marine reserves (less than 1% of ocean)
  - Increase biomass, size, density, diversity
- Monitor population charisteristics
  - Changes in size, age, year class can indicate fishery health

Ecosystem Based Management

- Catch Share Programs (transferable quotas or IFQ's)
  - Benefits
    - Provide fishers with a direct financial stake in the health of fish stocks
    - Fishers can more effectively plan their fishing effort
    - Improved product quality and value
    - Bycatch reduction
    - Improved safety
    - Increased predictability
  - Concerns
    - Allocation of shares
    - Transition to a new regulatory system
    - Privatization of public resources
    - Monopolization of resource by largest operators
  - Lots of catch share programs in Alaska

Ecosystem Based Management

- Ecologically Sustainable Yield (ESY)
  - Allows a sustainable harvest that does not shift the marine ecosystem to an undesirable state
  - Requires long-term monitoring of all trophic levels
  - Requires more complete knowledge of the biology of individual species
- The Future of fisheries management is based around ecosystem approaches

Study Hard!

- Good Night!!!