Restoration Blueprint
Economic Analysis

An Effort to Restore Critical Marine Habitats in the Florida Keys
Outline

- Economic Analysis
  - Ecosystem Services
  - Sanctuary-Wide Regulations
  - Spatial Regulations
    - Commercial Fishing
    - Recreational Fishing
    - Non-Consumptive Users
    - Non-Market Values
- Conclusion
Economic Analysis
Ecosystem Services

Goods and services the environment provides

- Consumptive Recreation
  - Recreational fishing
- Non-Consumptive Recreation
  - Diving and snorkeling
- Food Supply
  - Commercial fishing
- Education
  - Visitor centers
Analysis

- Each regulation for each alternative is analyzed
  - Benefits
  - Costs
  - Net Benefits

- Analysis quantitative when possible
  - If numeric data wasn’t available then a qualitative analysis was provided

- All numbers represent the maximum potential loss
The Process

Partners for Analysis

- NOAA’s National Center for Coastal and Ocean Science
- University of Miami - Rosenstiel School of Marine and Atmospheric Science
- NOAA’s Integrated Ecosystem Assessment

Data

- Florida Fish and Wildlife Conservation Commission
- Florida Department of Environmental Protection
- FKNMS Baitfish Permit Database
- Monroe County Tourist Development Council
- NOAA Fisheries Marine Recreational Fishing Statistics Program
Economic Analysis - Sanctuary-wide Regulations
Alternative 1 - “No Action”

- **Benefits**
  - Avoided costs by not adapting Alternative 2, 3, or 4

- **Costs**
  - Lost benefits given up by not adapting Alternative 2, 3 or 4
    - This is called Opportunity Cost
Sanctuary-wide Regulations:
Alternatives 2, 3 & 4:

• Limit discharge from cruise ships in sanctuary
• Increase # days allowed for emergency regulation
• Align NOAA permitting regulations with those of the Florida Department of State Division of Historical Resources (DHR)
• Ability to address impact from derelict or deserted vessels
• Prohibit fish feeding
• Mooring buoy restrictions
• Baitfishing

Only included in Alternative 4:

• Require FKNMS authorization for live rock aquaculture
• Limit boat speed within 100 yards of all shorelines
Economic Analysis - Marine Zone Boundaries & Regulations
Terminology

• **Revenue** - Value of landings from commercial fishermen (also referred to as ex-vessel value)
• **Spending** - Expenditures associated with a trip
  • hotels, food, concessions, charter fees, etc.
• **Output** - Value of production of goods
  • Items customers purchased and what businesses need to have/purchase to support those customer needs
• **Income** - Total value paid to workers and includes proprietor income
• **Jobs** - Sum of full-time, part-time and seasonal jobs
• **Person-Day** - one person fishing a full or any part of a day
Commercial Fishing Methodology

• Partnerships
  • NOAA’s NCCOS and U Miami RSMAS

• Data
  • Best available data was for large national statistical areas used by FWRI for commercial fisheries
    • Pounds and Value of Revenue by FWRI
    • 12 Statistical Areas that overlay FKNMS boundaries
      • Data is not of a fine enough spatial resolution to analyze individual zones
        • Estimates are for the industry and do not represent how that impact may be distributed across fishermen
Commercial Fishing Methodology

- Reef fish and Lobster methodology uses
  - Habitat-species relationships provided by U Miami RSMAS for reef fish
  - Lobster habitat-species relationships provided by FWRI
  - Habitat maps provided by NCCOS
  - Control totals of commercial catch are provided by FWRI by statistical area
  - NCCOS used commercial catch by species and statistical area and distributed these catch data (pounds & value) by habitat
  - Approach has been used for analysis of impact in the past when fine spatial data is not available
Commercial Fishing Methodology

- Shrimp
  - Control totals of commercial catch are provided by FWRI by statistical area
  - Data on time spent at each location (effort)
  - NCCOS used commercial catch by statistical area and distributed these catch data (pounds & value) by effort
Commercial Fishing Methodology

- Stone Crab
  - Control totals of commercial catch are provided by FWRI by statistical area
  - NCCOS used commercial catch by statistical area and distributed evenly across each statistical area
  - Greater uncertainty in the estimates of maximum potential loss
Commercial Fishing - Costs

Alternative 3

Revenue $0.59 mil
Output $1.0 mil
Income $0.65 mil
Jobs 15
Recreational Fishing Methodology

• Partnerships
  • NOAA’s NCCOS and U Miami RSMAS
• Data
  • Best available data was for large national statistical areas used by FWRI
    • NOAA Fisheries Marine Recreational Fishing Statistics Program
  • 12 Statistical Areas that overlay FKNMS boundaries
    • Data is not of a fine enough spatial resolution to analyze spatial alternatives
    • Same accepted approach of overlaying effort and species habitat used in commercial fishing
Recreational Fishing Methodology

- Reef Fish
  - U Miami RSMAS developed estimates of recreational fishing effort (person-days) for reef fish by gear type and mode of access
  - Control-totals of person-days from NOAA Fisheries for statistical areas
  - NCCOS used person-days by species and statistical area and distributed these days by habitat
  - Spending estimates provided by NOAA
Recreational Fishing Methodology

• Spiny Lobster
  • FWRI provides spiny lobster fishing effort
  • Control-totals of person-days provided by FWRI for statistical areas
  • NCCOS used person-days by species and statistical area and distributed these days by habitat
• Spending estimates provided by NOAA
Recreational Fishing - Costs

Alternative 3

Spending $13.0 mil
Output $14.6 mil
Income $6.8 mil
Jobs 40
Non-Consumptive Recreation

Recreation such as snorkeling, diving, wildlife viewing, kayaking, visitor center use, photography or parasailing that does not involve the removal of resources.
Non-Consumptive Recreation Methodology

- Process
  - Information on the area protected from each alternative
  - Estimates of person-days of activity from NOAA and Florida Keys TDC
  - Spending estimates provided by NOAA
Nonconsumptive Recreation - Benefits

Alternative 3

Spending $30.4 mil
Output $34.0 mil
Income $14.9 mil
Jobs 420
Net Benefits - Sum of All Impacts

Alternative 3

Output $18. mil
Income $7.5 mil
Jobs 365
Non-Market Value

• Many people have value for resources even if they do not use them
• Many people have value for resources above and beyond what they pay to access or use them
• This value may increase or decrease as the access, quality and quantity of the resource increases and decreases
• This is known as consumer surplus and this can be evaluated
• Alternative 3 a net gain of over $15 million
Summary
Review

• Analyzed the impacts to ecosystem services in FKNMS as a result of Restoration Blueprint
• Reviewed relevant economic jargon
• Looked at sanctuary wide regulations
  • Overall net benefits accrue in each alternative
    • Improvements to resources result in increased environmental health and improvement to ecosystem services
• Considered marine zone regulations
  • Overall net benefits accrue in each alternative
    • Costs to recreational and commercial fishermen
    • Benefits to non-consumptive users and non-market valuation
Summary

• All costs represent maximum potential loss
  • All activity and resulting economic benefits would be lost
• Results do not address how the individual or the individual business may be impacted
• Alternatives offer net benefits
THANK YOU