

# 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 \$.59 mil

Output \$1.0 mil

Income \$.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 increase 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**

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