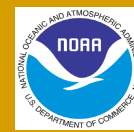


# Moving Beyond the Shallows: Mesophotic Coral Ecosystem Programs

Developing a comprehensive research strategy

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# Mesophotic?

## Definition of Mesophotic Coral Ecosystems (MCEs):

- Located in tropical, sub-tropical regions
- Typically found between 30-100+ m
- Characterized by:
  - Low photic levels
  - Presence of light-dependent corals and associated algal and sponge dominated communities

# Justification



- Poorly understood
- Endemic species
- Possible refugia for shallow water species
- Increasing threats

# History

- Advances in technical diving methods and instrumentation
- DeepCRES Program (2006)
- AMLC Meeting (2007)
- MCE Workshop (2008)



# DeepCRES Hawaii



# DeepCRES Caribbean





# MCE Workshop

## Key objectives:

- Describe current state of knowledge about regulating processes
- Identify importance
- Assess vulnerability to exploitation and human disturbance
- Develop a research strategy




# MCE Workshop Participants

- International collaboration
- Variety of expertise
- Researchers, managers, government agencies, and non-governmental organizations







# MCE Workshop Teams

- Characterization
  - Biodiversity
  - Geomorphology and Physical Processes
- Ecology
  - Community Structure/Dynamics
  - Connectivity
- Management
  - Fishery Uses/Impacts
  - Management Needs

# MCE Research Priorities

## Biodiversity

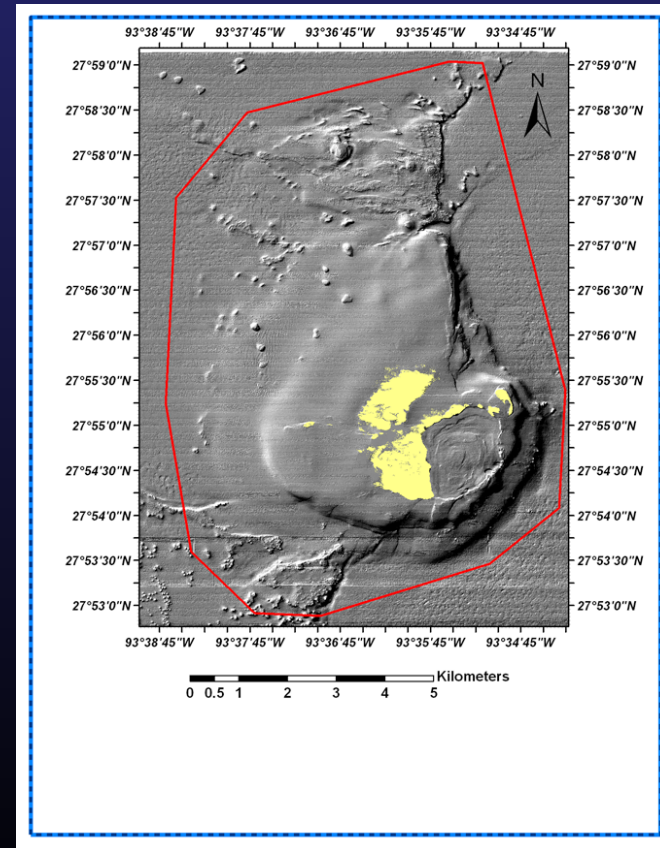
- Survey and inventory of organisms
- Taxonomic and systematic studies
- Replication across habitat, depths, and geographic region
- Consistent sampling methodologies
- Understanding of factors that govern patterns of diversity




# MCE Research Priorities

## Geomorphology and Physical Processes

- Mapping on large and small scale
- Water column dynamics
- Broader physical characteristics/hydrodynamics
- Investigation of the evolution and stratigraphic record of MCEs





# MCE Research Priorities

## Community Structure/Dynamics

- Characterization of community structure including patterns of distribution and abundance
- Understanding of biotic and abiotic factors
- Understanding of specific processes and mechanisms that underlie the ecological dynamics of this community



# MCE Research Priorities

## Connectivity

- Genetic and ecological connectivity
- Extent of physiological adaptation
- Reproductive output, fecundity, and larvae retention
- Trophic connectivity between MCEs and shallow reefs
- Impact of anthropogenic and natural disturbances on biological processes and connectivity

# MCE Research Priorities

## Fisheries Uses/Impacts

- Human dimensions
- Habitat types, distributions, and uses
- Understanding of physical dynamics
- Knowledge of population and community dynamics, and connectivity
- Modeling and decision support



# MCE Research Priorities Management Needs

- Distribution
- Ecosystem function
- Biodiversity
- Conditions and trends
- Uses/Values/Threats



# MCE Outcomes

- Collection of review papers published in peer-reviewed journal
- Definition of mesophotic coral ecosystems
- Reference list
- MCE web database:  
<http://www.mesophotic.org>





# Future

- New program initiatives
- NOAA collaboration with other organizations and MCE researchers
- Better understanding of these unknown and important ecosystems





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