

# *Definition and Measurement of Reef Area and Vertical Relief of Restored Oyster Reefs*

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# Universal Metrics

- Reef Areal Dimension
- Reef Height (*Crassostrea virginica*)
- Emergent Reef Structure (*Ostrea lurida* only)
- Oyster Density
- Oyster Size-Frequency Distribution

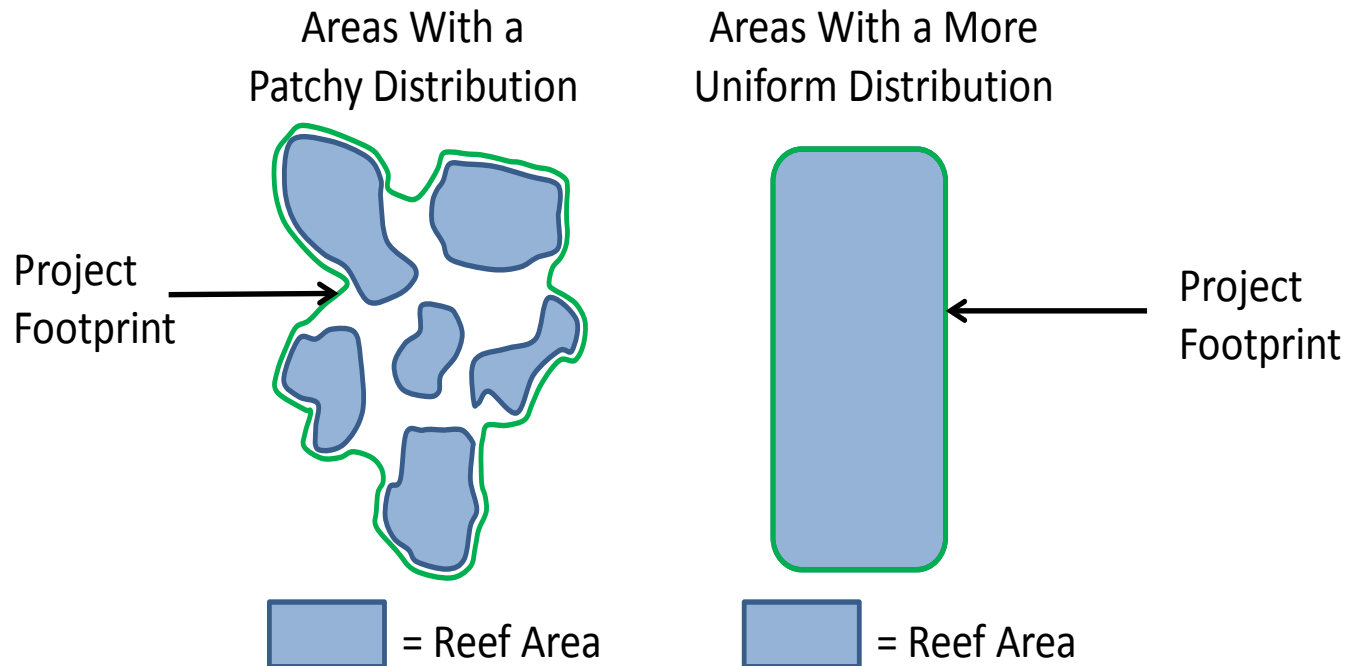


Mosaic of images obtained using side-scan sonar showing oyster reefs in Mobile Bay, AL

# Universal Metric: Reef Areal Dimension

- Consists of two component metrics:
  - Project footprint – maximum areal extent of the footprint of the reef system
  - Reef area – summed area of patches of living and non-living oyster shell (or reef substrate) within the project footprint

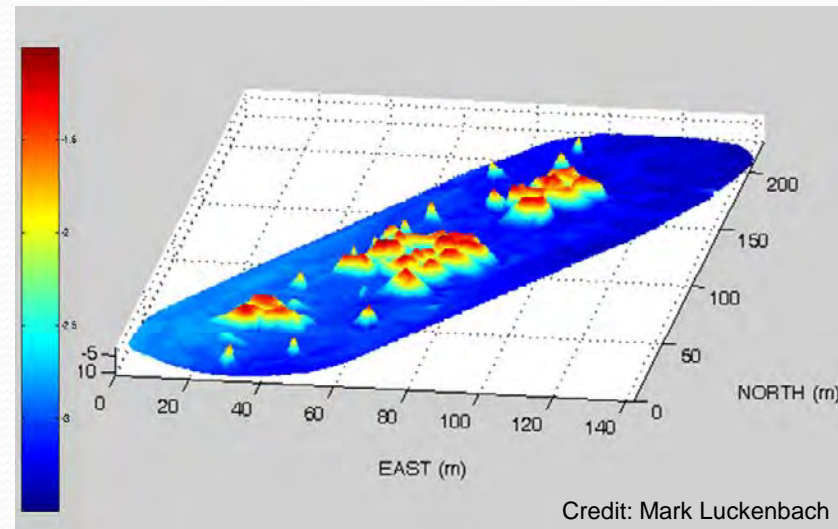
# Universal Metric: Reef Areal Dimension



**The footprint perimeter is defined as a continuous line where the percent coverage of living or non-living shell substrate is equal to or greater than 25%**

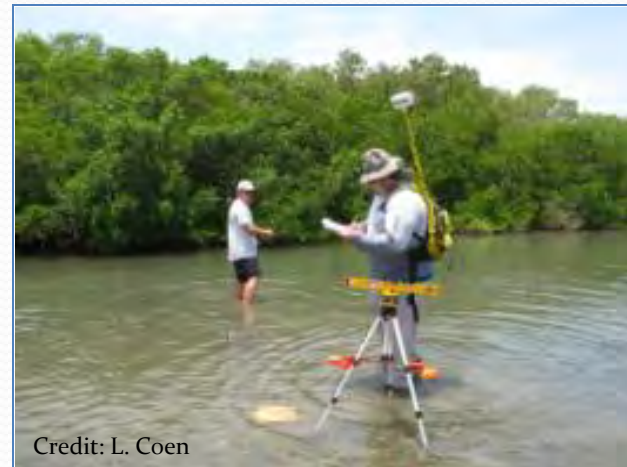
# Universal Metric: Reef Areal Dimension

- Units:  $m^2$
- Preferred Methodology: Differential GPS/GIS (side-scan sonar/depth-finder for sub-tidal)
- Performance Criteria = None
  - Gains in reef areal dimension may be due to spreading of original cultch and not accretion of the reef
  - Still important to document potential changes in area over time to performance

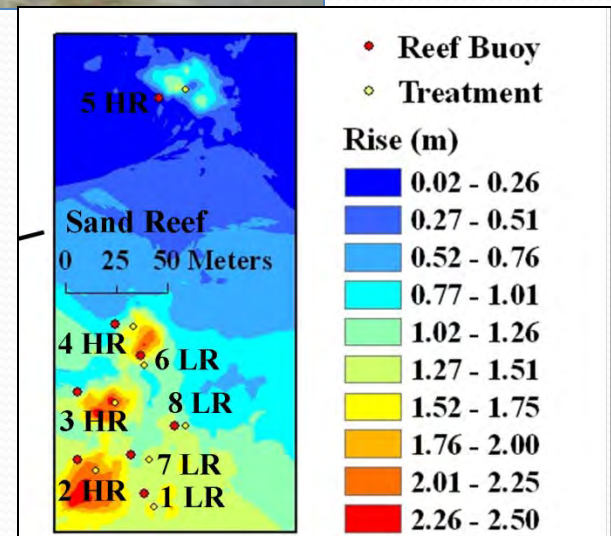


# Universal Metric: Reef Height

- For *C. virginica*
- Average height of a reef off the bottom substrate
- Units: m
- Preferred Methodology: rod and transit/laser-level (subtidal: side-scan sonar/depth finder)
- Performance criteria = positive or neutral change in reef height from original structure



Credit: L. Coen



# Universal Metric: Emergent Reef Structure

- For *O. lurida* only
- Consists of three component measurements:
  - Shell thickness - Average height of bed off the bottom substrate
  - Percent cover - Visual estimation of percentage of substrate covered by shell
  - Emergent shell volume - Volume of emergent shell present on bed
- Units: cm (shell thickness); % (percent cover); ml/m<sup>2</sup> (emergent shell volume)
- Preferred Methodology: 1/16<sup>th</sup> m<sup>2</sup> quadrats (ruler; visual estimation; weight displacement of all collected shell)
- Performance Criteria = Positive or neutral change in component metrics from initial structure