Vulnerability: Key Concepts

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Natural Resources Defense Council
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Photo: NYTimes, Chris Becker
Impacts of OA are the Result of:

- CO₂ emissions and seawater absorption
- Vulnerabilities on-the-ground
- River input
- Eutrophication
Actual Impacts of OA are the Result of:

CO₂ emissions and seawater absorption + Vulnerabilities on-the-ground = Actual impacts

River input \rightarrow Eutrophication

Develop site-specific adaptation with priority areas

Photo: http://pbn.com/detail.html?sub_id=9871f164ed9a&print=1
Actual Impacts of OA are the Result of:

CO₂ emissions and seawater absorption + Vulnerabilities on-the-ground = Actual impacts

↓
Develop site-specific adaptation with priority areas

River input

Eutrophication

Photo: http://pbn.com/detail.html?sub_id=9871f164ed9a&print=1
Actual Impacts of OA are the Result of:

- CO$_2$ emissions and seawater absorption
- Vulnerabilities on-the-ground
- Exposure
- Social Sensitivity
- Adaptive Capacity

= Actual impacts
  
  Develop site-specific adaptation with priority areas
Exposure

• The **assets** in the path of the disturbance
  - shellfish, lobster, other marine organisms

• Where will OA reduce shellfish?
  – Where is OA happening (and projected)?
  – Where are the shellfish? When is the damage threshold reached (soon vs. later)?
Global projections

Year, $\Omega_{1.5}$
- 2006 - 2023
- 2024 - 2042
- 2043 - 2062
- 2063 - 2082
- 2083 - 2099

Gulf of Maine

Shellfish distribution

DMR survey

Exposure

Van Hooidonk et al. 2014
Sensitivity

• Fishing dependency and engagement
Sensitivity

Licenses for Lobster
(median 2003-2013)

# Licenses, All Fish
(median 2003-2013)

Revenues, Lobster Landings

Revenue, All Fish
(median 2003-2013)

ACCSP 2014
Adaptive Capacity

• Ability to cope, prepare, adapt to, or prevent the loss of shellfish catch
Adaptive Capacity

Education

Income

Census 2000
Purpose & Benefits

resilient communities
Vulnerability → Adaptation

- Intervention points to reduce vulnerability
  - Exposure, sensitivity, and adaptive capacity
- Phases of disaster
- Decision level
Questions?