

An underwater photograph showing a shark swimming over a vibrant coral reef. The water is clear and blue, and the coral is diverse and colorful. The text is overlaid on the top half of the image.

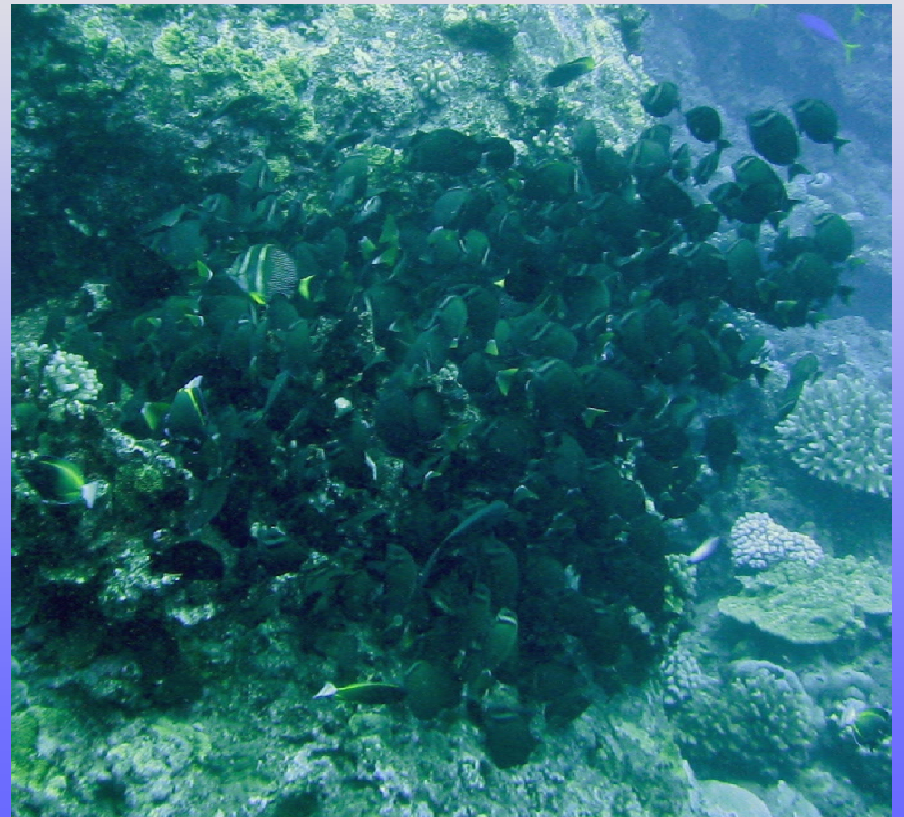
# Ecosystem Threats: What the fishing community can do to ensure a sustainable future

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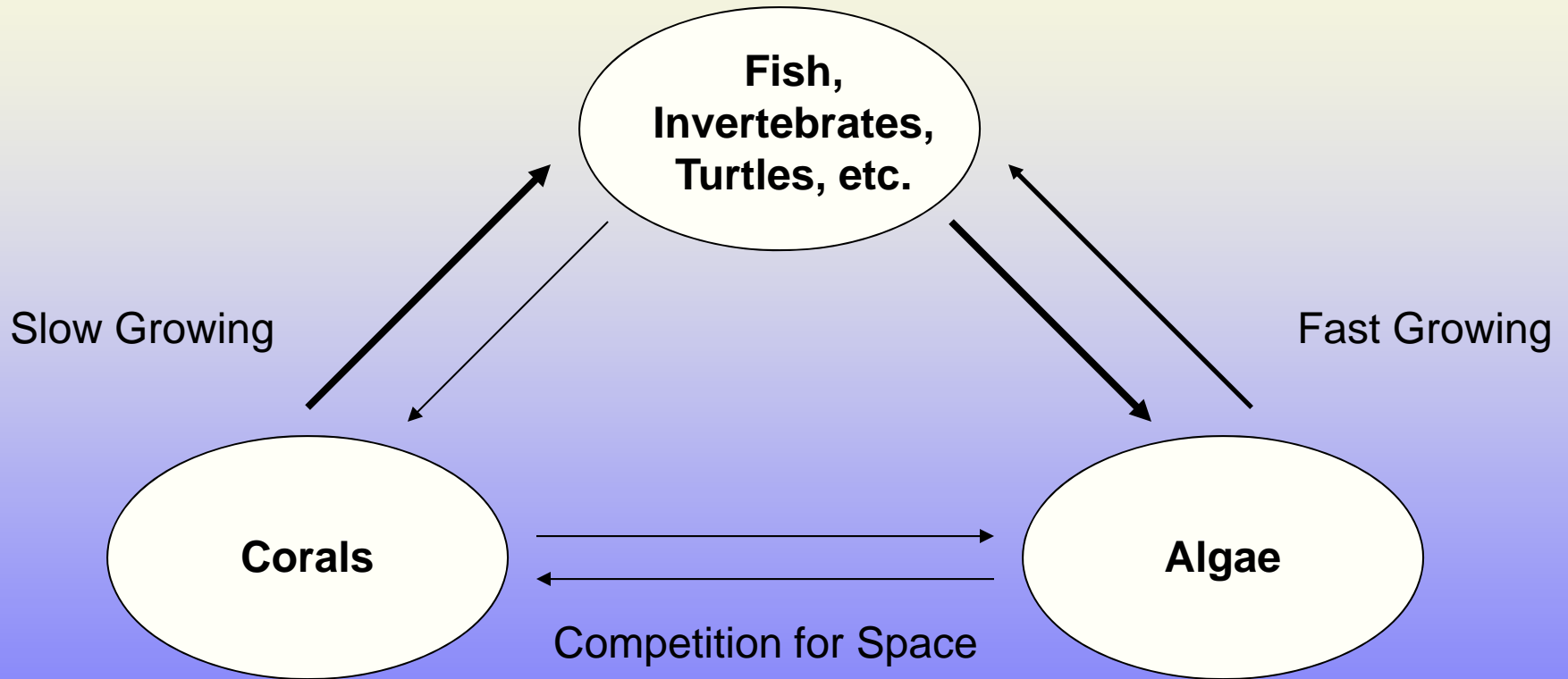
March 18, 2010  
Regional Ecosystem Advisory Committee

# Overview

- Reef Ecosystem Interactions 101
- Ecosystem Threats
- Resilient Reefs
- Paths to Resiliency



# Simplified View of a Reef



- Structure
- Protection
- Food

- Food
- Structure
- Protection

# Corals and Algae in a Reef Without Herbivores....

Fish,  
Invertebrates,



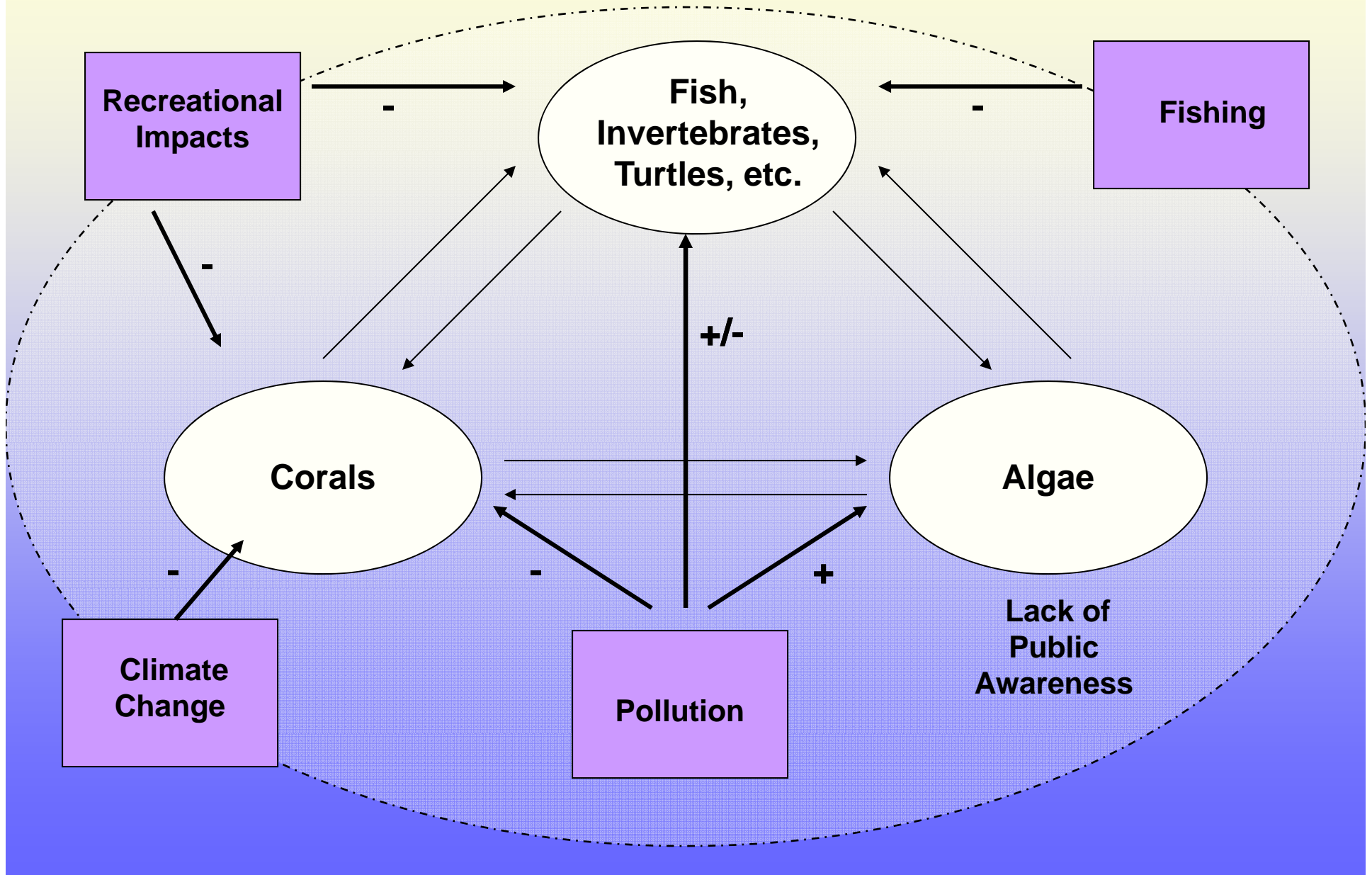


# Important Interactions

- Corals and algae compete for space
- Herbivores are essential to maintain the equilibrium between algae and corals
- Intact fish communities are necessary for healthy reefs



# Human Activities Alter this Balance



# Climate Change

- What does this mean for Guam's reefs?
  - Warmer waters → Increased coral bleaching, shifts in species distribution
  - Ocean acidification → May impact coral growth rates as well as other organisms that calcify, including invertebrates
  - Increased sea levels
  - ???



# Coral Bleaching on Guam

- Two events over the last 5 years
  - Corals and other organisms with zooxanthellae down to 5m were observed to bleach
    - Including fire corals, giant clams, and anemones
    - In the 200x event we saw mortality in recently bleached corals → rapidly covered in algae
    - In the 200x event we noticed an increase in coral disease associated with the event



# Ocean Acidification

- Carbon Dioxide is absorbed by the ocean
- As atmospheric CO<sub>2</sub> increases, the amount absorbed by the ocean increases



# Fishing

- Fishing has a direct effect on reef ecosystems
- Fish are a renewable resource IF we harvest them in a sustainable manner
- We need to consider our fishing practices in the context of these broader ecosystem threats

# Reef Resilience

- Preserve the Balance
  - Ensure that all parts of the ecosystem are in place
    - Herbivorous fish and invertebrates
    - Apex predators
- Reduce Impacts
  - Pollution
  - Recreational Impacts



Guam Dept. of Agriculture

# How do we Balance?

- The role of Marine Protected Areas
  - Improved resilience – stabilizes coral cover
- Enhance Herbivory
  - Reduce take of herbivores in heavily impacted areas – this may be very important for reef restoration
- Enhance Reproductive Capacity in Stocks
  - Choose to harvest fish after they've become reproductively mature

DRAFT POSTER

**Guam/Mariana Archipelago Reproductive Size L50**

This poster shows the average size at first maturity. Size at first maturity (also called L50) is the size at which a fish can produce eggs (spawn) for the first time. By allowing the fish to reach their L50 size before harvesting, we can improve the long-term sustainability of our fishery. Fish much larger than their L50 can produce greater numbers of healthier eggs. If we allow some fish to reach these larger sizes and spawn, there will be even more fish to harvest in the future.

**Species and L50 Data:**

- Guili, Guilan puengi / highfin nudoorfish: L50: 15.4 in. 4.9 years
- Atulai / big-eye scad: L50: 8.3 in. 9 months
- Guili, Guilan puengi / highfin nudoorfish: L50: 11.4 in. 2.7 years
- l'e, Tarakitū / bluefin trevally: L50: 20.2 in. 2.7 years
- Gaddao mattingaa, Buelli / yellow grouper: L50: 16 in. 3.6 years
- Gaddao / honeycomb grouper: L50: 6.65 in. 1.1 years
- Guasa, Tataga / bluepine unicornfish: L50: 14.2 in. 2 years
- Gaddao / blacktip grouper: L50: 6.2 in. 4.6 years
- Hang'on / orangeeye unicornfish: L50: 9.5 in. 2 years
- Hiyuk, Filaang / blackblotched surgeonfish: L50: 9.9 in. 1 year
- Milau / ashfin surgeonfish: L50: 9 in.
- Kijū / cornet tang: L50: 3 in.
- Mafute' / blackspot emperor: L50: 9.2 in. 1.5 years
- Buan-pento / onepot emperor: L50: 12.7 in. 3 years
- Palakse', Lagua / redlip parrotfish: L50: 15.4 in. 4 years
- Palakse', Lagua / pacific surgeonfish: L50: 12 in. 3 years
- Gualah, Lago / spotted longnose: L50: 9.8 in. 1.4 years
- Falnske', Lagua / bluefin surgeonfish: L50: 5.7 in. 11 months
- Satmonetiyo, Satmonetiyo / dash-dot goatfish: L50: 7.8 in.
- Tiao, Satmonetiyo, Satmonetiyo / yellowstripe goatfish: L50: 7.9 in. 3.4 years
- Manahak less'o', Hiteng kahla'o / forked rabbitfish: L50: 7.9 in. 10 months
- Manahak, Sesyon / wrapped rabbitfish: L50: 8.8 in. 4 months
- Pa'pangpang / slipper lobster: Only lobsters greater than 31 carapace length, which are not carrying eggs, can be legally harvested.
- Mahongang / spiny lobster: Only lobsters greater than 31 carapace length, which are not carrying eggs, can be legally harvested.

**Logos:** PMPRI, NOAA, and other organizational logos.

Poster concept, design and art by Ellyn Tong

# Key Points

- There are big threats to our reefs on the horizon
- Herbivores are essential to maintain the equilibrium between algae and corals
- Apex predators play an important role in keeping our fish stocks healthy and robust
- Fishers can help improve resiliency by making choices about their target fish
- Enhance herbivory in restoration areas to help restore the balance
- Increase reproduction by targeting fish above the L50 and also leaving the really big fish

Si Yu'os Ma'ase!

Questions?

