

INVASIVE SPECIES AND OVERFISHING

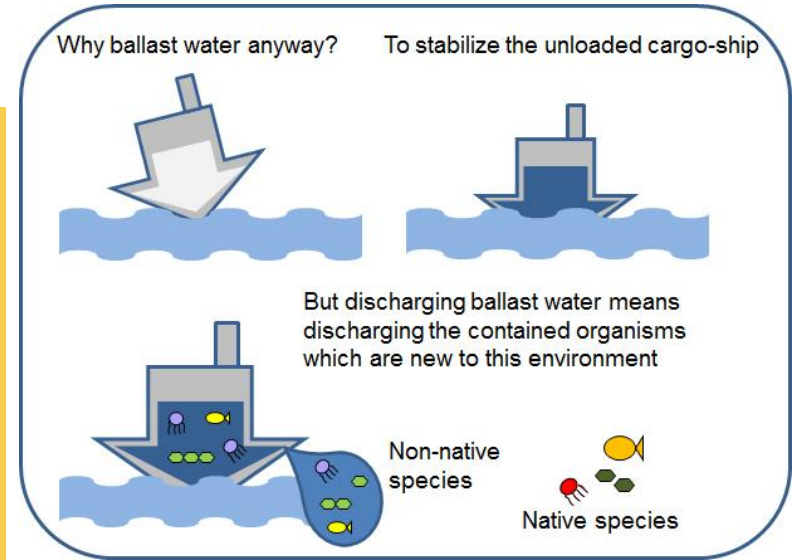
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OUTLINE

- Discuss how invasive species can put ecosystems out of balance.
- Describe some specific invasives to coral reef ecosystems.
- Discuss the causes of overfishing and the practice is threatening ocean ecosystems including coral reefs.
- Describe how these practices could have synergistic effects on reefs.

INVASIVE SPECIES

- Definition- A species that is introduced into a new area separate from where its population lived and evolved
- How they are introduced
- Impacts on ecosystem if established
- Rarely positive



http://www.northseaballast.eu/downloadimage/2145/1968_3192012_44609_PM_bw%20uitleg.jpg/bw%20uitleg.jpg

LIONFISH: CASE STUDY



Image Source: sciencenutshell.com

- Venomous, predatory fish
- Native to Indo-Pacific region
- Invasive in the Caribbean, Gulf of Mexico, and Atlantic Ocean
- How could this happen!?

CONTROL & MANAGEMENT OF LIONFISH

- Revitalization of Predator species (Grouper, Sharks...)
- Limit trade among aquarists
- Encourage fishing & consumption among humans
- Killing individual specimen when spotted



THE LIONFISH'S IMPACT ON CORAL REEFS & FISHERIES

- Predation of native herbivores (direct)
- Algal Blooms (indirect)
- Coral Bleaching (indirect)

- No Natural Predators
- “Fishing Pressure”
- Fishing down the Food Web



Image Source: <http://guyharveysportswear.com>

OTHER EXAMPLES

- Toxic Algae-HAB, Red tides
- Amphipods- small crustaceans
- Sponges

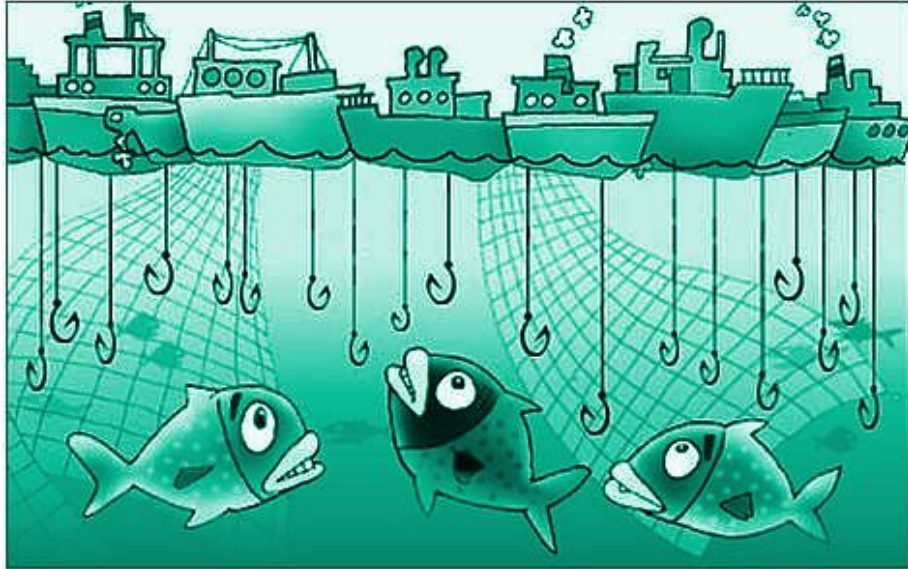


MANAGEMENT PLANS FOR INVASIVES OVERALL:



- Coordination & Collaboration between agencies
- Prevention
- Monitoring
- Response & Eradication
- Education & Outreach
- Research
- Policy

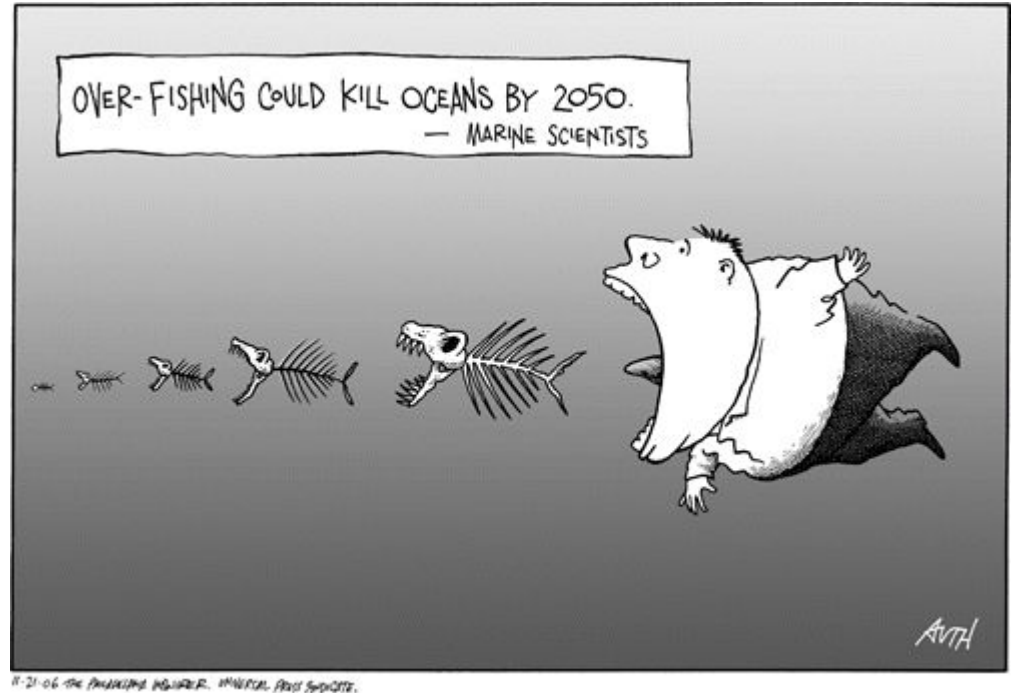
OVERFISHING: HISTORY



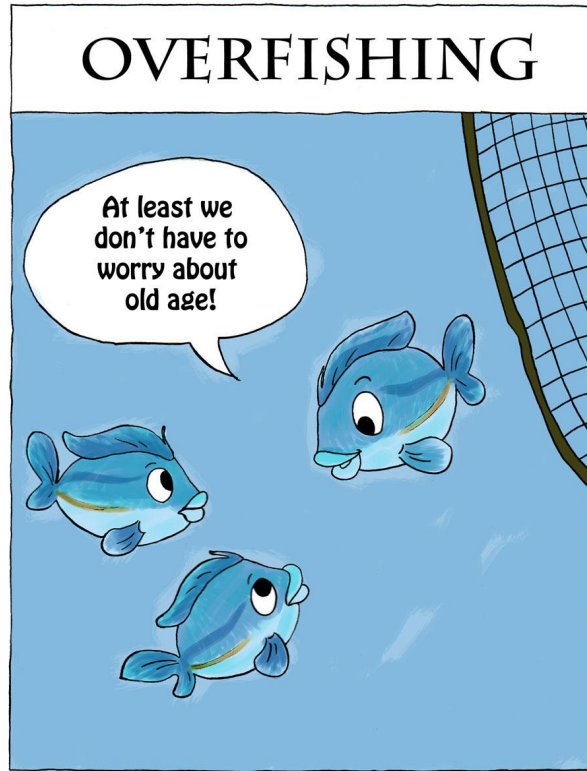
1. Aboriginal & Subsistence Exploitation
2. Colonial & Systematic Exploitation
3. Geographically Pervasive Global Exploitation

OVERFISHING: CAUSES

- Increased Efficiency of Commercial Fishing Equipment
- Lack of Regulation & Enforcement
- Increased Demand for Reef Fish
- Culture



EFFECTS AND MANAGEMENT



- Removes top predators
- Ecosystem imbalance
- Damage Reef structure
- fishing methods
- “Tragedy of the commons”
- Collapse of fishing markets
- Management policies—especially with Juveniles

SAINT JOHN'S OVERFISHING

- Overfished liked most waters
- Grouper is an example
- New regulations on:
 - 100 species
 - Cowfish
 - Queen Angelfish
 - Spiny lobster
- Limits of fish caught
- Better enforcement

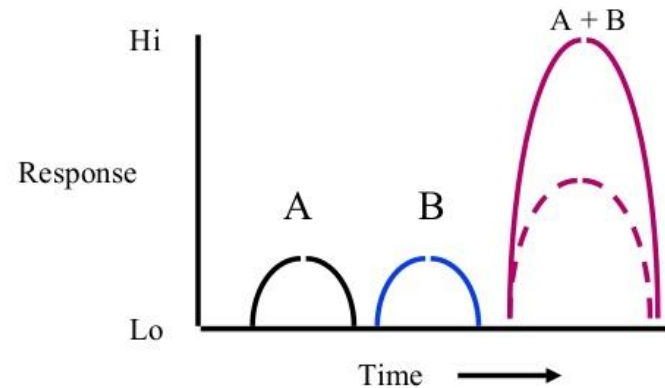


picture-<http://1.bp.blogspot.com/-8GubwCUq318/UaGwALiipHI/AAAAAAAAADNk/Ru8Fxfkji nIY/s1600/Queen-Angelfish-Gd-Pic.jpg>

COMBINED EFFECTS OF OVERFISHING AND INVASIVES

- Hypothesized to have synergistic effects
- Combined with other factors
- Greater effects to biodiversity and the ecosystem

Synergistic Effects



The effect of two chemicals taken together is greater than the sum of their separate effect at the same doses, e.g., alcohol and other drugs

QUESTIONS?

RESOURCES

- coraldigest.org (Invasives; Overfishing)
- Estuarine Coastal and Shelf Science (Impact Factor: 2.06). 03/2012; 99:42–49
- "Marine Invasive Species -- Pristine Seas -- National Geographic." *National Geographic*. National Geographic Partners, 2016. Web. 19 Apr. 2016. <<http://ocean.nationalgeographic.com/ocean/explore/pristine-seas/critical-issues-marine-invasive-species/>>.
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- Saylan, Charles, and Daniel T. Blumstein. *The Failure of Environmental Education (and How We Can Fix It)*. Berkeley: U of California, 2011. Print.
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