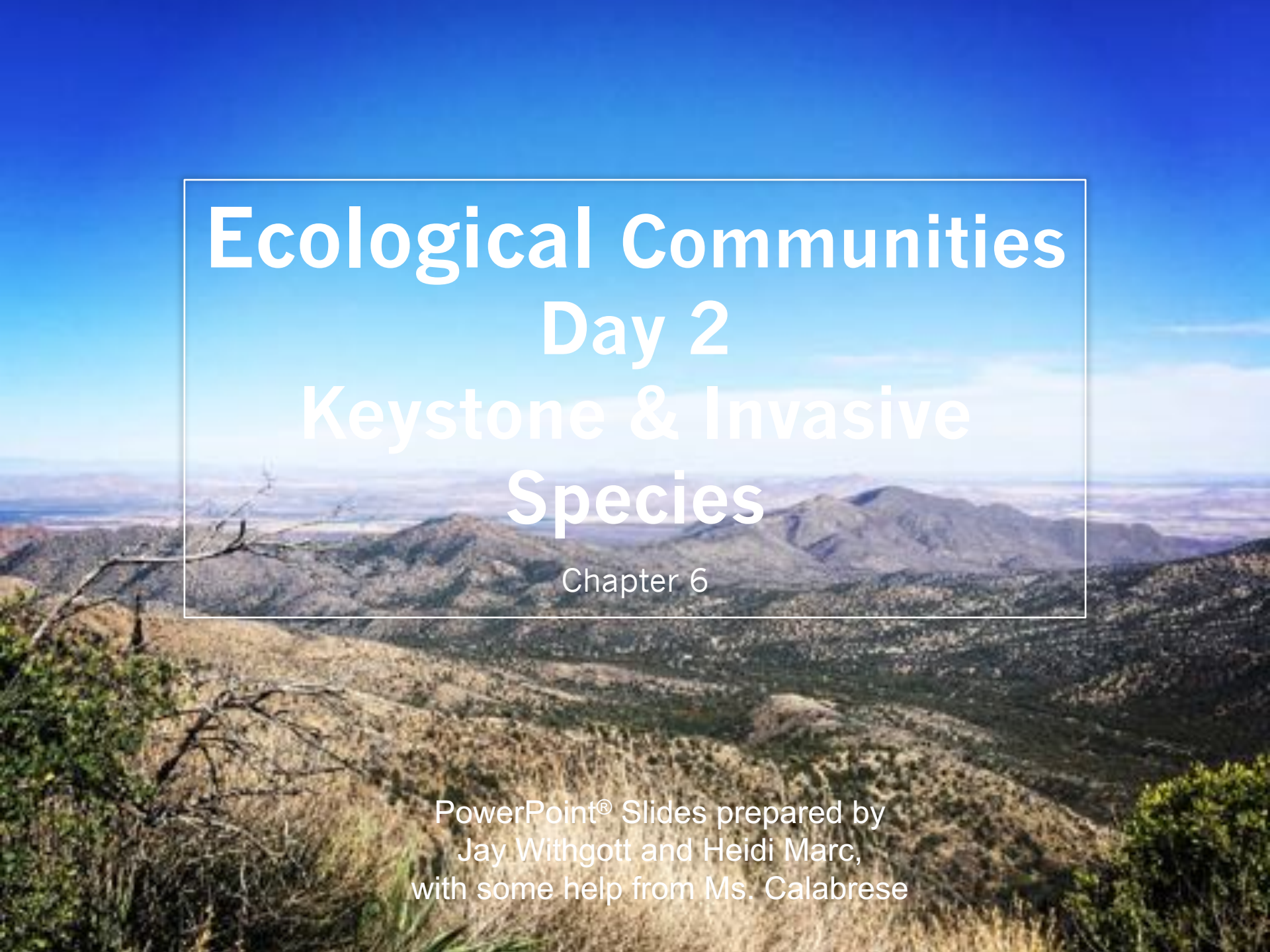

Ecological Communities
Day 2
Keystone & Invasive Species

Chapter 6

PowerPoint® Slides prepared by
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with some help from Ms. Calabrese

How Wolves Change Landscapes

https://www.youtube.com/watch?v=ysa5OBhXz-Q&t=44s

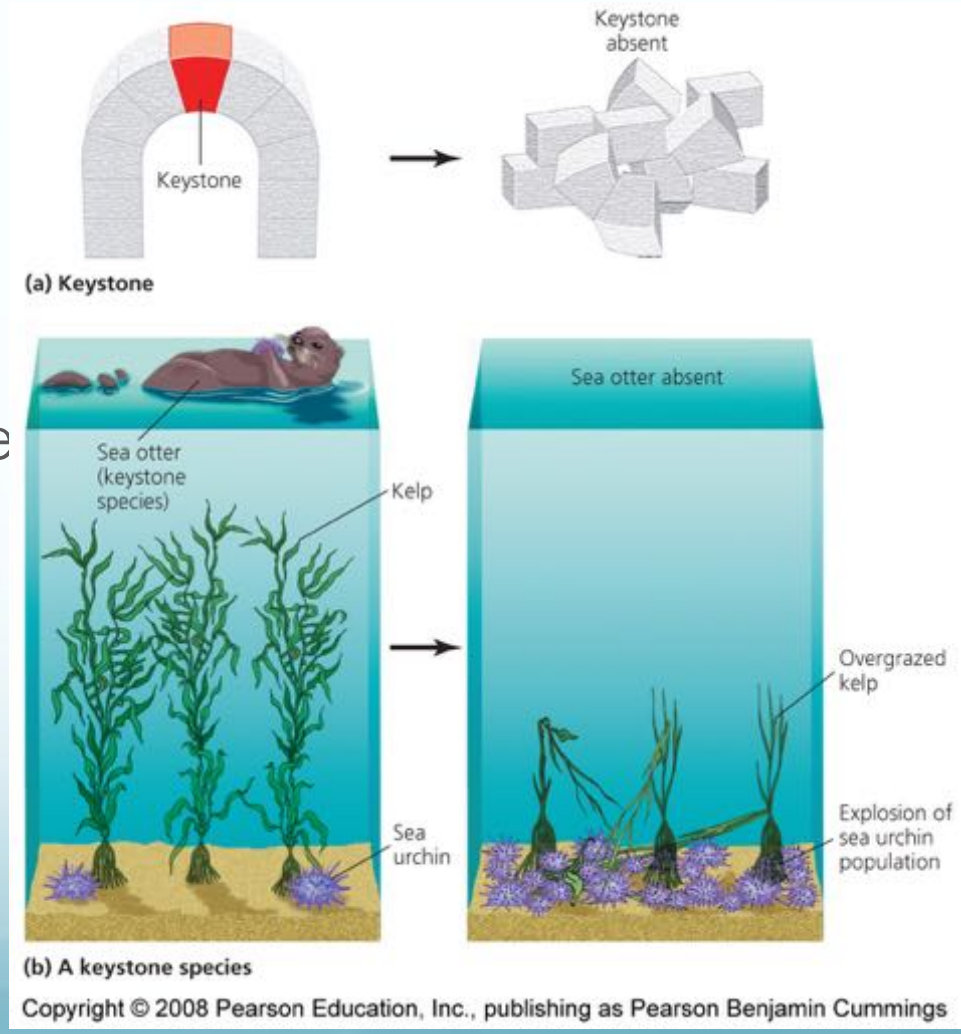
Video Questions:
Turn & Talk

1. What is a **trophic cascade**?
2. What is the definition of an **ecosystem engineer**? Can you give an example of one from the video?
3. How has the reintroduction of wolves changed the landscape? Explain.


Keystone

Some Organisms Play Bigger Roles

- **Keystone Species**
  - Has a strong or wide-reaching impact far out of proportion to its abundance
  - Removal of a keystone species has substantial ripple effects
    - Alters the food chain



Species Can Change Communities

- **Trophic Cascade:**
  - Predators at **high trophic levels** can indirectly affect populations of organisms at **low trophic levels** by keeping species at **intermediate trophic levels** in check
    - Extermination of wolves led to increased deer populations, which led to overgrazed vegetation and changed forest structure
- **Ecosystem Engineers:**
  - Physically modify the environment
    - Beaver dams, prairie dogs, fungi

Check In Question #1: Turn & Talk

- Which of the following is TRUE about top predators?

A. They are often keystone species

B. They are likely to be herbivores

C. They are likely to be producers

D. They include bacteria and fungi

E. Their removal increases biodiversity

Invasive Species

- **Invasive Species:**
  - Non-native (exotic) organisms that spread widely and become dominant in a community
    - Growth-limiting factors (predators, disease, etc.) are removed or absent
    - They have major ecological effects
    - Chestnut blight, a fungus from Asia, wiped out American chestnut trees
- Some species help people (i.e., European honeybee)


Dutch Elm Disease
Destroyed most of the American Elms

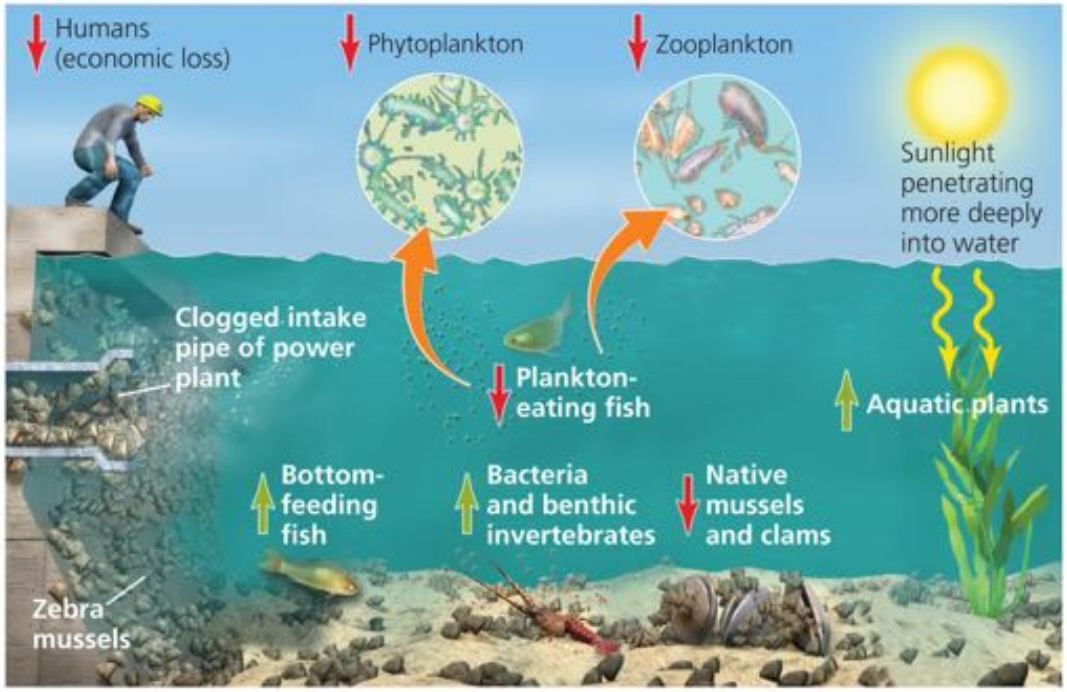

Chestnut Blight
Killed nearly every mature American chestnut preceding 1930

Rats

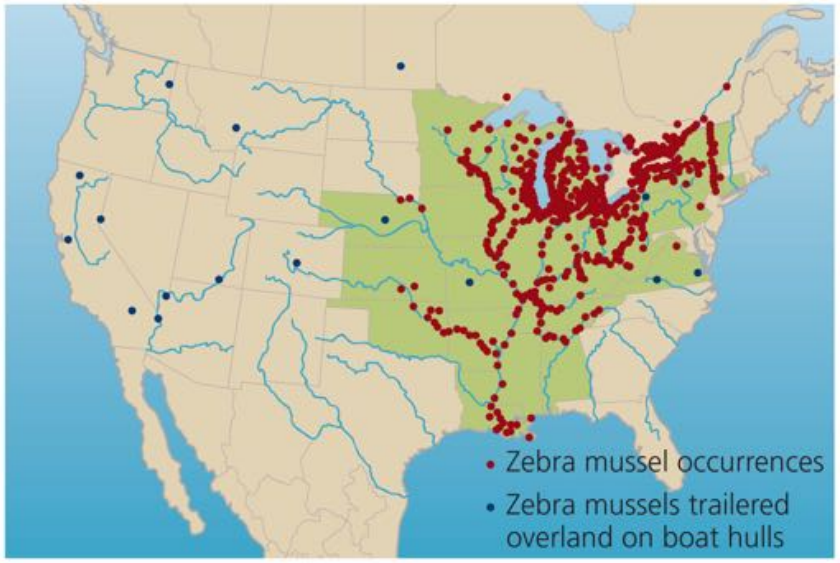
Invasive Species Benefits:

European Honeybee

Two Invasive Mussels



(a) Impacts of zebra mussels on members of a Great Lakes nearshore community



(b) Occurrence of zebra mussels in North America, 2005

(c) Occurrence of quagga mussels in North America, 2007

Controlling Invasive Species

- Techniques to control invasive species
  - Remove manually
  - Toxic chemicals
  - Drying them out
  - Depriving of oxygen
  - Stressing them
    - Heat, sound, electricity, carbon dioxide, ultraviolet light

Prevention, rather than control, is the best policy

Check In Question #2: Turn & Talk

- All of the following are ways to control invasive species, EXCEPT:

A. Remove individuals from the area

B. Stress them out

C. Trap them

D. Encourage them to hybridize with another species

Weighing the Issues: Are Invasive Species All Bad?

- Some ethicists have questioned the notion that all invasive species should automatically be considered bad.

1. If we introduce a non-native species to a community and it greatly modifies the community, do you think that is a bad thing?
2. What if it drives another species extinct?
3. What if the invasive species arrived on its own, rather than through human intervention?
4. What ethical standard(s) would you apply to determine whether we should battle or accept an invasive species?

Review Question: Turn & Talk

- What is meant by keystone species, and what types of organisms are most often considered keystone species?