Feeding Relationships – The Food Web

• One of the earliest approaches to the study of communities describes who eats whom!
Feeding Relationships – The Food Web

• Food web – a summary of the feeding interactions within a community

Why is this better than a food chain???
Food Webs – Very, VERY complex!!!

- Can be represented in many different ways to try and reduce the complexity
  - Only include common species.
  - Exclude weakest trophic links.

Isn’t it much clearer this way???

Even a food web with only 10 fish species and their foods can be very complex.

Removing weak feeding relationships produces a picture of the community that is only a bit more comprehensible.
Strong Interactions and Food Web Structure

- Paine suggested feeding activities of a few species may have a dominant influence on community structure.

Which has more influence on the intertidal community? Why?

Called strong interactions!
Indirect Interactions

- Indirect interactions are the effects of one species on another through a third species
  - Trophic cascades (Chapter 18)
  - **Indirect commensalism**
  - Apparent competition

- One species indirectly benefits another species (through a third species) while it is neither helped or harmed

This is commensalism. What would be indirect commensalism???
Indirect Commensalism

- Example:
  - Beavers fell cottonwood trees which then produce stump sprouts
  - Beetles prefer consuming high nutrition sprout leaves
     - Beetles grow larger, faster and utilize defensive compounds found in leaves

Who gains?
Who loses?
Who’s not affected?

Indirect commensalism between beavers and beetles
Indirect Interactions

Indirect interactions are the effects of one species on another through a third species

Trophic cascades (Chapter 18)
Indirect commensalism

**Apparent competition**

- Negative effects between two competitors who share a predator or herbivore

This is competition. What would be apparent competition???
Indirect Interactions

Example:
One species may facilitate the presence or increase the abundance of the predator which suppresses the second species.

Exotic plant *Brassica nigra* sheltered mammals which increased herbivory on native bunchgrass *Nassella pulchra*.
Keystone Species

- The feeding activities of a few keystone species may control the structure of communities.
- Keystone species reduce the probability of competitive exclusion = more diversity!!!

http://www.youtube.com/watch?v=Ng6CNn6XnBg
Keystone Species

Urchin barrens

http://www.youtube.com/watch?v=-p6viD0h5nw

Removing a sea star acting as top predator in intertidal food webs reduced the number of species both in Mukkaw Bay, Washington, and New Zealand.

Following sea star removal at Mukkaw Bay, the number of species fell from 15 to 8.

At the New Zealand study site, the number of species decreased from 20 to 14.
Mutualistic Keystones

- Keystone species exert strong effects on their community structure, despite low biomass.