

## Lecture 6 – Introduction to Secondary Productivity

### READINGS FOR NEXT LECTURE:

- Krebs. Chapter 23 pages 463-469. "Food Chains and Trophic Levels"
- Guterl, F. 2003. Troubled seas: Ninety percent of the big fish have already been caught. *Newsweek*. July 14 edition, p 46. (H,W)
- Pauly D and V Christensen. 1995. Primary production required to sustain global fisheries. *Nature*. **374**:213-4. (H,W)

### REMINDER:

Pre-proposal due Thursday!  
No late proposals!

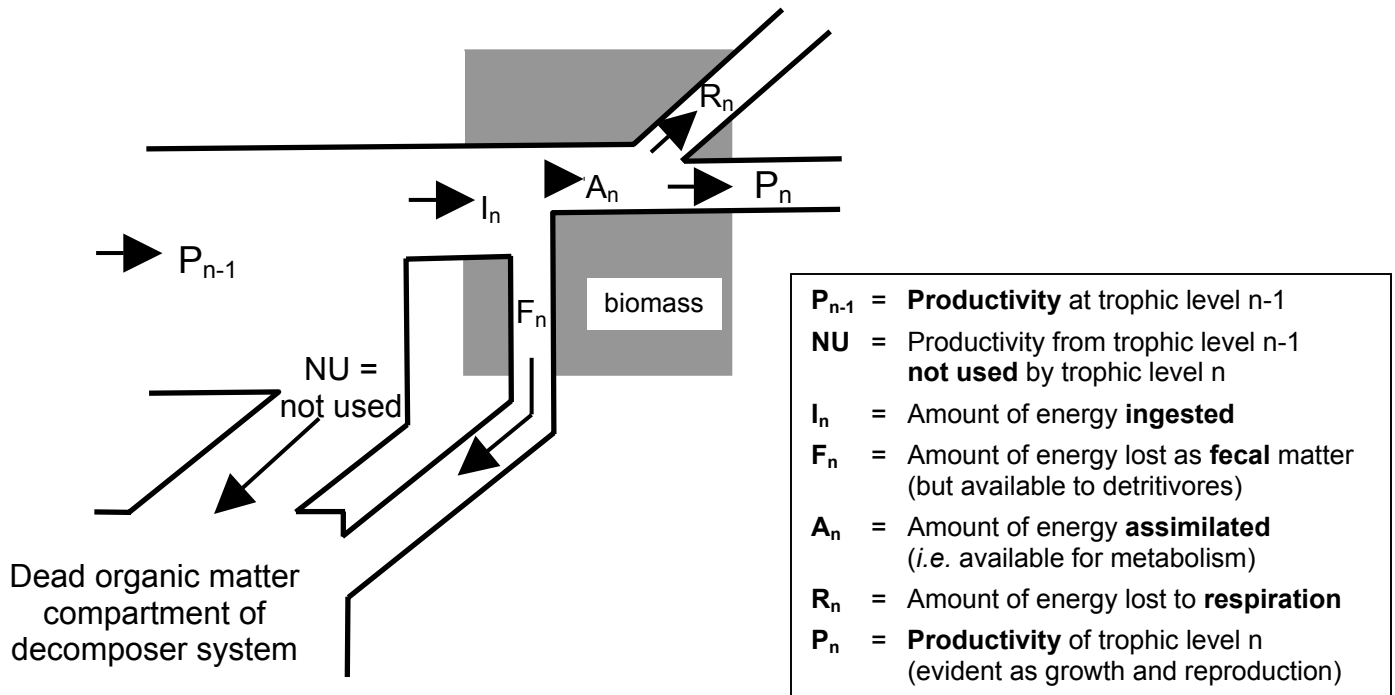
### MOVIE NIGHT:

Re-showing of **Cane Toads**  
Thursday, 8pm  
Food provided

The last few lectures, we have focused on primary productivity. As we saw previously, autotrophs are able to capture 1-2% of the incoming solar radiation.

We are now going to explore what happens to the energy stored in autotrophic biomass. **Secondary productivity** is defined as the rate of biomass accumulation by heterotrophs (herbivores, carnivores and detritivores).

For trophic level n:



### Study questions

1. What is the real truth to Dogbert's insights? What is the wasted step?
2. Define a trophic level. What are the difficulties in assigning a species to a single trophic level?
3. Describe the difference between exploitation, assimilation and production efficiencies. What are the typical ranges of each of these efficiencies? How do they combine to give an overall ecological efficiency?
4. According to the *Newsweek* article, what are the consequences throughout the marine food web of overfishing of top predator fish?
5. According to Pauly and Christensen's article, how much of aquatic primary productivity is required for the amount of fish caught annually? How does this number differ between freshwater and marine systems? Why does it seem unlikely that humans will be able to harvest much more of the world's aquatic productivity than is already being harvested?