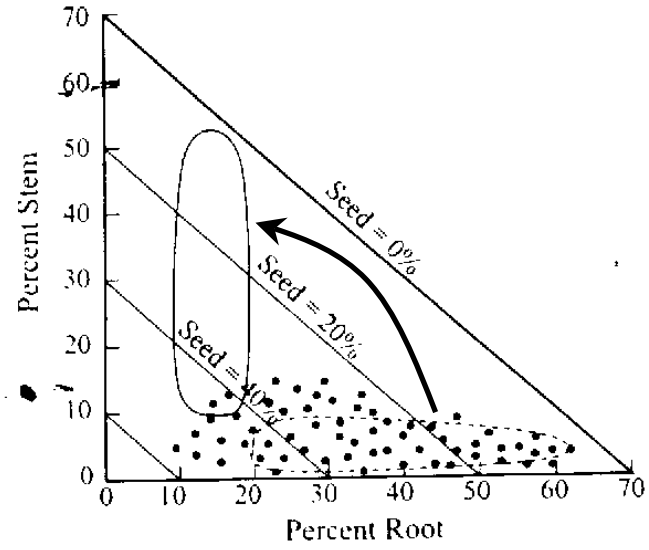
1. For two of the following three Ecosystem Processes, discuss how the two are linked to both the Tilman and Lehman "Human-caused disturbances" hypotheses and to the concept of species invasion. (3 points)

   Primary Productivity **Evapotranspiration** **Nutrient Cycling**

2. What is happening (or has happened) in the figure at right? (1 pt)



How does the process in the figure affect (1 pt ea):

A. Species richness

B. Average shoot: root ratio of the plant assemblage

C. Mechanism of competitive interactions among species

3. The Tilman et al. (2001) paper we read discussed the effects of human-caused environmental change on plant diversity.

   What are two means by which humans are changing the environment, and how might these human influences alter the diversity of plant communities? (2 pts)

   How might these two human effects on natural ecosystems (from your response above) influence the **invasibility** of natural areas? (2 pts)

4. A. How does disturbance affect successional patterns in natural plant assemblages? (1 pt)

B. Around the general successional time interval indicated by the bracket in the figure above, how might each of the following influence community development or composition? (1 pt ea)

Trade-offs in sexual reproduction

Herbivory

Colonization by "nitrogen fixing" plants

5. Scientists love to organize… (2 points total)

A. i. Place these grouping categories in order, from broadest to narrowest:

Community **Species** **Guild** **Functional Group**

ii. Use each of the following terms to indicate how each of the grouping categories is defined:

Ecological Function **Taxonomic Relationship** **Geography** **Resource Use**

i. Grouping categories:	**ii. Defined by:**
_____	_____
_____	_____
_____	_____
_____	_____

B. What does the phrase "Emergent Properties" mean? Pick one of the categories above and provide an example of an emergent property of that particular level of organization.

6. Design a plant that could effectively invade a natural plant community that has been subjected to **one** of the following disturbances – you pick the disturbance. (3 pts total)

   A. Construction of a hydroelectric dam (results in formation of a reservoir with widely fluctuating water levels),
   B. Fire, or
   C. Road construction

   Briefly describe each of the following characteristics of your plant:

   Seed size –

   Seed number –

   Other important seed characteristics –

   Plant growth form –

   Plant growth rate (remember this is correlated with resource consumption) –

   Any other important ecological traits of the species –