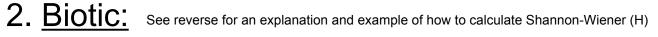
## Aquatic Ecology - Species Diversity

Name:		Date:Gro	Group #:	
Location A:				
1. <u>Abiotic:</u>				
Water Temperature	С	Dissolved Carbon Dioxide	ppm	
Dissolved Oxygen	ppm	рН		
Description:				



Name	Abundance	P <sub>i</sub>	$(P_i)(\log_2 P_i)$ a
Total / H		1.000	

## 3. Calculations:

### a. Shannon-Wiener

 $H = -\sum_{i=1}^{s} (P_i)(\log_2 P_i)$ 

H = Index of Species DiversityS = number of species*Pi* = proportion of total samplebelonging to *i*th species

Example:

A pond with 2 species (Species 1 = 99, Species 2 = 1)

 $H= - [(P_1)(log_2P_1) + (P_2)(log_2P_2)$  $= - [(0.99)(log_2 0.99) + (0.01)(log_2 0.01)$ = 0.81 individuals

\*The pond with the largest H has greater diversity and or equitable distribution.

# b. Simpson's

$$D = 1 - \sum_{i=1}^{s} (P_i)^2$$

D = Simpson's index of Diversity  $P_i$  = proportion of individuals of species I in the community

Example:

A pond with 2 species (Species 1 = 99, Species 2 = 1)

 $D = 1 - [(0.99)^2 + (0.01)^2 \\= 0.02$ 

\*The larger D is the greater the diversity.

## Information-theoretic Approach

How difficult would it be to correctly predict the species of the next individual collected?

Used by communication engineers to 'crack' codes and predict the next letter in a message.

Actually a measure of uncertainty.

What would be the species diversity of this sample if all species were equal in abundance?

# **Probability Approach**

What is the probability that two specimens picked at random in a community of infinite size will be the same species?

In the boreal forest, the probability of pick two trees of the same species randomly would be high.

In the tropical rainforests the probability of picking two trees of the same species randomly would be low.

Gives greater weight to common species than rare.