Conservation
Worksheet I
(Basic Ecology, Taxonomy, Biodiversity and Extinction, Basic Genetics, Small Populations)

Name:________________
1. What are three levels of biodiversity?

2. What are ecosystem services? Give three examples of ecosystem services.

3. What are three factors that have lead to the current biodiversity crisis?

4. List and explain two examples of nonsustainable resource utilization that we discussed in class.

5. Why are intact healthy coral reefs important to coastal communities in tropical latitudes?

6. Complete the following diagram:
7. Define the following terms:
   a. Pyramid of biomass
   b. Trophic level
   c. Producer
   d. Consumer
   e. Primary producer
       Example:________________
   f. Autotrophic
   g. Primary consumer
       Example:________________
   h. Secondary consumer
       Example:________________
   i. Heterotrophic
   j. Omnivore
   k. Decomposer

8. Why can you feed 10X more people on a diet of rice and beans rather than a diet of steak and lamb chops?

9. What is biological magnification?

10. Why do high levels of DDT in birds such as bald eagles and brown pelicans lead to declines in population sizes?
11. What are two criteria for organisms to belong to the same biological species?

12. What is the significance of the Cretaceous - Tertiary Boundary?

13. How long ago did the dinosaurs go extinct?

14. What is an ecological island and why can the Mt. SAC Wildlife Sanctuary be considered an ecological island?

15. Describe the difference between the terms extinction and extirpation. Give examples of each.

16. What is an endemic species? List two examples of endemic species.

17. Label the X and Y axis of the following graph. What does the graph say. What are two reasons for the relationship?

Species – Area Curve

• What does the graph say?

• Why the relationship?
18. What are two reasons top carnivores are more prone to extinction than herbivores?

19. What does the black-footed ferret eat?

20. What is the breeding habitat for the following organisms?
   a. The light-footed clapper rail:
   b. Belding’s savanna sparrow:
   c. The California gnatcatcher:

21. Extinction prone species include those that prey on livestock or humans. What are two mammals found in Montana that are known to prey on livestock or humans?

22. Define the following terms:
   a. Homologous chromosomes
   b. Alleles
   c. Homozygous dominant
   d. Homozygous recessive
   e. Heterozygous
   f. Phenotype
   g. Genotype

23. Blue is dominant to white. A blue flowered plant that had a white flowered parent is crossed with a white flowered plant. What percentage of the offspring are expected to be white flowered? What are the genotypes of the potential offspring? What are the phenotypes of the potential offspring?
24. What is the MVP for:
   a. short term survival (100 years or less)?
   b. long term survival (>100 years)?

25. Give at least 5 reasons you would expect a population of 11 black rhinos to be in danger of going extinct?

26. Inbreeding increases the probability of negative traits being expressed. Why?

27. A huge fire destroyed 75% of the Jeffrey Pine Forest in the Mammoth Lakes area. The fire was so hot that the seed bed on the forest floor was completely destroyed. The only potential for regeneration of the forest will be seed produced by the surviving trees in the forest. Did the population of pines experience a population bottleneck? Explain.

28. What is genetic drift?

Multiple Choice
Questions 29 - 33 should be answered based on the following hypothetical data on the mammal fauna of the Great Basin Ranges. Species diversity in these ranges was measured in 1950, 1970, 1990, and 2010. Fifty (50) species were recorded at each sampled time in the White Mountains. The numbers of species recorded in the Panamint Range were 60, 55, 40, and 38 respectively. The number of species recorded for Wheeler Peak in Great Basin National Park was 18, 22, 26, and 27. Use equilibrium theory and species area curves to explain this data. You may want to graph the data before you evaluate it. **Note these mountain ranges are ecological islands separated by vast areas of desert.**

29. What area is at equilibrium?
   a. The White Mountains   b. The Panamint Range   c. Wheeler Peak

30. Which area is the largest habitat island?
   a. The White Mountains   b. The Panamint Range   c. Wheeler Peak
31. Which area is the smallest?
   a. The White Mountains  
   b. The Panamint Range  
   c. Wheeler Peak

32. In which area was the extinction rate greater than the colonization rate?
   a. The White Mountains 
   b. The Panamint Range 
   c. Wheeler Peak

33. In which area was the colonization rate greater than the extinction rate?
   a. The White Mountains 
   b. The Panamint Range 
   c. Wheeler Peak

From the articles

34. The authors of article 1 (What is Conservation Science), state that trends in public attitudes foreshadow a potential crisis of political will when it comes to preserving biodiversity. What are three pieces of evidence they use to back up this statement?

35. The authors of article 1 state that pristine nature does not exist. Give a piece of evidence to back up this statement.

36. From article 2 (Ecosystem Functions and Services) define:
   a. Nitrogen fixation
   b. Cyanobacteria
   c. Mycorrhizae (fungi)
   d. Keystone species
   e. Mobile links
   f. Ethnobotanical knowledge

37. From article 2 (Ecosystem Functions and Services):
   a. What are two effects of intense soil cultivation on soils?
   b. How do vegetation layers, especially trees, reduce erosion and floods?

37. According to article 3 (Status of the World's Land and Marine Mammals):
   a. What percentage of mammals are threatened with extinction?
   b. Among land mammals, where are most threatened species concentrated?
38. According to article 4 (*Biodiversity and Conservation: Challenges Beyond 2010*):
   
a. How many mass extinctions are known from the fossil record?

   b. The last mass extinction was associated with the extinction of the dinosaurs. How long ago did this mass extinction take place?

   c. In what biome do most species live?

39. Article 6 (*A Strategy for the Future of California's Flora*) state four factors that contribute to a high degree of biodiversity in California. What are these four factors?

40. From article 7 (*Determining Minimum Habitat Areas and Habitat Corridors for Cougars*):
   
a. The article uses the term "indicator species". Give two examples of "indicator species".

   b. The cougar population in the Santa Ana Mountain consists of how many adults?

   c. How long did it take the San Joaquin Hills cougar population to go extinct once it was isolated by urbanization?

   d. Where is the corridor between the Santa Ana Mountains and Chino Hills?

41. From article 8 (*The need for Predator Management in the Conservation of Some Vulnerable Species*):
   
a. What are three mobile and adaptable predators mentioned in the introduction. Why are they thriving in urban areas.

   b. The smaller the habitat area, the greater the incidence of nest predation. Why?

   c. What led to an increase in the raven population in the Mojave Desert. What endangered species did the increase in the raven population affect?
**Matching:** Answers may be used once, many times, or not at all.

1. _____Consequence of tropical deforestation
   - a. Coastal sage scrub
   - b. Cyanobacteria
   - c. DDT
   - d. Decreased rainfall

2. _____Converts atmospheric nitrogen to fertilizer
   - e. Ecological island

3. _____Has an ecosystem impact that is disproportionately large in relation to its abundance.
   - f. Endemic
   - g. Extinction of dinosaurs
   - h. Extirpation

4. _____Animals that provide critical ecosystem services and high ecosystem resilience by connecting habitats and ecosystems as they move between them.
   - i. Genetic Drift
   - j. Genotype

5. _____Photosynthetic organism
   - k. Indicator species
   - l. Keystone species

6. _____Autotrophic
   - m. Mobile links
   - n. Mycorrhizae

7. _____Fat soluble pesticide that becomes more concentrated as you move to higher trophic levels.
   - o. Nitrogen fixation
   - p. PCB’s
   - q. Phenotype

8. _____Cretaceous - Tertiary Boundary
   - r. Prairie dogs

9. _____Permian - Triassic Boundary
   - s. Primary producer

10. _____Species found in one location and nowhere else.
    - t. Salt marsh

11. _____Local extinction
    - u. 225 million years ago

12. _____Any area surrounded by a hostile environment.
    - v. 570 million years ago

13. _____Primary food source of the black-footed ferret.

14. _____Breeding habitat of the California gnatcatcher.

15. _____The physical appearance of an organism.

16. _____The specific combination of alleles (Ex. Heterozygous)

17. _____The chance loss of alleles due to a drastic reduction in population size.

18. _____An organism capable of fixing nitrogen.

19. _____Fungi associated with roots of plants that helps the plant absorb water and nutrients.

20. _____Species that exist at low densities and require large areas. They can be used to address the viability of an ecosystem.