Conservation Biology, EXAM II (75 points) NAME: KEY
27 October 2005

Your exam will take place in two parts. The first will be a typical individual exam which should take you about 50 minutes. The second part will be about 25 minutes in groups of four students on a short set of additional questions. The score for your group exam will earn you additional points on your individual exam. See your syllabus for grading details.

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1. According to Bill Mannan, what percent of land in the world is under some type of reserve protection? [1.5 points]
   About: a) 5% b) 10% c) 15% d) 20% e) 25%

2. The oldest Hawaiian island, Kauai, is about how many years old? [1.5 points]
   a) 5,000 b) 50,000 c) 500,000 d) 5 million e) 5 billion

3. The table below provides Fst data and Slatkin's Migration Estimates collected by Dr. Seuss about four populations of truffula trees. If population B went extinct because of the thneed trade, which population would you advise Dr. Seuss use to repopulate the habitat formerly occupied by population B? Why? [4 points]

	Population A	Population B	Population C	Population D
Population A	--	0.09	0.1	0.3
Population B	0.784	--	0.4	0.6
Population C	0.835	0.651	--	0.7
Population D	0.815	0.522	0.456	--

(Fst below the diagonal, Slatkin's Migration Estimates above the diagonal)

lower means closer related

higher means more migrants

4. Explain how the information gleaned from mtDNA is different from information gleaned from nuclear DNA. [3 points]

♀ only

5. Why is the concept of a metapopulation attractive to some conservation biologists? [4 points]

rather open

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14

6. Explain how the Kanab Amber Snail, the ESA, the Grand Canyon, and ecosystem restoration are linked. [6 points]

endangered subspecies
lives in GC
preventing ↑ flooding of GC

7. Explain what Rob Robichaux meant by "Preparing for Loihi." [4 points]

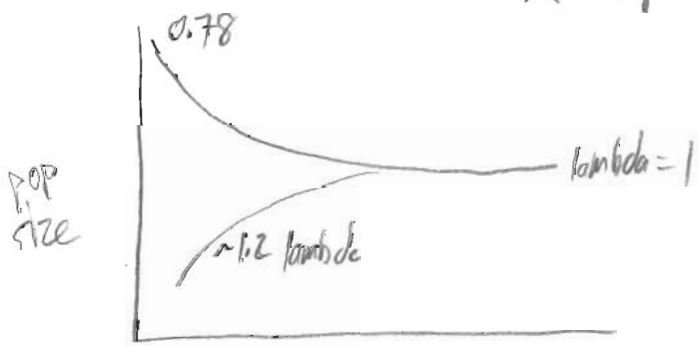
new seamount
adaptive radiation
evolutionary process

8. What are two ecological impacts of (pick one) kudzu vine, buffel grass, or argentine ants? [3 points]

open

9. Draw a simple graph, with labeled axes, that shows a density-dependent change in population size over time that has a lambda of 0.78 at time zero. [5 points]

λ changes over time b/c pop. size changes



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10. Explain how population size and effective population size are different. [3.5 points]

total # indivs

takes into account sex ratios and number of offspring an individual leaves

$N_e = \frac{4N_m N_f}{N_m + N_f}$ if = sex ratio's

$N_e = \frac{4N}{2+\sigma^2}$

11. What did Rob Robichaux say was the problem with the captive propagation program that was undertaken for the Silverswords in the 1970s, 80s, and 90s? [2 points]

only 2 founders ∴ low genetic variation

12. Why won't some Hawaiian silversword species recover without human intervention even if invasive grazers are removed? [3 points]

too few or too isolated to reproduce

13. Explain PVA, how you go about doing one, and what the utility of this approach might be to conservation biology. [6 points]

population viability analysis
lots of data + best expert opinions
predict pop persistence given certain pop. size + other variables
predictions can be for different amounts of time into the future

useful when pressed to answer "how many do we need"?
guideline

14. How is a structured population model different than an unstructured population model? [3 points]

takes into account the fact that populations are made up of different age classes and sexes that have different probabilities of survival + reproduction

15. A well-designed reserve system, based on full knowledge of the needs of a focal species, may still not ensure that species' persistence. According to Bill Mannan this failure may be because of "external influences." Give an example of an external influence that may affect Northern Spotted Owls. [2 points]

global warming
disease outbreak
invasive species
etc.

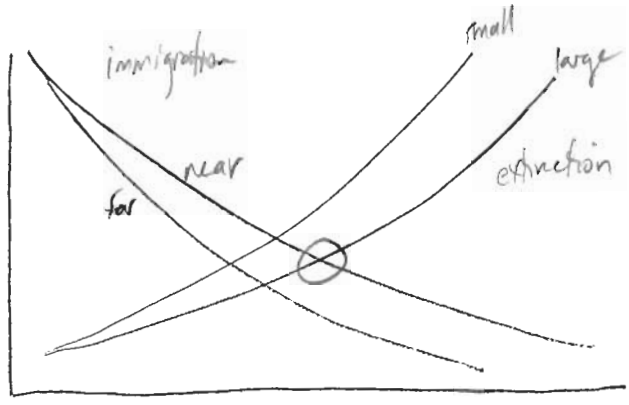
jen
19.5

16. Describe two traits that may predispose a species to become invasive. [3 points]

habitat generalist
short generation time
small body size
high reproductive rate
few local predators/competitors

17. On the figure below, label the axes and explain where the highest equilibrium number of species would be and why. [5 points]

(island biogeography) equilibrium theory of



18. Explain the concept of cryptic species. [2 points]

can't differentiate w/o genetic, or perhaps reproductive incompatibility
look the same morphologically, behaviorally, etc.

19. Distinguish between introgression and inbreeding. [3 points]

genes are shared among individuals b/c they are identical by descent (close relatives mating)
adding genetic material to one spp from another via hybridization
typically used in context of genes from generalist (coyote) replacing genes of rare specialist (redwolf)

20. How do we know where pumas originated? [3.5 points]

Melanie Culvers genetic analyses indicate that two radiations originated in E Brazil. One spread all the way to N. America and very far south, the other was a more localized S. American radiation. Fossil evidence and molecular clock estimates corroborate this hypothesis.

21. What is an allele? How many alleles do we each have for a given gene? How is this different than the number of alleles for a given gene across all people in Tucson? [4 points]

"a version of a gene"
many possible b/c variation among individuals
2, one on each chromosome

22. What are one pro and one con of connecting habitat patches with some type of corridor system? [3 points]

see Bill Monroe's lecture

yay
23.5