Oefenexamen Wildlife Conservation

1. [Multiple select] Which of the following are threats to biodiversity?
   A. Invasive species
   B. Habitat disruption
   C. Overexploitation
   D. Global climate change

2. What is the simplest way to describe biodiversity?
   A. It is simply all the animals of the rainforest
   B. It is all the bacteria and animals of the tropical biomes
   C. It is the number of species found in a defined geographic unit
   D. It is the percentage of rare species in a defined geographic unit

3. Which biome is currently experiencing the greatest rate of destruction?
   A. Humid tropics
   B. Temperate
   C. Dry tropics
   D. Boreal

4. Which mathematical constructions does Fig.1 demonstrate?
   a. Ballistic motion (left) & Brownian walk (right)
   b. Lévy walk (left) & Ballistic motion (right)
   c. Brownian walk (left) & Lévy walk (right)
   d. Lévy walk (left) & Brownian walk (right)

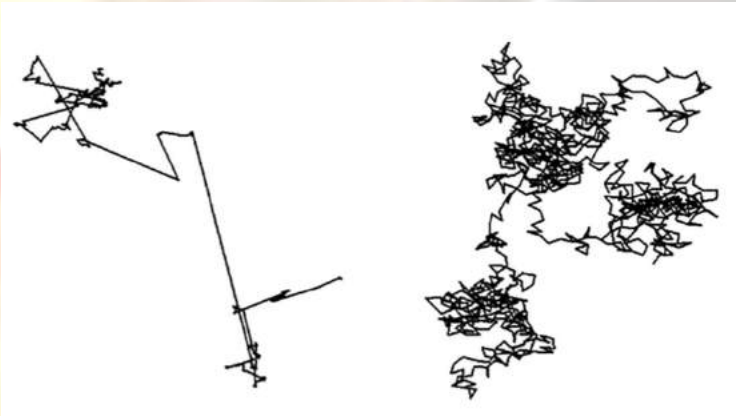


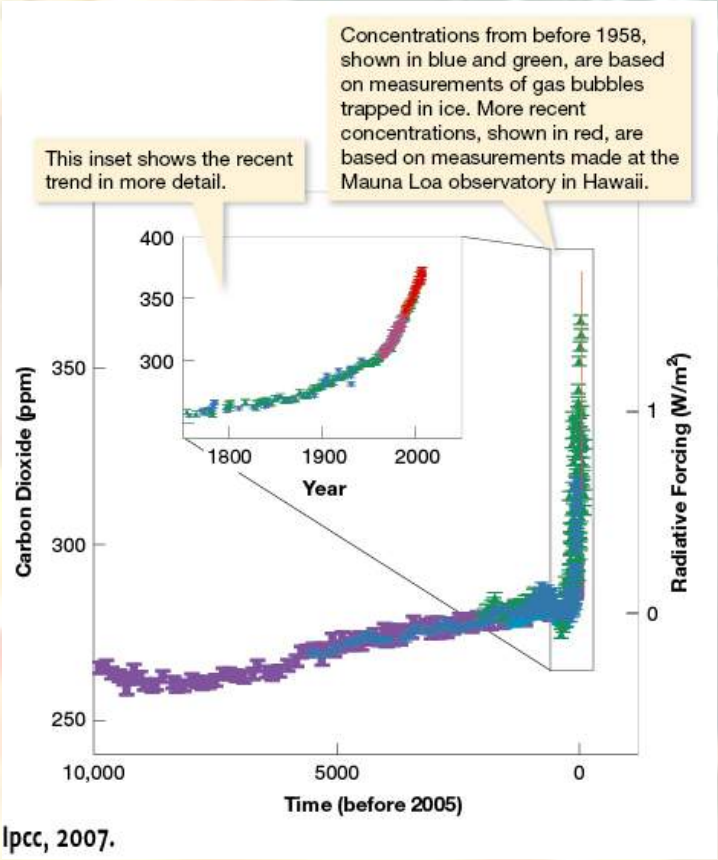
Figure 1 (Reynolds, 2018)

5. Select the most appropriate description of 'mesopredator release' from the options provided below:
   A. It is the expansion of a middle-rank predator, resulting from a decline in an apex predator.

B. It is the expansion in density of a middle-rank predator, resulting from a decline in the density of an apex predator.
C. It is the expansion in density or distribution of a middle-rank predator, resulting from a decline in the density or distribution of an apex predator.
D. It is the expansion in density or distribution, or the change in behaviour of a middle-rank predator, resulting from a decline in the density or distribution of an apex predator.

6. Different ungulate abundances have different impacts on forest ecosystems. Name three positive impacts of low to medium ungulate densities and three negative impacts of high ungulate densities on forest ecosystems.

7. Using the figure below, which of the following statements is accurate regarding the concentration of Earth's atmospheric carbon dioxide through time?



Ipcc, 2007.

A. Over the last 200 years (1800 to 2000), the Earth's carbon dioxide levels doubled
B. Over the last 10.000 years carbon dioxide levels on Earth have doubled
C. Over the last 200 years (1800 to 2000), the Earth's carbon dioxide levels have increased greater than 100 ppm.
D. All of the above

8. Why do ocean waters become acidic as carbon dioxide is assimilated?
   A. Carbon dioxide produces more hydrogen ions in salt water
   B. Carbon dioxide is converted to calcium carbonate and that raises pH
   C. Carbon dioxide does not play a role in ocean acidification
   D. Carbon dioxide dissolved in water converts to carbonic acid

9. Global climate change is already having significant effects on species and ecosystems (reviewd in Mawdsley et al., 2009). Name four of these effects.

10. Towards the poles, we find a _____ richness of parasites
   A. Higher
   B. Lower

11. Infection in wildlife species can be controlled through defensive and offensive approaches
Which of the examples below are offensive approaches?
   A. The strategic use of wildlife diversity to reduce host and vector transmission
   B. The targeted control of superspreading hosts
   C. The reduction of human-wildlife contact rates to mitigate spillover
   D. Taking advantage of antagonism between symbionts to suppress within-host growth and pathology

12. What percentage of zoonoses originated in wildlife?
   A. 65-75%
   B. 45-55%
   C. 5-10%
   D. 25-35%

13. Write down two positive and two negative effects of tourism on marine mammals.

14. Argue why you are pro or con commercial seal hunting in the Arctic. Use at least two arguments.

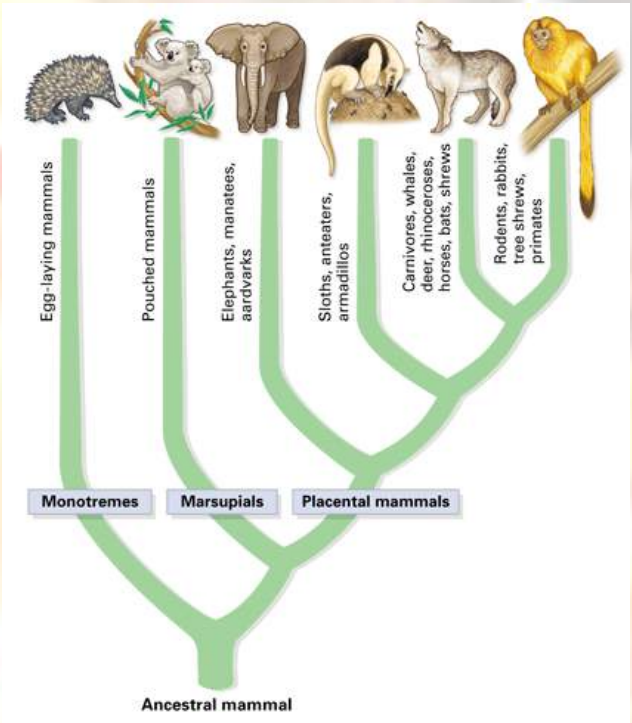
15. Like many environmental issues the solutions are complex. While aquaculture provides much needed additional food it also _____
   A. Releases excess nutrients and antibiotics into the environment
   B. Requires jobs that few are interested in taking
   C. Produces excess food that goes to waste
   D. Will put fisheries out of business

16. Why might it be important to preserve rare alleles in a population?
    A. Because these alleles may be selected for in the future if environmental conditions change
    B. Because these alleles are mutations that increase fitness
    C. Because these alleles will confer immediate advantages
    D. These alleles are not important to populations

17. The co-occurrence of different sources of stochasticity (compared to just one source) increase/decrease the extinction risk of a population.
    A. Increase
    B. Decrease

18. When populations have no allele in common, what would the F_{ST} value be?
    A. 0
    B. 0.5
    C. 1
    D. 2

19. In the Meinweg National Park (Limburg, the Netherlands) a genetic study was performed on the European adder (*Vipera berus*). It turns out that the effective size of the Meinweg population is rather small (< 30) and that sections (subpopulations) separated by roads are characterized by relatively large genetic distances (F_{ST} > 0.1). Given this information, what is, from a genetic point of view, the main risk for the adders of the Meinweg? What management actions are available to alleviate this risk (mention two)?



20. In wildlife conservation, the EDGE method is often used to facilitate prioritising species in conservation management. ED stands for 'Evolutionary Distinctiveness'. Based on this information, which species in de figure below would you prioritise in your conservation plan?

A. Echidna
B. Koala
C. Elephant
D. Anteater
E. Wolf
F. Golden lion tamarin

21. [Multiple select] Some strategies to protect wildlife diversity will probably prove more useful than others. Which of these activities will clearly benefit only one or a small range of species?

A. Targeted land protection
B. Species translocation
C. Efforts to increase landscape permeability
D. Captive propagation

22. [Open] If you were to prioritize global biodiversity efforts, would you prefer to focus on prioritizing species or on prioritizing areas? Motivate your answer.
Would you include the costs of realising your goals into your study? Motivate your answer.

23. [Open] Since we have limited funds available, money for conservation is often based on some kind of prioritisation. Some prefer to priorities certain areas, other prefer to prioritise certain species. Yet others prefer to prioritise the maintenance of functional diversity. What is functional diversity and why do some advocate to prioritise conservation based on functional diversity?

[End of the exam]

Answers

1. Answer: A, B, C, D
2. Answer: C
3. Answer: A
4. Answer: D
5. Answer: D
6. Ungulate herbivory is crucial in:

   - Shaping the age structure,
   - Shaping the species composition,
   - Shaping the spatial structure, e.g., formation of open areas, maintaining heterogeneity of habitats that support a high biodiversity, Impact on tree regeneration.
   - Lighter levels of grazing/browsing result in an increase in productivity by e.g., stimulating production of side shoots, which leads to increased species richness by reduction of dominant, vigorous species.

   Negative impacts when ungulates are overabundant:
   Heavy levels of grazing/browsing may suppress tree species growth rates, which leads to:
   - species-poor assemblages,
   - lack of regeneration,
   - absence of middle story, understory becomes stunted, this may have impacts on other species
7. Answer: C
8. Answer: D
9. Answers:

• shifts in species distributions, often along elevational gradients;
• changes in the timing of life-history events, or phenology, for particular species;
• decoupling of coevolved interactions, such as plant–pollinator relationships;
• effects on demographic rates, such as survival and fecundity;
• reductions in population size (especially for boreal or montane species);
• extinction or extirpation of range-restricted or isolated species and populations;
• direct loss of habitat due to sea-level rise, increased fire frequency, bark beetle outbreaks, altered weather patterns, glacial recession, and direct warming of habitats (such as mountain streams);
• increased spread of wildlife diseases, parasites, and zoonoses (including Lyme borreliosis and plague);
• increased populations of species that are direct competitors of focal species for conservation efforts; and

• increased spread of invasive or non-native species, including plants, animals, and pathogens.

10. Answer: B
11. Answer: B, C
12. Answer: A
13. Please check this open question yourself
14. Please check this open question yourself
15. Answer: A
16. Answer: A
17. Answer: A. Increase, because of an increase in total stochasticity. Different sources of stochasticity can reinforce each other (e.g,. drought during a period when population size is already relatively low because of demographic stochasticity).
18. Answer: C
19. Answer: The main genetic risk for this population is inbreeding depression. This risk can be alleviated by either introducing or translocating animals from other populations, and by increasing connectivity, for example by creating ecoducts.
20. Answer: A
21. Answer: B, D
22. Both are possible, reasonable arguments should be given; most arguments are pro areas. To make prioritizing more realistic, including costs and doing a proper cost-benefit analysis is almost necessary. Otherwise your efforts might be a waste of time.
23. Answer: Functional diversity reflects the diversity of morphological, physiological, and ecological traits within a community it helps to explain ecosystem functioning. People that advocate using functional diversity to prioritise in conservation assume that some species are functionally identical. In this case, functional species groups exist. The consequence of this is that the loss of a species matters less, as long as its function is retained.