

THE OPEN UNIVERSITY OF SRI LANKA

PGD /M.Sc. In Environmental Sciences Level 07 (2014)
NEP 2202 Biodiversity Conservation And Management
FINAL EXAMINATION 2014

Date: 22nd March 2014

Time.1.30 pm - 4.30 pm

Answer any **four (4)** questions.

1. Read the following paragraph and answer the questions below.

The Sinharaja forest was notified as a national heritage wilderness area on 21 October 1988 (Gazette No. 528/14). Most of the area was originally declared a forest reserve on 3 May 1875 under the Waste Lands Ordinance and notified in the Ceylon Government Gazette No. 4046 dated 8 May 1875 while the rest was notified a proposed forest reserve in the early 20th century. The Sinharaja Forest Reserve comprising the existing and proposed forest reserves was declared a biosphere reserve in April 1978 by UNESCO and inscribed on the World Heritage list in 1988.

- a. To which two IUCN category/categories does this Protected Area belong to? (give name and IUCN category/ies)
- b. Which of these two IUCN categories shows distinct zonation ? Explain briefly by naming the zones and the purpose of such zonation in terms of management objectives.
- c. Which of the four systems recognised in the 1999 Biodiversity Conservation Action Plan (BCAP) of Sri Lanka is best associated with the Sinharaja World Heritage site?

- d. State the 2 most relevant recommendations in the 1999 Biodiversity Conservation Action Plan (BCAP) of Sri Lanka for successful management of the Sinharaja Forest with the help of local people.
- e. To what (i) Wallace's biogeographic region and (ii) biome does the Sinharaja forest belong to? (note: Give the current name for the biogeographic region)
- f. Briefly describe the 2 most characteristic structural features of canopy and emergent trees in the biome to which the Sinharaja forest belongs, and give reasons for such adaptations.
- g. If you compare the biome you stated above with the desert biome, what climatic feature would be most different between the 2 biomes? Give the most appropriate example of how have plants in the two biomes have adapted to this climatic feature in each environment?
- h. Which of these two types of biomes could be expected to have the highest alpha, beta and gamma diversity? Explain your answer using the definitions of these three types of diversity.
- i. In which biome would you expect to have the greater diversity of amphibians? Explain briefly in relation to the relevant climatic features of the two biomes and 2 key features of amphibians.

2. Your nephew who is a university student has read the following paragraph on the CITES website <http://www.cites.org/eng/prog/shark/index.php>. Please answer the questions that he is asking you.

“Approximately 400 species of sharks are found in the world. Sharks were first included in Appendix II of CITES in February 2003, after the Conference of the Parties (i.e. States that have agreed to be bound by the Convention) decided at its 12th meeting in 2013 to include the basking shark (*Cetorhinus maximus*) and whale shark (*Rhincodon typus*) in Appendix II. As of June 2013, eight species of sharks and all manta rays are included in Appendix II, and none in Appendix I. Although CITES is legally binding on the Parties – in other words they have to implement the Convention – it does not take the place of national laws. Rather it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level. For many years CITES has been among the conservation agreements with the largest membership, now reaching 179.”

Source: website <http://www.cites.org/eng/prog/shark/index.php>

a. What is CITES (definition and aims) and why have States joined it?

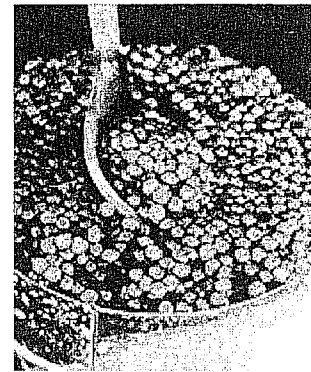
b. Assign the correct CITES appendix number to the definitions given below.

Appendix No?	Definition
	Includes species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.
	Includes species threatened with extinction. Trade in specimens of these species is restricted and permitted only in exceptional circumstances.
	Includes species not necessarily threatened with extinction, but for which trade must be controlled to avoid utilization that can jeopardize their survival.

- c. Briefly explain the status of sharks under CITES using the definitions for Appendix I and II.
- d. Select the most appropriate description in the IUCN Red List for the basking shark from the following: (i) Threatened with extinction (ii) Conservation dependant (iii) Least concern (as inferred from the paragraph above).
- e. What is the generic name of the whale shark? What is the specific epithet of the whale shark?
- f. Why is *Rhincodon typus* written in italics?
- g. What are sharks? Answer by classifying this organism from Kingdom, Superclass to Class level.
- h. Which international organisation helps implement the CITES Convention by addressing and gathering information on wildlife trade?
- i. Which international organisation keeps track of species that are in danger of extinction and what categories of threat does it use to denote conservation status of a species?

3. Read the following paragraph and answer the questions below

“Sturgeons are among the world's most valuable wildlife resources. These northern hemisphere organisms can be found in large river systems, lakes, coastal waters and inner seas in many parts of the world. For many wealthy people caviar, (i.e. unfertilized sturgeon roe), is a delicacy, sold fresh or by the jar. Fresh sturgeon caviar of some species ranges from about 20 US\$ to around US\$ 100 per ounce depending on the species. For countries that have sturgeon in their waters, it is therefore a major source of income and employment, as well as an important element of the local food supply. However, current trends in illegal harvest and trade have put all these benefits at risk. A review of trade showed that several species of sturgeons were unsustainably exploited in a number of areas, primarily through illegal harvesting. Other species were being harvested at their biological limit and were considered vulnerable to declines unless management plans and significant reduction of harvesting were put in place. There is a clear pattern of declining yields in the Caspian and Black Sea sturgeon populations that required immediate attention.”



Caviar

Source: adapted from <http://www.cites.org/eng/prog/sturgeon.php>

- a. Which level of biodiversity (i.e. genes, species, ecosystems) is the main focus of the above paragraph?
- b. What type of biodiversity value and use can be best assigned to the sturgeon? Explain your selection of a particular value (i.e. whether it is direct/indirect use values (if so, is it subsistence/productive/commercial use?), optional value, existence value, bequest value, ethical value or aesthetic value).

- c. Explain whether the sturgeon exemplifies resource use (and if so what type of resource use) or non-resource use.
- d. Which of the following ecosystem service is apparent from the above paragraph in terms of waters with the sturgeon?
(i) Provisioning, (ii) Supporting, (iii) Regulatory and (iv) Cultural.
- e. Mention the types of employment possible as suggested in the above paragraph?
- f. Select the Phylum and Class in the animal Kingdom to which the sturgeon belongs from the responses below:
 - i. Arthropoda, Malacostraca
 - ii. Chordata, Mammalia
 - iii. Echinodermata, Holothuroidea
 - iv. Chordata, Chondrichthys
 - v. Chordata, Osteichthys

4.0 It is increasingly evident that the fishing cat is threatened in Sri Lanka due to the loss of wetlands.

4.1 Analyse in point form the advantages and disadvantages of *in-situ* and *ex-situ* conservation for the fishing cat in Sri Lanka, explaining the differences and cost effectiveness of these 2 approaches.

4.2. Read the following paragraph.

'The tiny Rwandan water lily is the smallest and the rarest water lily in the world. It was almost lost to the world. Its last known remaining native habitat was a hot spring in Rwanda, which was totally destroyed when the water was redirected to supply a local laundry. Just one single plant was brought back to Kew Gardens in the UK.. After a great deal of set backs, the Kew staff managed to get 50 tiny seedlings from the mother plant. Their efforts have now saved this species from inevitable extinction.'

The above information was obtained from the film " The World of Plants" by David Attenborough. Explain the advantages and disadvantages of *in-situ* and *ex-situ* conservation for the Rwandan water lily in comparison to that of the fishing cat.

5.0. The manager of the Hurulu Biosphere Reserve in Sri Lanka has been asked to prepare a strategic communication plan. You have been asked to help him.

- (a) What two categories of communication are essential to prepare and implement your plan successfully?
- (b) What are the 10 steps that you would recommend for the communication plan?
- (c) The Manager has identified foreign and local visitors as well as communities living near the BR (some engage in poaching in the forest) as the main target groups for communication.
 - (i) What do you feel are the role and goals of communication for each of these groups?

(ii) What type of communication (instrumental or interactive) would be most effective for the foreign and local visitors? Why do you say so?

(iii) Which type of communication (instrumental or interactive) would be most effective for the local communities? Why do you say so?

(d) How would you advise the manager to formulate the main message for each target group?

(e) Select the most important and viable means/channels for each target group from the following list:

- A film to be shown on national TV
- Leaflets in the national language
- Leaflets about the reserve in English and German
- Posters and interpretive media in a visitor centre in English, Sinhala and Tamil
- Small monthly group meetings
- A colourful brochure of the Hurulu BR in Sinhala
- A beautiful PowerPoint presentation about the importance of the Hurulu BR

(f) Which means/channels do you think would be the least effective for the three target groups? Explain why you say so.

(g) Will the reserve's communication activities stop local poachers who would be economically deprived if hunting was stopped in the reserve? What other instruments could be used to stop hunting, and what role has communication to create a behavioural change in this context? Analyse the situation and present your recommendations.

(h) What kind of management approach would be necessary to stop illegal hunting and to obtain the collaboration of local people?

6.0 Your neighbour's child has been given an assignment from school after a visit to the Dehiwala Zoo which she finds very difficult. Your help has been requested.

6.1 Help her to classify these animals and identify the biogeographic regions in which these animals are found naturally.

Animal	Class	Sub class (only for mammals)	Infra-class (only for mammals)	Biogeographic region <i>Mark whether</i> <i>Australian (A)</i> <i>Afrotropical/Eithiopean</i> <i>(AF)</i> <i>Oriental/Indo-Malayan</i> <i>(IM)</i> <i>Nearctic (N)</i> <i>Palaearctic (P)</i>
Red Necked Wallaby				
Greater Kudu				
Polar bear				
Chimpanzee				
Yellow eared bulbul				
Long haired spider monkey				
Sri Lanka hanging parrot				
Echidna				
Capuchin monkey				
Indian gavial				

Animal	Class	Sub class (only for mammals)	Infra-class (only for mammals)	Biogeographic region <i>Mark whether</i> <i>Australian (A)</i> <i>Afrotropical/Ethiopian</i> <i>(AF)</i> <i>Oriental/Indo-Malayan</i> <i>(IM)</i> <i>Nearctic (N)</i> <i>Palaearctic (P)</i>
Laughing kookabura				
Hippopotamus				
African elephant				
Sloth bear				

(You need not copy the above table in your answer scripts)

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cont

6.2 Answer the questions below:

a) How many species are represented in the above table under the following vertebrate “classes”? : (i) Mammalia ... (ii) Aves (3) (iii) Reptilia
(Write the # against each class in your answer script)

(b) (i) What animals belong to the subclass Prototheria?
(ii) What animals belongs to the infraclass Metatheria, and what is the basis for this classification? (iii) In what biogeographic region is it found? (iv) What other animal/s in the table above are from the same biogeographic region?

c). (i) Which of the species in the table above is most closely related to humans ? (iii) In which of the following biome is this animal. (ci) not found naturally: Tundra Biome Rainforest biome or Savanah biome ? (ii) What other species from the above table are found in the same biogeographic region as the species you listed in c (i)?

d). (i) Which species in the table above is/are indigenous to Sri Lanka but is also found elsewhere in the world? (ii) What species in the above table are endemic to Sri Lanka ? (Explain why you say so) (iii) What other species in the table occurs in the same biogeographic region as the endemic species? (name the biogeographic region).

(f) (i) What species in the above table occurs in the Nearctic or Palearctic biogeographic region? (ii) What species can be found in the Neotropical bioregion ?

6.3. The following mammals are exhibited at the Dehiwala Zoo: Golden Palm Civet, Golden Jackal, European Brown Bear, Ocelot, Fishing Cat, Leopard, Jaguar, Royal Bengal Tiger, African Lion, Callifornia Sea Lion and Ring Tailed Coati. Help your friend’s child by placing the above mentioned animals in the correct cells of the following table. Then answer the questions below.

Please reproduce this table in your answer sheet and fill in the blanks as appropriate

	Suborder?	Suborder ?
Super family CANOIDEA	Super family FELOIDEA	
Family CANIDAE	Family VIVERRIDAE	Family OTARIIDAE
Family URSIDAE	Family FELIDAE	Family ODOBENIDAE
Family PROCYONIDAE		Family PHOCIDAE
Family MUSTELIDAE		

- To what order/s and sub-order/s do these animals belong to?
- What animal in the above table is a prominent member among the fauna in the Taiga or Coniferous biome?
- What animals of the Family Felidae can be found in the rainforests of the Neotropical biogeographic region?
- Which species from the cat family is primarily found in wetland ecosystems of Sri Lanka?
- Which animal in the above list is a major tourist attraction in the grasslands of the Serengeti National Park, Tanzania? What biodiversity value would the species you have? Explain your selection (i.e. whether it is direct/indirect use values (if so, is it subsistence/productive/commercial use?), optional value, existence value, bequest value, ethical value or aesthetic value). Explain whether it exemplifies a resource use (and if so what type of resource use) or non-resource use.