AS-2946
B.Sc. (Fifth Semester) Examination, 2013
FORESTRY
Paper : Sixth
(Fundamentals of Wildlife & Management)

Time Allowed : Three hours
Maximum Marks : 60

Model answer

Dr. Prabal Sarkar
Department of Forestry, Wildlife & Environmental Sciences
Guru Ghasidas Vishwavidyalaya
Bilaspur, Chhattisgarh

AS-2946
B.Sc. (Fifth Semester) Examination, 2013
FORESTRY
Paper : Sixth
(Fundamentals of Wildlife & Management)
Time Allowed : Three hours
Maximum Marks : 60

Note : Section-A is compulsory. Attempt any four questions from Section-B

Section : A (Objective type questions)   (1X20 = 20)

Q1. (a) Multiple choice questions

(i) A National Park has how much number of zones?

      (a) Two   (b) Three

      (c) Four   (d) Five

   Ans : (a) Two

(ii) Hangul is distributed in

      (a) Assam   (b) Arunachal Pradesh

      (c) Jammu & Kashmir   (d) Ladakh

   Ans : (c) Jammu & Kashmir

(iii) How many numbers of Elephant Reserve are there in India?

      (a) 20   (b) 31

      (c) 32   (d) 33

   Ans : (c) 32

(iv) Under which section of the Wild Life (Protection) Act, 1972 hunting of wild animal is strictly prohibited?

      (a) 9   (b) 8

      (c) 7   (d) 6

   Ans : (a) 9

(v) A mono-specific population is formed of how many species?

      (a) One   (b) Two

      (c) One or two   (d) None

   Ans : (a) One

(vi) The functional status of an organism in its community is called

(a) Habitat	(b) Trophic level
(c) Ecological niche	(d) All of the above

Ans : (c) Ecological niche

(vii) Periodicity refers to which activity of an organism for food, shelter and reproduction?

(a) Rhythmic	(b) Cyclic
(b) Daily	(d) Seasonal

Ans : (a) Rhythmic

(viii) An orderly and progressive replacement of one community by another community till the development of a stable community is called

(a) Ecosystem development	(b) Ecological succession
(c) Community development	(d) All of the above

Ans : (b) Ecological succession

(ix) Which edge has wide ecotone?

(a) Gradual	(b) Small
(c) Both	(d) None

Ans : (a) Gradual

(x) The maximum possible rate of reproduction for a population under optimum conditions is called

(a) Realized natality	(b) Potential natality
(c) Birth rate	(d) Mortality

Ans : (b) Potential natality

B. Fill in the blanks

(xi) Ex-situ conservation refers to the conservation of species away from their natural habitat.

(xii) Population growth pattern is expressed either by S-shaped or J-shaped   growth curves.

(xiii) IUCN categorized species into Endangered, Vulnerable, Rare etc.

(xiv) Survey is the estimation of the abundance of animals and plants.

(xv) There are six zoo-geographical regions in the world.

(xvi) Biodiversity refers to the variety and variability among all groups of living organism.

(xvii) CZA is a body constituted by <u>Central</u> Government.

(xviii) <u>Bell</u> shaped age pyramid indicates for stable population.

(xix) A corridor is <u>narrow passage</u> of lands.

(xx) <u>Introduction</u> is the intentional or accidental dispersal of an organism outside its historical and present distribution range.

<div align="center">

Section : B   4 x 10 = 40

Note : Attempt any four questions. Each question carries 10 marks

</div>

Q2.   Define the term Protected Area. What are the differences between Conservation Reserve and Community Reserve?   (2+8)

<u>**Ans**</u> :

<u>**Protected area**</u> :

An area declared under the Wild Life (Protection) Act, 1972 for the protection of wildlife in India. As on today, there are four types of protected areas in India namely-

(a) National Park :

A large area which received highest level of protection under Section 35 of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife is called National Park. There are about more than 100 National Park in India. In Chhattisgarh, there are 4 national parks.

(b) Wildlife Sanctuary :

A large area which received medium level of protection under Section 18A of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife is called National Park. There are about more than 500 wildlife sanctuaries in India. In Chhattisgarh, there are 11 wildlife sanctuaries.

(c) Conservation Reserve :

A small area owned by the government located very adjacent to a national park or wildlife sanctuary which received medium level of protection under Section 36A of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife is called Conservation Reserve.

(d) Community Reserve :

A small area *owned by the local people* located very adjacent to a village area which received medium level of protection under Section 36C of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife is called Community Reserve.

There are more than 100 National Parks and more than 500 Wildlife Sanctuaries in India.

Difference between Conservation Reserve and Community Reserve

Conservation Reserve	Community Reserve
1. A small area declared under Section 36A of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife	A small area declared under Section 36C of the Wild Life (Protection) Act, 1972 for the conservation of Wildlife
2. The land belongs to the government	Land belongs to the villagers
3. Located very adjacent to a national park or wildlife sanctuary	Located very adjacent to a village area
4. Both notification and de-notification may be allowed under the Wild Life (Protection) Act, 1972	Both notification and de-notification is allowed under the Wild Life (Protection) Act, 1972
5. No trespassing is allowed inside a National Park	Trespassing may be allowed with permission from the Forest Department
6. Cattle grazing is strictly prohibited	Cattle grazing may be allowed with permission from the Forest Department
7. Developmental activity or project/ scheme may be implemented	Developmental activity or project/ scheme may be implemented
8. Conservation Management Committee constitutes to advice the CWLW.	Community Management Committee constitutes to advice the CWLW

Q3. **What are the differences between wildlife census and survey? What are the objectives of census? Give various methods of wildlife census.** **(2+2+6)**

Definition

Census is the estimation of the abundance of animals and plant population. This may be in terms of actual number or descriptive relative terms such as absent, rare, occasional, common and abundant.

In wildlife science, census does not depend on actual sighting of the species or population, but also on evidence collected with respect to their presence.

Census gives data on population size and it also gives the number per unit area.

Objective of the census

- to know the population size
- to know the age-sex composition
- to determine the change in the population over a period of time
- to compare population of a particular species between two areas.

Methods of Census

A) DIRECT SIGHTING

1. Presence or absence of abundance:-

This census is aimed at finding of simple presence or absence of animals and plants in pre-determined quadrat or block. Sometimes, presence of data can be quantified based on Caughley (1979) using blocks.

2. Road side count :-

This is a simple technique for monitoring the populations of deer, antelopes, goat and sheep. It is designed for preliminary population survey by using vehicle on road / and foot. Distance chosen for census should be covered within 2 hours. The maximum distance should be not more than 30 km. and the vehicle should not be run more than 20 km per hour.

3. Waterhole Census : -

This method is based on the assumption that in dry season, all the animals come to drink water at the waterhole. This method is best suitable for large animal census in dry season and in open area. However observation must cover all the individuals of the same species. Animal should not feel disturbance during census. It is one of the best methods to record total count of the animals.

4. Aerial census :-

In this method, individuals are counted from hill top or helicopter/ aircraft. Sometimes, photographs are also taken to count the individuals. This method is widely used in Africa.

This method is useful to record the population of large animal and in open area. However, this method is very expensive and poor country like India cannot effort this method. This method is not useful in those areas where there is very dense forest. This method is also not useful to count small animals.

(B) INDIRECT SIGHTING

1. Dung survey method :-

Dung or dropping is a reliable indicator of an animal presence and has frequently been used for estimating abundance. This method is used to estimate abundance of species which are nocturnal,, very shy and dangerous to approach very close to them. In certain situation, dung/ dropping counts can be lead to actual population establishment. Eg. Elephant, tiger. However this method has some draw back. This is because, it is very difficult to identify the species by showing dung or dropping several time. The data can be analyzed to estimate abundance; not the density.

2. Call counts :-

Call of birds and sounds emitted by other animals are used for estimation of their population. This method is useful for the estimation of the bird species.

In flat terrain, census can be conducted. But in hilly area, vintage point on ridge can be used to record call.

However it is not possible to directly count females or young ones by this method. Male which has no territory do not call. So this method has some draw back. In this method, total population can be measured at extrapolation.

3. Pugmark method :-

Till the development of camera trapping technique, the pug mark method was seemed to be the best method to count tiger and other predator.

In this method, all the pugmarks are traced in a given period of time and compare with each other to estimate population.

However, there is always mistake on identification of species. Most often there is mistake of age-sex classification. On the other hand the size of the pugmark also varies with the types of substratum as well as the mode of locomotion.

Q4. Write the differences between re-stocking and re-introduction of species. Discuss about the various process of re-stocking of species in the world.   (4+6)

Difference between re-stocking and re-introduction

Re-stocking is the movement of plants and animals of a species with the intension of building up the number of individuals of that species in an original habitat. It is an useful tool where –(i) a small population inbreed themselves, (ii) a populations whose size drop below critical level or whose recovery rate is very slow and (iii) a population where there is a need of out breeding.

On the other hand, re-introduction is the intentional movement of an organism into a part of its native range from which it has disappeared or become extirpated in historic time as a result of human activities or natural catastrophe. It is a useful tool for restoring a species to an original habitat where it has become extinct due to human persecution, over-collection, over-harvesting or habitat destruction.

Process of re-stocking

1. Feasibility study

An assessment should be made on the following aspects before re-stocking-

-   Present distribution range and any record of loss of population within the present distribution range.
-   Taxonomic status of the species or sub-species or race – if possible genetic study should be done.
-   Status and biology of the wild population.

2. Previous reference on re-stocking

-   Information available on re-stocking/ re-introduction of the same species or similar species should be gathered and evaluated.

3. Choice of release site

-   The site should be within the present distribution range
-   The site must have long-term protection.

4. Evaluation of re-stocking site

-   Re-stocking should be taken at the site where the habitat and landscape requirements of the species are satisfied.
-   A habitat restoration programme should be initiated before the re-stocking programme.

5. Availability of suitable release stock

-   It is desirable that resource animals come from wild stock
-   If captive or artificially propagated stock is to be used, it must be from a population which has been soundly managed for birth demography.

Q5. What is the full form of NTCA? Discuss about the Project Tiger and Project Elephant.

(2+8)

NTCA

The National Tigre Conservation Authority (NTCA) is a body constituted by the Central Government of India under the Wild Life (Protection) Act, 1972 for the maintenance of a viable population of tiger in India through declaration and management of Tiger Reserve.

The body constituted of following members :-Central Environment Minister, Environment Minister of State, 2 MPs, 8 Tiger experts, 6 CWLW of Tiger Reserve states, 3 officials from MoEF, and 6 other members (tribal affairs, social justice, ST commission, SC commission, Panchayat Raj and Ministry of Law).

Tiger Reserve

There were about 40,000 tigers during 1905-10. This number drastically came down due to large scale hunting during British Period as well as after Independence in India. The first ever all India Tiger Census was conducted in 1972 which revealed the existence of only 1872 tigers in India.

In 1969, a serious concern was voiced about the low population of tiger at the IUCN meeting held at Delhi. Subsequently, a nationwide ban on tiger killing was imposed in 1970. In 1972, the Wild Life (Protection) Act, 1972 was come into force and the Tiger Project was initiated in 1973.

Concept of Tiger Project

Zone : This includes creation of Tiger Reserve. The reserve constitutes of a centrally located Core Zone which is surrounded by a buffer zone. Normally, the core zone consisting of a National Park or Wildlife Sanctuary area where no human activity is allowed. On the other hand, human settlement or human activity may be allowed in the buffer zone.

Objective of the reserve

- Elimination of all forms of human exploitation and biotic disturbance from the core area and rationalization of activities in the buffer zone.
- Restricting the habitat management only to repair the damages done to the ecosystem by human and other interferences.
- Monitoring the faunal and floral changes over time and carrying out research about wildlife.

Number of Tiger Reserve in India

Initially, nine tiger reserve were declared during 1973-74. However as on today, there are 39 numbers of tiger reserve. Another 3 numbers are proposed for tiger reserve.

Project Elephant

Project Elephant was launched in 1992 to assist state having free ranging population of wild Asian Elephants to ensure long-term survival of identified viable populations of elephant in their natural habitats. There are more than 25,000 elephant in India.

There are 32 number of elephant reserves in India which constitutes 4.58% of the total geographical area of India and 22.12% of the total forested area of India.

Objectives of the Elephant project

There have been drawn lines to restore the lost and degraded habitat of elephant including creation of corridor for their migration, mitigation of human-elephant conflict and establishment of database on the population dynamics of elephants. It also aims at improving quality of life or people living around elephant habitats through sustainable development. There the elephant reserve has following objectives:-

- To restore the lost and degraded habitat of elephants.
- To create / manage corridors for elephant movement.
- To mitigate human-elephant conflict.
- To establish the database on the population dynamics of elephants.
- To improve the quality of life of people living around elephant habitats

Number of elephant reserves

There are 32 numbers of elephant reserve in India covering states like – Arunachal Pradesh, Assam, Meghalaya, Nagaland, West Bengal, Odisha, Jharkhand, Uttar Pradesh, Karnataka, Kerala ,Tamil Nadu and Andhra Pradesh.

Function of Elephant Project

The states are being provided financial assistance for ensuring long-term survival of elephant in their habitat.

Q6. Define the term "Biosphere Reserve". Mention about the various zones of the Biosphere Reserve. How many Biosphere Reserves are there in India?   (2+4+4)

<u>Definition</u>

A biosphere reserve is a kind of conservation reserve created to protect the ***biological and cultural diversity*** of a region while promoting sustainable economic development.

A biosphere reserve is a unique kind of protected area that differs from a PA (NP, WLS). There are three very different, but equal, aims:

- *conservation* of genetic resources, species, and ecosystems;
- scientific *research and monitoring*; and
- promoting *sustainable development* in communities of the surrounding region.

National parks and other kinds of protected natural areas usually are primarily concerned with conservation, and only secondarily with *research* and *sustainable development*.

Biosphere reserves serve in some ways as 'living laboratories' for testing out and demonstrating integrated management of land, water and biodiversity.

<u>Zones</u>

A biosphere reserve must contain three elements:

- **Core Areas:** These areas are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education).
- **Buffer Zones:** usually surround or adjoin the Core Areas. Buffer Zones may be used for sound ecological practices including environmental education, *recreation, ecotourism* and applied and *basic research*.

- **Transition, or Cooperation, Zones:** These areas may contain towns, farms, fisheries, and other human activities and are the areas where local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests, and other stakeholders work together to manage and sustainably develop the area's resources.

Number of Biosphere Reserve

The first biosphere reserve of the world was established in 1979, since then the network of biosphere reserves has increased to 564 in 109 countries across the world (MAB, 2010). Presently, there are 18 existing biosphere reserves in India.

S. No.	Name	Date of Notification	Area (*in km^2*)	Location (State)
1	Achanakamar - Amarkantak	2005	3835.51 (Core 551.55 & Buffer 3283.86)	Covers parts of Anupur and Dindori districts of M.P. and parts of Bilaspur districts of Chhattishgarh State.
2	Agasthyamalai	2001	1828	Neyyar, Peppara and Shendurney Wildlife Sanctuaries and their adjoining areas in Kerala.
3	Cold Desert	2009	7770	Pin Valley National Park and surroundings; Chandratal and Sarchu & Kibber Wildlife Sanctuary in Himachal Pradesh
4	Dehang-Dibang	1998	5111.50 (Core 4094.80 & Buffer 1016.70)	Part of Siang and Dibang Valley in Arunachal Pradesh.
5	Dibru-Saikhowa	1997	765 (Core 340 & Buffer 425)	Part of Dibrugarh and Tinsukia Districts (Assam)
6	Great Nicobar	1989	885 (Core 705 & Buffer 180)	Southern most islands of Andaman And Nicobar (A&N Islands).
7	Gulf of Mannar	1989	10,500 km^2 Total Gulf area (area of Islands5.55 km^2)	Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu).
8	Kachchh	2008	12,454 km^2	Part of Kachchh, Rajkot, Surendra Nagar and Patan

				Civil Districts of Gujarat State
9	Khangchendzonga	2000	2619.92 (Core 1819.34 & Buffer 835.92)	Parts of Khangchendzonga hills and Sikkim.
10	Manas	1989	2837 (Core 391 & Buffer 2,446)	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamprup and Darang districts (Assam)
11	Nanda Devi	1988	5860.69 (Core 712.12, Buffer 5,148.570) & T. 546.34)	Part of Chamoli, Pithoragarh, and Bageshwar districts (Uttarakhand).
12	Nilgiri	1986	5520 (Core 1240 & Buffer 4280)	Part of Wayanad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka).
13	Nokrek	1988	820 (Core 47.48 & Buffer 227.92, Transition Zone 544.60)	Part of Garo hills (Meghalaya).
14	Pachmarhi	1999	4926	Parts of Betul, Hoshangabad and Chindwara districts of Madhya Pradesh.
15	Seshachalam Hills	2010	4755.997	Seshachalam Hill Ranges covering parts of Chittoor and Kadapa districts of Andhra Pradesh
16	Simlipal	1994	4374 (Core 845, Buffer 2129 & Transition 1400	Part of Mayurbhanj district (Odisha).
17	Sunderbans	1989	9630 (Core 1700 & Buffer 7900)	Part of delta of Ganges and Brahamaputra river system (West Bengal).
18	Panna	2011	2998.98	Part of Panna and Chattarpur district (Madhya Pradesh).

Q7. Define the term "zoo". What are the primary objectives of the zoo? Mention the National Zoo Policy. **(2+2+6)**

Zoo

Zoo means an establishment, whether stationery or mobile, where captive animals are kept for exhibition to the public. It is established under Section 38H of the Wild Life (Protection) Act, 1972.

On the basis of area, number of animal, types of species, zoos are classified into four categories namely, Large Zoo, Medium Zoo, Small Zoo and Mini Zoo.

Objectives of the Zoo

The zoo shall be to complement and strengthen the national efforts in conservation of the rich biodiversity of the country, particularly the wild fauna.

National Zoo Policy, 1988

(a) Policy

- Zoo shall prepare a long-term master plan
- Every zoo shall maintain a healthy, hygienic and natural environment in the zoo.
- Zoo shall give priority to endangered species in their collection and breeding plan.
- Zoo shall keep animal of both the sexes.
- Zoo shall avoid keeping surplus animals.

(b) Health care

- Zoo must have health care unit.
- Zoo must follow quarantine Rules and Regulations.

(c) Breeding Progress for Species

- All zoos must take initiative for captive breeding program.
- After successful breeding, zoo must take initiative of re-introduction/ re-stocking programme.
- Zoos shall give priority in their breeding program to endangered species.
- Zoos shall take utmost precaution to prevent inbreeding.
- Special efforts shall be made for avoid human imprinting.

(d) Education

- Each zoo should have a well-drawn up plan for educating the visitors.
- Attractive and effective signage should be displayed.

(e) Research

- The Zoo shall encourage research on the biology, behavior, nutrition, and veterinary aspects.

Q8. What is biodiversity? What are the different levels of biodiversity? Give the causes of depletion of biodiversity.   (2+4+4)

Ans :

Biodiversity is the degree of variation of life forms within a given species, ecosystem, biome, or an entire planet. Biodiversity is a measure of the health of ecosystems. Biodiversity is in part a function of climate.

Rapid environmental changes typically cause mass extinctions. One estimate is that less than 1% of the species that have existed on Earth are extinct.

Biodiversity supports many ecosystem services that are often not readily visible. It plays a part in regulating the chemistry of our atmosphere and water supply. Biodiversity is directly involved in water purification, recycling nutrients and providing fertile soils..

The traditional three levels at which biological variety has been identified:

(a) Species diversity :

It is the variety in the number and richness of the species of a region. The number of species per unit area is called species richness. The number of individuals of different species represents species evenness or species equitability. Species diversity is product of both the species richness and evenness or equitability.

(b) Genetic diversity :

It is the diversity in the number and types of genes as well as chromosomes resent in different species and the variations in the genes and their alleles in the same species.

Variation in the genes of a species increase with increase in size and environmental parameters of the habitat.

(c) Ecosystem diversity :

It is the type of diversity that consists of variety of forms in the ecosystem due to diversity of niches, trophic levels and ecological processes like nutrient recycling, food webs, energy flow, role of dominant species and various related biotic interactions.

Cause of depletion of biodiversity

(a) Habitat destruction :

Factors contributing to habitat loss are: overpopulation, deforestation, pollution (air pollution, water pollution, soil contamination) and global warming or climate change.

(b) Deforestation

Deforestation on a human scale results in decline in biodiversity, and on a natural global scale is known to cause the extinction of many species. The removal or destruction of areas of forest cover has resulted in a degraded environment with reduced biodiversity. Forests support biodiversity, providing habitat for wildlife; moreover, forests foster medicinal conservation. With forest biotopes being irreplaceable source of new drugs (such as taxol), deforestation can destroy genetic variations (such as crop resistance) irretrievably.

(c) Human overpopulation :

It is self-evident that the massive growth in the human population through the 20th century has had more impact on biodiversity than any other single factor.

(d) Developmental activities

Deforestation and forest degradation, through agricultural expansion, conversion to pastureland, infrastructure development, destructive logging, fires etc., account for nearly 20% of global greenhouse gas emissions, more than the entire global transportation sector and second only to the energy sector. It is now clear that in order to constrain the impacts of climate change within limits that society will reasonably be able to tolerate, the global average temperatures must be stabilized within two degrees Celsius. This will be practically

impossible to achieve without reducing emissions from the forest sector, in addition to other mitigation actions.

(e) Introduced and invasive species :

Human activities have frequently been the cause of invasive species circumventing their barriers, by introducing them for food and other purposes. Human activities therefore allow species to migrate to new areas (and thus become invasive) occurred on time scales much shorter than historically have been required for a species to extend its range.

(f) Genetic pollution:

Endemic species can be threatened with extinction through the process of genetic pollution, i.e. uncontrolled hybridization, introgression and genetic swamping.

(g) Overexploitation:

Overexploitation occurs when a resource is consumed at an unsustainable rate. This occurs on land in the form of overhunting, excessive logging, poor soil conservation in agriculture and the illegal wildlife trade.

(h) Climate change :

Global warming is also considered to be a major threat to global biodiversity. For example coral reefs which are part of the biodiversity hot spot. It will be lost in 20 to 40 years if global warming continues at the current trend.