Topic IV Land and Water Use – Study Notes/Test Practice

1. Forestry C. Rangelands and D. Other Land Use

Tree plantations – large areas typically planted with a single rapidly growing tree species

Forest – areas dominated by trees and other woody vegetation; approximately 73% of forests used for commercial timber production in the United States are privately owned.

Clear-cutting – removing all, or almost all, the trees within an area; easiest harvesting method, and in most cases, the most economical; when a stand has been clear-cut foresters replant or reseed the area

Selective cutting – removes single trees or relatively small numbers of trees from many in a forest; this creates many small openings in a stand where trees can reseed or young trees can be planted

Forest fires – a natural process that is important for nutrient cycling and regeneration; a prescribed burn is a fire that is deliberately set under controlled conditions, this helps reduce the risk of uncontrolled natural fires

Forest management – includes timber harvesting practices (clear-cutting and selective cutting), logging, deforestation, and reforestation (tree plantations), and fire management

National forests – many originally established to ensure a steady and reliable source of timber

Rangelands –dry, open grasslands; used primarily for cattle grazing; susceptible to fires and other environmental disturbances

Overgrazing – Taylor Grazing Act of 1934 was passed to halt overgrazing; it converted federal rangelands from a commons to a permit-based grazing system

Desertification – the transformation of arable, productive land to desert or unproductive land due to climate change or destructive land use

Rangeland management – Bureau of Land Management (BLM) focuses on mitigating damages caused by grazing and are not consistently successful in preserving vulnerable rangeland ecosystems

Suburban – areas that surround metropolitan centers and have low population densities compared to urban areas

Exurban – areas similar to suburban areas, but are unconnected to any central city or densely populated area

Urban sprawl – the creation of urbanized areas that spread into rural areas and remove clear boundaries between the two; has had dramatic environmental impacts – suburban residents drive twice as much as city dwellers, suburban communities use more than twice as much land as urban, often replacing farmland

Causes and effects of sprawl – (1) automobiles and highway construction (2) living costs (3) urban blight, and (4) government policies

Urban blight – the degradation of the built and social environments of the city that often accompanies and accelerates migration to the suburbs

Highway Trust Fund – begun by the Highway Revenue Act of 1956 and funded by a federal gasoline tax, pays for the construction and maintenance of roads and highways (highways allow people to live farther away from where they work, more highways mean more driving, means more gasoline purchases, leads to more gasoline tax receipts, and so on…..positive feedback loop); this cycle exemplifies a phenomenon known as induced demand

Induced demand – when an increase in the supply of a good causes demand to grow

Zoning – a planning tool developed in the 1920s to separate industry and business from residential neighborhoods and create quieter, safer communities

Multi-use zoning – allows retail and high-density residential development to coexist in the same area

Smart growth – focuses on strategies that encourage the development of sustainable, healthy communities; The EPA lists 10 basic principles of smart growth: (1) mixed land uses (2) create a range of housing opportunities and choices (3) create walkable neighborhoods (4) encourage community and stakeholder collaboration in development decisions [stakeholder- people with an interest in a particular place or issue] (5) take advantage of compact building design (6) foster distinctive, attractive communities with a strong sense of place [sense of place – the feeling that an area has a distinct and meaningful character] (7) preserve open space, farmland, natural beauty, and critical environmental areas (8) provide a variety of transportation choices [transit-oriented development {TOD} – attempt to focus dense residential and retail development around stops for public transportation, giving people convenient alternatives to driving] (9) strengthen and direct development toward existing communities (10) make development decisions predictable, fair, and cost-effective

Tragedy of the commons – the tendency of a shared, limited resource to become depleted because people act from self-interest for short-term gain

Externality – a cost or benefit of a good or service that is not included in the purchase price of that good or service *(For example: if a bakery moves into the building next to you and you wake up every morning to the delicious smell of freshly baked bread, you are benefitting from a positive externality; on the other hand, if the bakers arrive at three in the morning and make so much noise that they interrupt your sleep, and you are not as productive at your job the next day, you are suffering from a negative externality)*

Maximum sustainable yield (MSY) – MSY of a renewable resource is the maximum amount that can be harvested without compromising the future availability of that resource (the maximum harvest that will be adequately replaced by population growth); every population has a point at which a maximum number of individuals can be harvested sustainably, that point is often reached when the population size is about one-half the carrying capacity

Public and federal lands – in the United States, publicly held land may be owned by federal, state, or local governments; of the nation’s land area, 42% is publicly held (larger % than in any other nation); the federal government is the largest single landowner in the US, roughly 25% of the country, most of this land (55%) is in the 11 western continental states

National wilderness areas – areas set aside with the intent of preserving large tracts of intact ecosystems or landscapes; areas created from other public lands, usually national forests or rangelands; allow only limited human use and are designated as roadless

National parks – many areas established to preserve scenic view and unusual landforms; about 3,400 national parks in the world, covering more than 400 million hectares (1 billion acres)

National wildlife refuge – the only federal public lands managed for the primary purpose of protecting wildlife; managed by the Fish and Wildlife Service

Land use and Federal Agencies – more than 95% of all federal lands are managed by four federal agencies: BLM, USFS, NPS, and FWS

1. Bureau of Land Management (BLM) – grazing, mining, timber harvesting, and recreation
2. United States Forest Service (USFS) – timber harvesting, grazing, and recreation
3. National Park Service (NPS) – recreation and conservation
4. Fish and Wildlife Service (FWS) – wildlife conservation, hunting, and recreation

Federal regulation of land use – government regulation can influence the use of private and public lands:

(1) 1969 National Environmental Policy Act (NEPA) – mandates an environmental assessment of all projects involving federal money or federal permits; along with other major laws of the 1960s and 970s (such as Clean Air Act, Clean Water At, and the Endangered Species Act) NEPA creates an environmental regulatory process designed to ensure protection of the nation’s resources

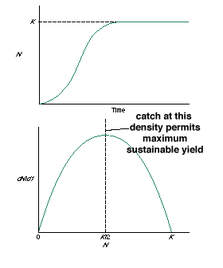
(2) Environmental impact statement (EIS) - outlines the scope and purpose of a project, describes the environmental context, suggests alternative approaches, and analyzes the environmental impact of each alternative, NEPA requires an EIS before any project can begin; EIS may uncover the presence of endangered species in the area under consideration

(3) Endangered Species Act (a 1973 law designed to protect species from extinction) may come into play if the EIS uncovers the presence of endangered species

Eminent domain – allows a government to acquire property at fair market value even if the owner does not wish to sell it

Test Practice: Preparing for the Exam…..Multiple Choice Questions

1. Which of the following is *not* an example of the tragedy of the commons?
   1. Overgrazing by sheep on community-owned pastures
   2. Depletion of fish stocks in international waters
   3. Automobile congestion in Yellowstone National Park
   4. Depletion of soil minerals by farmers on private land
   5. Tropical deforestation due to clearing land for agriculture and them moving on to another location
2. In the accompanying graph of the population growth of the common pheasant, one of the world’s most hunted birds, X represents



Time

* 1. Carrying capacity
  2. Maximum sustainable yield
  3. Resource depletion
  4. Endangered species designation
  5. Population overshoot

1. Under the provisions of the National Environmental Policy Act (NEPA), which of the following would require the preparation of an environmental impact statement (EIS)?
   1. The construction of a house on privately owned land
   2. The paving of a parking lot for a local business
   3. The expansion of an interstate highway
   4. The planting of trees in front of City Hall
   5. The revision of local zoning ordinances
2. Federally owned land in the United States can *best* be described as
   1. 25 percent of all land, with the majority of it in the west
   2. 42 percent of all land, with the majority of it in the east
   3. 28 percent of all land, with most of it in Texas
   4. 20 percent of all land, with 10 percent of it in the west
   5. 35 percent of all land, with the majority of it in the east
3. The four major public land management agencies in the United States operate under the principle of multiple use. Which of the following uses is common to all four agencies’ lands?
   1. Hunting
   2. Mining
   3. Grazing
   4. Timber harvesting
   5. Recreation
4. For many years, forest fires were suppressed to protect lives and property. This policy has led to
   1. A buildup of dead biomass that can fuel larger fires.
   2. Many forest species being able to live without having their habitats destroyed.
   3. Increased solar radiation in most ecosystems.
   4. Soil erosion on steep slopes.
   5. Economic instability.
5. When we purchase an item, we are charged for the labor and supply costs of producing that item. However, we are not charged for the costs of any environmental damage that occurred in manufacturing that item. Those costs are known as
   1. Externalities
   2. The tragedy of the commons
   3. The maximum sustainable yield
   4. Marginal costs
   5. Economic cost-benefit analysis
6. Which of the following is *not* an environmental consequence of clear-cutting?
   1. Increased soil erosion and sedimentation in nearby streams.
   2. Decreased biodiversity due to habitat fragmentation.
   3. Increased fish populations due to the influx of nutrients into streams.
   4. Decreased tree species diversity due to the loss of shade-tolerant species.
   5. Stands of same-aged trees.
7. Which of the following are environmental impacts of urban sprawl?
8. Greater reliance on the automobile and increased fossil fuel consumption
9. Increased consumption of land for housing and highway construction
10. Loss of valuable farmlands
    1. I only
    2. II only
    3. I and II only
    4. II and III only
    5. I, II, and III
11. Which of the following was a significant cause of urban sprawl over the past 50 years?
    1. Migration of people from rural areas to large central cities.
    2. Increased availability of public transportation.
    3. Lower property taxes in urban areas.
    4. Use of the federal gasoline tax to construct and maintain highways.
    5. Improved infrastructure and reduced crime rates in urban areas.
12. Which of the following is not an environmental benefit of smart growth?
    1. Reduced flooding
    2. Increased impervious surfaces
    3. Reduced fossil fuel consumption
    4. Increased open space
    5. Decreased water pollution

Test Practice: Preparing for the Exam - Free Response Questions

1. The property pictured below is the Farm Barn at Shelburne Farms, a National Historic Landmark, nonprofit environmental education center, and a 1,400 acre working farm on the shores of Lake Champlain. However, for the sake of this exercise, let’s assume that the property pictured below belongs to the federal government.

* 1. Identify and explain which of the four public land management agencies would be involved in managing this public land. (2 points)
  2. Applying any three of the basic principles of smart growth, explain how the private land surrounding this federally owned property might be developed to minimize environmental impacts. (4 points)
  3. Define *environmental impact statement* and describe one condition under which an EIS might be required for the use of either the privately owned or federally owned lands associated with this tract. (4 points)

1. The town of Freemont met recently to discuss the pros and cons of protecting prairie dogs. Prairie dogs are burrowing rodents the size of rabbits that live in colonies underground in grasslands and prairies. Their numbers have been greatly reduced over the last few decades. Dr. Masser, a local biologist, pointed out that prairie dogs are an important part of the prairie food web, as they are prey for many birds and mammals. Without federal protection from both the Bureau of Land Management and the U.S. Fish and Wildlife Service, they could become extinct in a few years. Dr. Masser also explained that 2 of the 5 species of prairie dogs are already listed as either threatened or endangered. Local ranchers disagreed. Mr. Smith stated that he will continue to poison or shoot the prairie dogs on his land because they destroy the grasses that are needed by his livestock, and he encourages the BLM to do the same on public lands.
   1. Explain the tragedy of the commons in general terms. Then, using the information you must read about the prairie dog and any other relevant information, incorporate the town of Freemont’s discussion into your explanation. (4 points)
   2. Identify and discuss *one* argument in favor of preserving western grasslands as habitat for prairie dogs and *one* argument in favor of maintaining those grassland for the grazing of livestock. (3 points)
   3. Identify *one* action that the Bureau of Land Management and *one* action that the U.S. Fish and Wildlife Service could take to resolve this land use conflict. (3 points)

Do the Math…….. The Cost of Commuting (ALWAYS show your work)

*Imagine that you are one of 1,000 people who used to live in a downtown area and walked or took public transportation to work. Now you and the others have moved to the suburbs and drive 20 km per day each way.*

1. How many additional kilometers are being driven each day by those 1,000 people?
2. How many additional kilometers are being driven each week by those 1,000 people? (Assume that each person works 5 days a week.)
3. How many additional kilometers are being driven each year by those 1,000 people?
4. If the average car gets 10 km per liter, how many liters of gasoline will be used by those 1,000 people each year?
5. Assuming that you are not going to move back to an urban area or change your job, what measures could you take to lessen your impact on the environment?