23n25 February 2005
18th n 19th class meeting
(Miller Chapters 5,10)

Environmental Biology
ECOL 206
University of Arizona
spring 2005

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Environmental Biology 206
-SE 5,10
-SDCP reading for Monday
-07 March Group Project
-11 March Exam2
-11 March Lab Binder due
-11 March current events

-Exam key posted (Tuesday 22 Feb)
  (please, one week from posting to address grading issues)

-Lab (Tumamoc Hill)
  * meet S side BSE (4th and Highland)
  * materials to read, some to print
  * no flip flops, be prepared for weather
  * water and snack?

-Rate peers for project topic submission

206 Course Web Link:
Public Workshop Set for March 5 in Willcox
Work Starting on Aravaipa Ecosystem Management Plan

Those interested in the future management of the Aravaipa Canyon ecosystem in southeastern Arizona are invited to participate in a workshop on Saturday, March 5. The daylong session, hosted by the Bureau of Land Management (BLM) Safford Field Office, Arizona Game and Fish Department, and The Nature Conservancy, will begin at 9:00 a.m. at the Willcox Community Center, located at 312 W. Stewart in Willcox, Arizona. The public is encouraged to attend and share their ideas. Advance registration is suggested.

The workshop will provide another opportunity for the public to participate in the development of the Aravaipa Ecosystem Management Plan, said Marlo Draper, who leads the BLMs participation on the planning team. A series of open houses were held in October to solicit the first phase of input prior to the start of the Plan. Management issues such as access, recreation use, protection of riparian resources and water quality, continued use of prescribed fire, and enhancement of wildlife habitat were all identified, and will now be explored in greater detail at the March 5 workshop, Draper added.

The objectives of the workshop are to provide information on current management in the planning area and to create workgroups that are committed to developing the Ecosystem Plan. These workgroups will continue to meet and share input throughout the planning process. Those wishing to participate in the workshop should contact Draper at 928-348-4426 in advance to select one of the seven workgroups:
- Recreation (hiking, hunting, birding, camping, etc.)
- Transportation/Motorized Access
- Riparian/Water Quality
- Upland Habitats (soils, vegetation, grazing)
- Cultural Resources and Socio-Economics
- Special Management Areas (wilderness, Areas of Critical Environmental Concern)
- Wildlife and Special Status Species

Onsite registration for the workshop will start at 9:00 a.m., followed by introductions and a short Aravaipa slide show beginning at 9:30. After an overview of the planning process, participants will join one of seven break-out sessions. Following lunch, workshop leaders from the BLM, AGFD, and TNC will continue to discuss the results of the October open houses, related issues, and the assigned tasks for their groups. The workshop should end by 3:30 p.m.

The Aravaipa Ecosystem Management Plan (EMP) will provide guidance for 69,609 acres of public land around Aravaipa Canyon managed by the BLM and 7,802 acres of private land owned by The Nature Conservancy (TNC) known as the Aravaipa Canyon Preserve. The EMP will replace the 1988 Aravaipa Canyon Wilderness Management Plan, which does not cover lands included in the wilderness expansion of the Arizona Desert Wilderness Act of 1990.

The Plan will incorporate new management plans for three Areas of Critical Environmental Concern (ACECs): Table Mountain Research Natural Area ACEC, Desert Grasslands Research Natural Area ACEC, and Turkey Creek Riparian ACEC. It will also include National Wild and Scenic Rivers System suitability recommendations made in 1994 for Aravaipa and Turkey creeks. The EMP will also incorporate the BLMs Standards and Guidelines for eight BLM-managed grazing allotments: South Rim, Painted Cave, Dry Camp, Hell Hole, Horse Mountain, Brandenberg, South Aravaipa, and Aravaipa.

For more information about the upcoming workshop or the planning process, please contact planning and environmental coordinator Marlo Draper (928) 348-4426 or Marlo_Draper@blm.gov or public affairs specialist Diane Drobka (928) 348-4403 or Diane_Drobka@blm.gov at the BLM Safford Field Office.
Buffelgrass Removal at Tumamoc Hill, 05 March 2005

Saturday, March 05, 2005 - 10 am - 4 pm

Researchers from the University of Arizona and community volunteers will unite on Saturday, March 5 to fight a foreign invader. The goal is to save Tumamoc Hill from buffelgrass.

Buffelgrass - brought here from Africa for cattle forage - has the potential to be the most destructive plant pest known in the Sonoran Desert, says Desert Lab researcher Travis Bean. Tumamoc Hill is overrun with buffelgrass, which not only out-competes native plants for water and soil nutrients, but increases the risk of brush fires to dangerous levels through increased fuel loads. Infestations create a grass-fire cycle that transforms picturesque saguaro landscapes into buffelgrass monocultures.

Tumamoc Hill on Tucson's west side is home to the historic Desert Laboratory and an 860-acre nature preserve. For more than 100 years the Desert Lab has been dedicated to studying plants, animals and the environment of North American deserts.

The mission of the Desert Lab has become even more important in recent years. Expanding populations in the Southwest have increased the stress on natural environments that surround its growing cities.

On eradication day, researchers will show how to recognize buffelgrass, and demonstrate approved techniques to remove it, including rock picks and herbicides.

The event is Saturday, March 5, 10 a.m. to 4 p.m. Parking is available at nearby St. Mary's Hospital. Winter in Tucson still means plenty of sunshine most days, so wear protective clothing, including sunscreen, a hat and gloves, and sturdy shoes to navigate the rugged hillside.

For more information, or to volunteer with the eradication project, call Travis Bean at the Desert Lab at 629-9455, or e-mail.

Urbanization (area with > 2,500 people)

19 megacities (with > 10 million)
Pull:
- jobs and income
- education
- innovation, culture
- health care

Push:
- poverty
- lack of land, work
- famine, war

- 400 cities > 1 million
- 50% world’s population
- poverty and slums
- fast urbanization in developing world

Figure 11-22 Major urban regions in the United States. About 75% of Americans live in urban areas occupying about 9% of the country’s land area. Nearly half (48%) of Americans live in consolidated metropolitan areas with 1 million or more people. (Data from U.S. Census Bureau) Miller, 2003

Figure 11-21 Two megalopolises: Bowash, consisting of urban sprawl and coalescence between Boston and Washington, D.C., and Chipitts, extending from Chicago to Pittsburgh.
Unsustainable Urban Areas...

Figure 11.24. Urban areas rarely are sustainable systems. The typical city is an open system that depends on other areas for large inputs of matter and energy resources and for large outputs of waste heat. Large areas of nonurban land must be used to supply urban areas with resources. For example, according to an analysis by Mathis Wackernagel and William Rees, 58 times the land area of London is needed to supply its residents with resources. They estimate that meeting the needs of all the world’s people at the same rate of resource use as London would take at least three more earths.

Urban Heat Island

Figure 5-21. Profile of an urban heat island showing how temperature changes as the density of development and trees changes. Urban areas with few trees and large areas of heat-absorbing paved streets, roofs, and other dark surfaces that absorb and release heat are hotter than surrounding suburban and rural areas with more trees and less heat-absorbing surfaces. Cities can save money and partially counteract the heat island effect by (1) instituting tree planting programs, (2) using lighter-colored paving, building surfaces, and rooftops to reflect heat away, (3) reducing inputs of waste heat into the atmosphere by establishing high energy-efficiency standards for vehicles, buildings, and appliances, and (4) establishing gardens on the roofs of large buildings.
Reining in Urban Sprawl
Stoel, 1999

- Sprawl, suburbs, city center
- greenspace, pollution, traffic, erosion, water
- more highways do not help
- wealth vs. quality of life
- fossil fuels
- gov't subsidies
- divided jurisdictions
- Portland, Oregon
  success attracts people!
- antisprawl legislation
  developers and property rights advocates opposed
- last sentence about need to tax fossil fuels

- Travel delays cost DC area residents >$1,000/year
  (Buying larger pants to deal with weight problem)
Urbanization and Sprawl
Role of the automobile?

U.S. 4.6% population
~33% of world’s cars

Bicycles!!
Mass transit

Sprawl and Cars...

Land and Biodiversity
- Loss of cropland
- Loss of forests and grasslands
- Loss of wetlands
- Loss and fragmentation of wildlife habitats
- Increased wildlife roadkill
- Increased soil erosion

Human Health and Aesthetics
- Contaminated drinking water and air
- Noise pollution
- Skyline illuminated at night
- Traffic congestion

Water
- Increased runoff
- Increased surface water and groundwater pollution
- Increased use of surface water and groundwater
- Decreased storage of surface water and groundwater
- Increased flooding
- Decreased natural sewage treatment

Energy, Air, and Climate
- Increased energy use and waste
- Increased air pollution
- Increased greenhouse gas emissions
- Enhanced global warming
- Urban microclimates (heat island effect)

Economic Effects
- Higher housing costs
- Disruption of downtown business districts
- Increased unemployment in central city
- Loss of tax base in central city

Figure 11-20 Some of the undesirable impacts of urban sprawl and car-dependent development.
Subsidized!

> $300 billion/year

Costs not included:

> $300 billion/year

- Foreign military intervention
- Terrorism
- Habitat destruction
- Oil spills
- Health care (smog, accidents, poor fitness)
- Climate change (sea level, global warming)
- etc.

= $600 billion/year

"Cars Rule"

Miller p. 95

75% Americans drive to work alone
5% commute on public transit
0.5% bicycle to work

In US we drive 2.5 trillion miles/year
(same as all other people combined)

China and others aspiring...

In US, $1 of every $4 related to automobile

Globally: 1.2 million killed each year, 15 million injured

Cars: 25% of CO₂ emissions
Urban areas: 33-50% car related

Externalities accounted: + $5-8 / gallon gasoline
Curitiba has 26 parks of well-preserved environment, with rich and diversified fauna and flora. The city has a green area of 55m² for each resident and is known as the Ecological Capital of Brazil.

Curitiba has doubled in size in just 25 years and now has a population of 1.6 million.
Curitiba, Brazil

http://www.lightrailnow.org/facts/fa_cur02.htm

Why light rail better than busses in the US
Curitiba, Brazil

• During 1950s and 60s, cities across Brazil experienced rapid population growth due to agricultural mechanization. Curitiba had one of the highest population growths, 6% a yr.

• demanded effective city planning in areas ranging from social services, housing and sanitation, to the environment and transportation

• By the 1960s, officials were working on a Master Plan (1966) to meet these demands, which included a consolidated bus transit system
Curitiba, Brazil

• 340 routes
• 2,000 buses transport 2 million passengers daily
• 700 miles of bus routes; 40 miles dedicated to bus use only
• 25 terminals, 200+ bus tubes
• 30 routes and buses designed for specific use by the disabled
• 50-second deadhead (period between buses) at peak times, and 2 to 3 minutes at other times at the central station
• first city in Brazil to use less polluting fuels; 89.4% diesel, 8% anhydrous alcohol, and 2.6% soybean additive
• The resulting fuel is less polluting and cuts the emissions of particles to the air by up to 43 per cent.