9

The Urban Environment

Overview of Chapter 9

- Population and Urbanization
  - Characteristics of Urban Population
  - Urbanization Trends
- City as an Ecosystem
  - Environmental Problems in Urban Areas
  - Environmental Benefits of Urbanization
- Urban Land Use Planning
  - Transportation and Urban Development
  - Suburban Sprawl
- Making Cities More Sustainable

Las Vegas, Nevada

- Site of natural spring
- Las Vegas receives ~4" precipitation annually
- Hoover Dam provides water and allowed Las Vegas to grow
  - Competes with other western states for water
- Lots of impervious surfaces and energy demand
- Effects from climate change?

Dennis Flaherty/Science Source

Population and Urbanization

□ Milestone: As of 2008, half of the world's population lives in urban areas
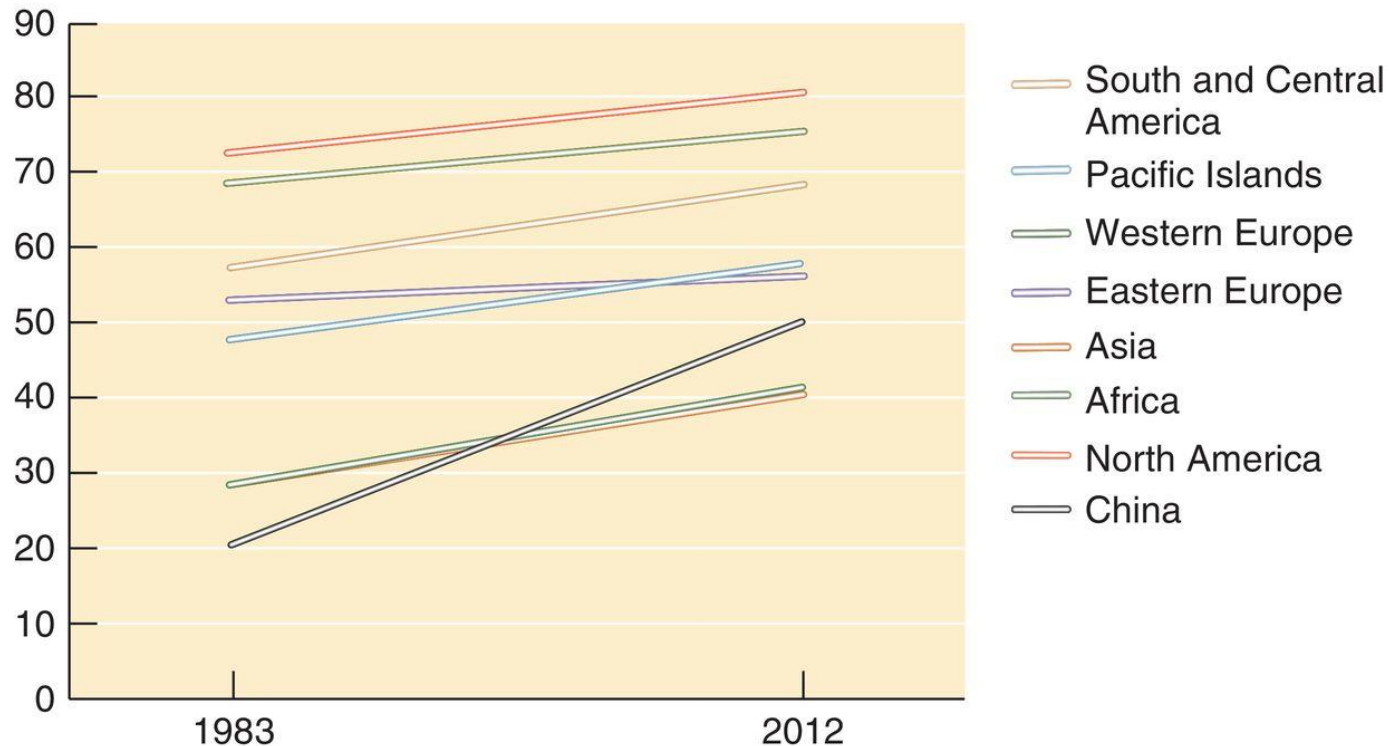
Population and Urbanization

- Urbanization
  - Process in which people increasingly move from rural areas to densely populated cities
- Jobs define urban vs. rural, not populations
  - Rural area occupations involve harvesting natural resources
  - Urban area occupations involve jobs not connected with natural resources
- People are moving to cities due to decrease in employment opportunities in rural areas

Characteristics of Urban Population

- Basic characteristics of city populations:
  - Diverse population in terms of race, ethnicity, religion and socioeconomic status
  - Younger population in cities than local rural area
    - Influx into cities
  - More males in cities in developing nations
  - More females in cities in developed nations

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Urbanization Trends

- Urbanization is increasing rapidly
  - Especially in developing countries
- World's 9 of 10 largest cities are in developing countries
- Megacities – cities > 10 million inhabitants

| Table 9.1	The World's 10 Largest Cities	
1975	*2011*	*2025 (Projected)*
Tokyo, Japan—26.6*	Tokyo, Japan—37.2	Tokyo, Japan—38.7
New York–Newark, USA—15.9	Delhi, India—22.7	Delhi, India—32.9
Mexico City, Mexico—10.7	Mexico City, Mexico—20.4	Shanghai, China—28.4
Osaka–Kobe, Japan—9.8	New York–Newark, USA—20.4	Mumbai (Bombay), India—26.6
São Paulo, Brazil—9.6	Shanghai, China—20.2	Mexico City, Mexico—24.6
Los Angeles, USA—8.9	São Paulo, Brazil—19.9	New York–Newark, USA—23.6
Buenos Aires, Argentina—8.7	Mumbai (Bombay), India—19.7	São Paulo, Brazil—23.2
Paris, France—8.6	Beijing, China—15.6	Dhaka, Bangladesh—22.9
Kolkata (Calcutta), India—7.9	Dhaka, Bangladesh—15.4	Beijing, China—22.6
Moskva (Moscow), Russia—7.6	Kolkata (Calcutta), India—14.4	Karachi, Pakistan—20.2

*Population in millions.
Source: "Urban Agglomerations 2011," U.N. Population Division Department of Economic and Social Affairs.

Urbanization Trends

- ## Urban Agglomeration
  - ### Urbanized core region that consists of several adjacent cities or megacities and their surrounding developed suburbs

United States Urban Agglomerations
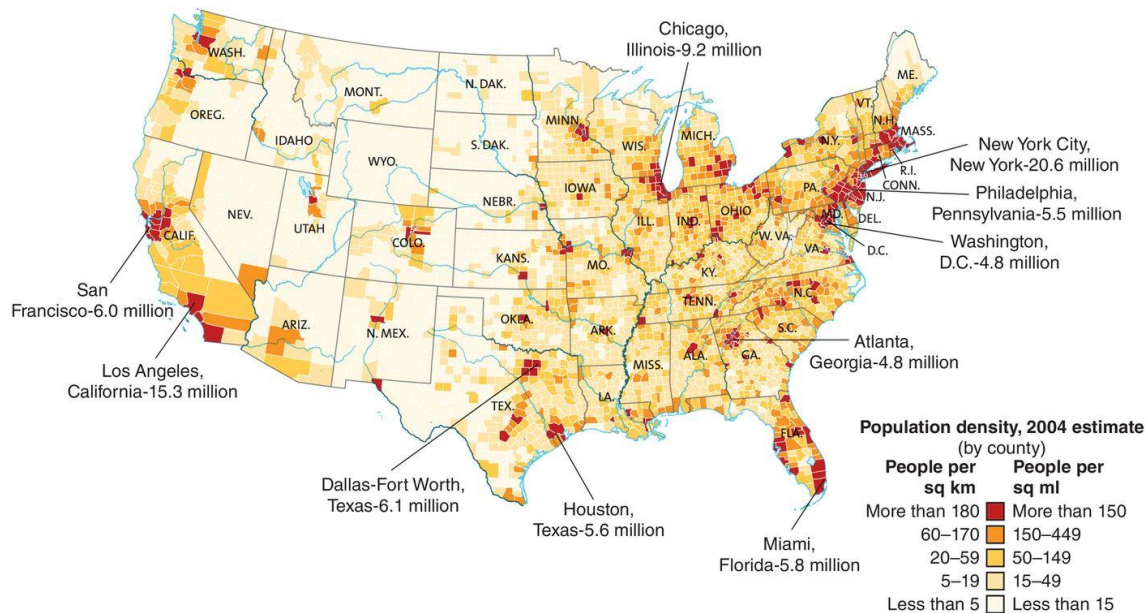
Substandard Housing & Homelessness

- Typically occupied by squatters
  - 1/3 of urban population in developing countries are squatters
- No city services
  - Water, sewage, garbage collection, police and fire protection

Peter Chadwick/Science Source

Paul Bradbury/Getty Images

City as an Ecosystem

- Urban Ecosystem: A heterogeneous, dynamic urban area studied in the context of a broader ecological system

- Urban ecology studied based on four variables: POET
  - Population
  - Organization
  - Environment
  - Technology

City as an Ecosystem

City as an Ecosystem

- Phoenix, Arizona
  - Along with Baltimore, comprise urban LTER sites
    - Long Term Ecological Research
- Studies and measurements of human environmental interactions
  - Affect of cities on animals
  - Hydrologic cycle
  - Heat
  - Many others

Cities are dynamic open systems

Natural capital (inputs)

Energy (fuel)
Clean water
Clean air
Food
Raw and refined materials for construction and industry
Business and consumer products

Products and wastes (outputs)

Waste heat, greenhouse gases
Wastewater, water pollution
Air pollution
Solid waste
Goods, services

Environmental Problems in Urban Areas

- Growing urban areas affect land use patterns
  - Fragment wildlife
  - Encroach wetlands, forests, desert, etc.
- Impermeable surfaces and urban runoff discharged into waterways
  - Motor oil, lawn fertilizers, heavy metals
- Noise pollution

# Environmental Problems in Urban Areas

□ Brownfields

  ◻ Urban areas of abandoned industrial or residential sites that may be contaminated from past use

 ◻ Reclamation of brownfields in Pittsburgh, PA was successful (below) in 1980s

AP Photo/Keith Srakocic

Environmental Problems in Urban Areas

- Long commutes
  - Buildup of emissions due to cars and industry
- Urban heat island
  - Local heat buildup in an area of high population density
  - Affect local air currents and weather conditions
  - Contribute to buildup of pollutants- dust domes
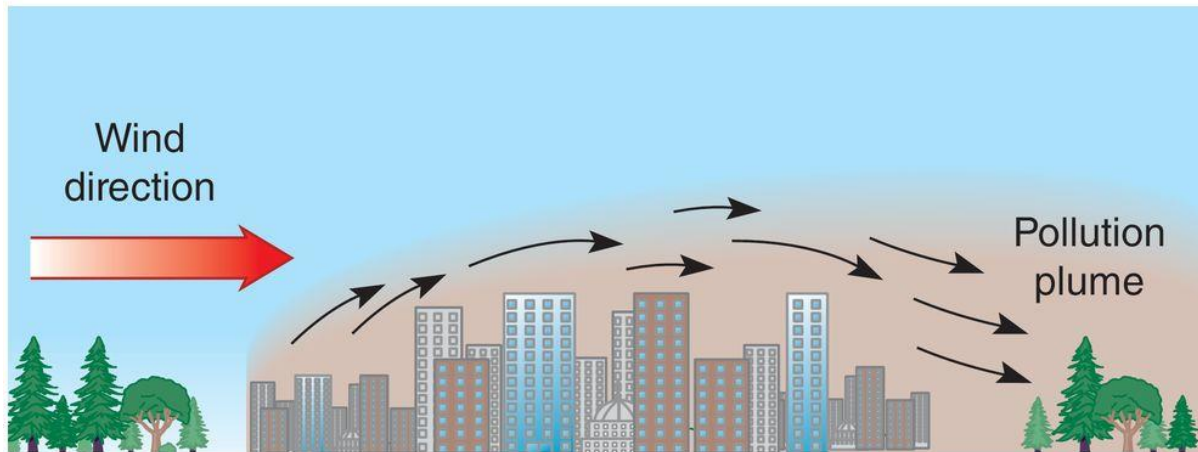
Urban Heat Island
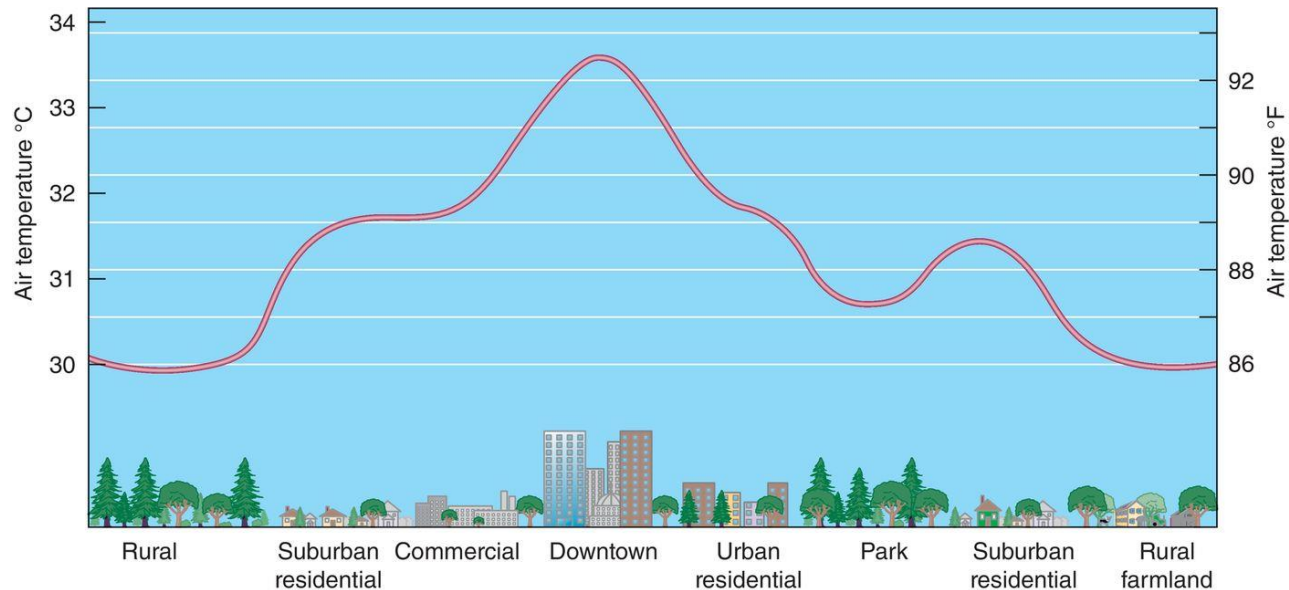
Temperature variations on a summer afternoon

Dust dome

Rural City Rural
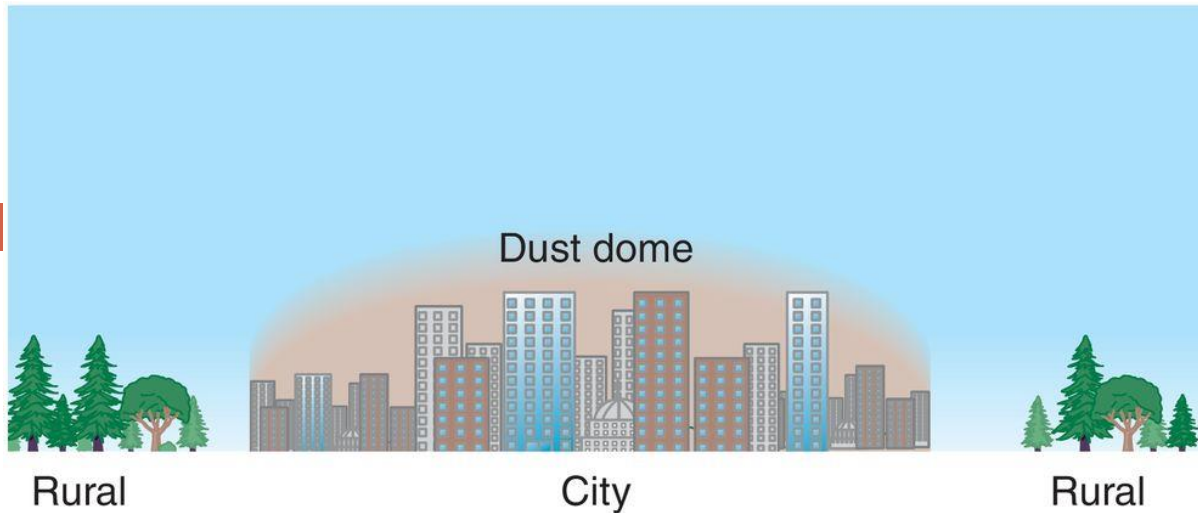
(a) A dust dome of pollutants forms over a city when the air is somewhat calm and stable.

Wind direction

Pollution plume

(b) When wind speeds increase, the pollutants move downwind from the city.

Environmental Benefits of Urbanization

- Well-planned city can benefit the environment
  - Reduces pollution
  - Preserves rural areas
- Compact Development
  - Design of cities in which tall, multiple-unit residential buildings are close to shopping and jobs, and all are connected by public transportation

Urban Land-Use Planning

- Process of deciding the best use for undeveloped land in a given area
- Based on economic concerns
- Influenced by political and economic factors
- Regulated through zoning
  - Commercial
  - Residential
  - Industrial
 - Property owners must meet zoning ordinances

Urban Land-Use Planning

- Gentrification
  - Movement of wealthier people back to older, run-down homes that have been renovated
  - Often displaces urban poor who cannot afford it
- Land-use planning
  - Process of deciding the best uses for land in a given area
  - Results in zoning (use zones)
  - David Harvey 1970s and Baltimore, Maryland
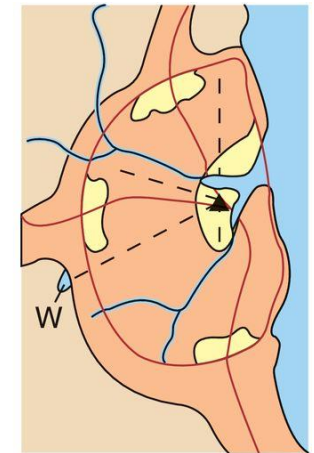
Transportation and Urban Development

□ Transportation availability affects city's spatial structure

□ Ex: An east coast U.S. city

    ▫ (a) 1700–1850

    ▫ (b) 1850–1910

    ▫ (c) 20th century
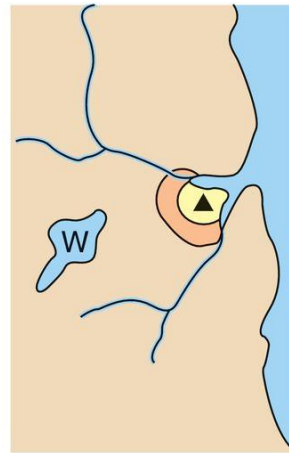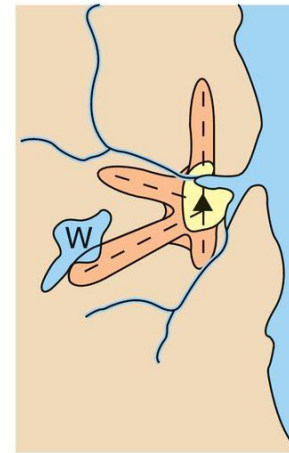
(a) 1700s to 1850s.   (b) 1870s to 1910s.   (c) 20th century.

Key

■ Water	■ Residential area	▲ Central business district
■ Undeveloped land	- - - Railroad, trolley lines	Ⓦ Wetlands
■ Commercial area	—— Interstates, beltway loop	

Transportation and Urban Development

□ Rapid transit systems to efficiently handle large numbers of people

□ Many cities facing investment choices for transportation

Scott Dalton/The New York Times/Redux Pictures

Suburban Sprawl

- Suburban Sprawl
  - Patchwork of vacant and developed tracts around the edges of cities; contains low population density
- Problems
  - Loss of wetlands
  - Air and water pollution
  - Loss of biological habitat


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Suburban Sprawl

□ Smart Growth: urban planning and transportation strategy that mixes land uses

  ◻ Commercial

  ◻ Manufacturing

  ◻ Entertainment

  ◻ Housing

□ At least 11 states currently using these management laws

Making Cities More Sustainable

- Characteristics of a sustainable city
  - Clear, cohesive urban growth policies
  - Efficient use of energy and other resources
  - Reduction of pollution and waste
  - Large areas of green space
  - Designed to be people-centers, not car-centered
  - Food grown IN the city (rooftop gardens)
  - Compact development

Making Cities More Sustainable

- Rise of urban gardening and use of rooftops
  - Urban development and sprawl encroaches on local farmland
- Increases food security, relationship with land and food
- Many restaurants, businesses, groups looking to creatively produce local food
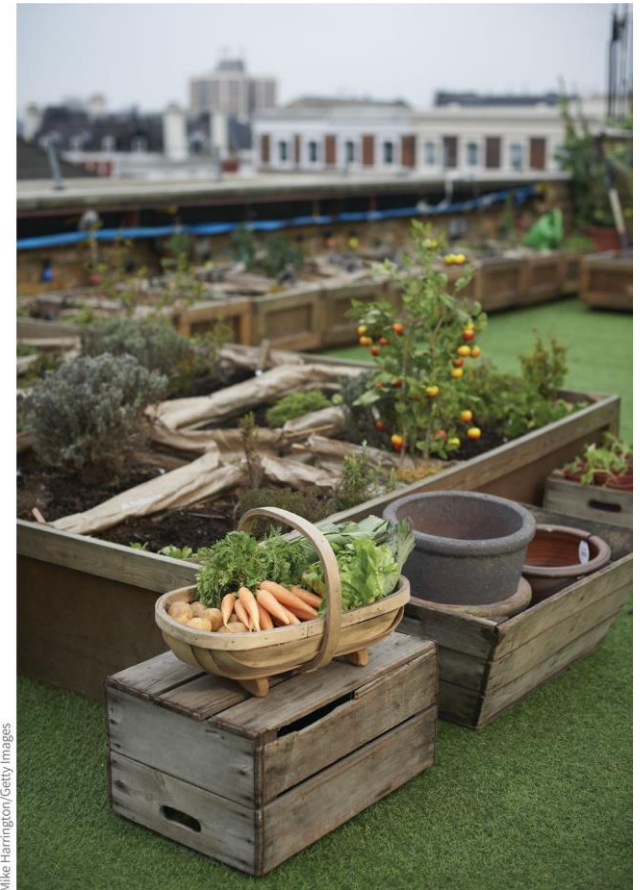
Mike Harrington/Getty Images

Green Architecture

- Rise of architecture that is sustainable (and even positive for surrounding environment)
  - Wastewater recycling
  - Efficient lighting
  - Sustainable building materials

Courtesy of Oberlin College

Barcelona, Spain: A People-centered City

© Kim Karpeles/Alamy

Sustainable Cities
Case in Point - Curitiba, Brazil

Express routes
Interdistrict routes
Direct routes
Feeder bus routes
Workers' routes

City center