Chapter Objectives

This chapter will help students:

- Describe the scale of urbanization
- Assess urban and suburban sprawl
- Outline city and regional planning and land use strategies
- Evaluate transportation options
- Describe the roles of urban parks
- Analyze environmental impacts and advantages of urban centers
- Assess urban ecology, green building efforts, and the pursuit of sustainable cities

Lecture Outline

I. Central Case: Managing Growth in Portland, Oregon

A. Oregon’s law required comprehensive land use plans, including an **urban growth boundary** (UGB), separating urban and rural areas.

B. The intent was to revitalize city centers, prevent suburban sprawl, and protect farmland, forests, and open landscapes around the edges of urbanized areas.

C. The Metropolitan Service District, or Metro, focused growth on existing urban centers and on building communities where people can walk or take mass transit between home, work, and shopping.

D. To many Portlanders today, the UGB remains the key to maintaining quality of life in city and countryside alike.
E. Opponents of Ballot Measure 37, requiring that landowners be compensated if the value of their land is decreased by government regulation, challenged the law and a new ballot initiative passed, called Ballot Measure 49, in 2007.

F. In 2010, Metro finalized a historic agreement with representatives and citizens of its region’s three counties to determine where urban growth will and will not be permitted over the next 50 years. Metro and the counties apportioned over 121,000 ha (300,000 acres) of undeveloped land into “urban reserves” open for development and “rural reserves” where farmland and forests would be preserved, precisely mapping the boundaries. The hope is that this agreement will give clarity and direction for landowners and governments alike for half a century.

II. Our Urbanizing World

1. The shift from rural to urban living, or urbanization, may be the single greatest change our society has undergone since we went from a nomadic hunter-gatherer lifestyle to a sedentary, agricultural one.

A. Industrialization has driven the move to urban centers.

1. Urban populations are growing for two reasons: The human population overall is growing (Chapter 8), and more people are moving from farms to cities than are moving from cities to farms.

2. Agriculture and industrialization bred further technological advances that increased production efficiencies, both on the farm and in the city. This process of positive feedback continues today.

3. Since 1950, the global urban population has grown almost five-fold, whereas the rural population has not quite doubled.

4. In developed nations, urbanization has slowed because most people already live in cities, towns, and suburbs, the smaller communities that ring cities.

5. Most fast-growing cities today are in the developing world, and in some places, population growth often exceeds economic growth. The result is overcrowding, pollution, and poverty.

6. Across the world today, 21 “megacities” are each home to 10 million residents or more.

B. Environmental factors influence the locations of urban areas.

1. Environmental variables such as climate, topography, and the configuration of waterways influence whether a small settlement will become a large city. Successful cities tend to be located in places that give them economic advantages.

2. Powerful technologies and cheap transportation enabled by fossil fuels have allowed cities to thrive even in resource-poor regions.
C. Cities grew, and then suburbs grew.
   1. American cities grew rapidly throughout the 19th and early 20th centuries, as a result of immigration from abroad and increased trade as the nation expanded westward. The bustling economic activity of downtown districts held people in cities despite crowding, poverty, and crime.
   2. However, by the mid-20th century, many affluent city dwellers were choosing to move outward to the cleaner, less crowded, and more park-like suburban communities.
   3. Several factors enabled people to move to suburbs in the mid- and late 20th century. The rise of the automobile was one, together with an expanding road network and inexpensive and abundant oil.
   4. Since then, technology has reinforced the spread of urban and suburban areas.
   5. By allotting more space to each person, suburban growth has spread human impact over more of the landscape than urban and rural areas have.

III. Sprawl
   1. Sprawl is a term that has become laden with meanings. It refers to the spread of low-density urban or suburban development outward from an urban center.

A. Urban areas spread outward.
   1. As urban and suburban areas grow in population, they also grow spatially.

B. Sprawl has several causes.
   1. Human population is growing.
   2. Per capita land consumption has increased.
   3. Better highways, inexpensive gasoline, and technologies such as telecommunications and the Internet, all have fostered movement away from city centers by freeing businesses from dependence on the centralized infrastructure a major city provides, and by giving workers greater flexibility to live where they desire.
   4. As growing numbers of people feel the negative effects of sprawl on their lifestyles, they have begun to question the mantra that all growth is good.

C. What is wrong with sprawl?
   1. Transportation—sprawl limits transportation options.
   2. Pollution—sprawl increases pollution by promoting automobile transportation.
3. Health—driving cars largely takes the place of walking, so sprawl promotes physical inactivity.

4. Land use—more land is developed while less is left as forests, fields, farmland, or ranchland.

5. Economics—sprawl drains tax dollars from existing communities and funnels them into infrastructure for new development on the fringes of those communities.

IV. Creating Livable Cities

A. City and regional planning help to create livable urban areas.

   1. **City planning (or urban planning)** is the professional pursuit that attempts to design cities to maximize their efficiency, functionality, and beauty.

   2. In today’s world of sprawling metropolitan areas, **regional planning** has become as important as city planning.

B. Zoning is a key tool for planning.

   1. **Zoning** is the practice of classifying areas for different types of development and land use.

C. Urban growth boundaries are now widely used.

   1. The UGBs sought to revitalize downtowns; protect farms, forests, and their industries; and assure urban dwellers some access to open space near cities.

D. “Smart growth” aims to counter sprawl.

   1. Proponents of **smart growth** want municipalities to manage the rate, placement, and style of development so as to promote healthy neighborhoods and communities, jobs and economic development, transportation options, and environmental quality.

E. The “new urbanism” is now in vogue.

   1. A school of thought called the **new urbanism** seeks to design neighborhoods on a walkable scale, with homes, businesses, schools, and other amenities all close together.

   2. New urbanist neighborhoods are generally connected to public transit systems. In **transit-oriented development**, compact communities in the new urbanist style are situated along stops on a major rail line, enabling people to travel most places they need to go by train and foot alone.

F. Transportation options are vital to livable cities.

   1. A key ingredient for improving the quality of urban life is making multiple transportation options available.
2. Mass transit options are cheaper, more energy efficient, and cleaner than automobiles, and also ease traffic congestion.

3. The United States lags behind most nations when it comes to mass transit.

4. Establishing mass transit is not always easy.

5. To make urban transportation more efficient, governments can raise fuel taxes, tax inefficient modes of transport, reward carpoolers with carpool lanes, encourage bicycle use and bus ridership, and charge trucks for road damage.

G. Parks and open space are key elements of livable cities.

1. Natural lands, public parks, and open space provide greenery, scenic beauty, freedom of movement, and places for recreation. These lands also keep ecological processes functioning by regulating climate, producing oxygen, filtering air and water pollutants, and providing habitat for wildlife.

H. Parklands come in various types.

1. Large city parks, greenbelts, and greenways are all important.

V. Urban Sustainability

A. Urban resource consumption brings a mix of environmental impacts.

1. It would seem that urban living necessitates greater consumption of resources; however, there is a complex mix of consequences.

   a. Resource sinks—cities and towns must import from widespread sources nearly everything they need to feed, clothe, and house their inhabitants. Cities also export wastes.

   b. Efficiency—cities should be able to minimize per capita consumption by maximizing the efficiency of resource use and delivery of goods and services.

   c. More consumption—the ecological footprints of cities are much greater than their actual land areas.

B. Urbanization preserves land.

C. Urban centers suffer from and export pollution.

1. **Noise pollution** is undesired ambient sound. Excess noise degrades one’s surroundings aesthetically, can cause stress, and at intense levels (such as with prolonged exposure to the sounds of leaf blowers, lawn mowers, and jackhammers) can harm hearing.

2. The glow of **light pollution** from city lights obscures the night sky, impeding the visibility of stars.
3. This urban heat island effect results from the concentration of heat-generating buildings, vehicles, factories, and people. It also comes from the way that buildings and dark paved surfaces absorb heat and then release it slowly, warming the air and interfering with patterns of convective circulation that would otherwise cool the city.

D. Urban centers foster innovation.

E. Urban ecology helps cities take steps toward sustainability.
   1. Researchers in the field of urban ecology hold that cities can be viewed explicitly as ecosystems.

F. Green buildings are a key step toward sustainable cities.
   1. Today there is a thriving movement in architecture and construction to design and build green buildings, structures that incorporate various means of reducing the ecological footprint of a building’s construction and operation.
   2. The U.S. Green Building Council promotes these efforts through its Leadership in Energy and Environmental Design (LEED) certification program. Buildings (either new buildings or renovation projects) apply for certification, and depending on their performance, may be granted silver, gold, or platinum status.

G. Steps toward livability enhance sustainability.

VI. Conclusion
   A. As half the human population has shifted from rural to urban lifestyles, the nature of our impact on the environment has changed.
   B. Limiting the waste of those resources by making urban and suburban areas more sustainable will be vital for the future.
   C. Transportation options must include accessible mass transit.
   D. Adequate park lands and green spaces must be available.

Key Terms

city planning  
green buildings  
Leadership in Energy and Environmental Design (LEED)  
light pollution  
new urbanism  
noise pollution  
regional planning  
smart growth  
sprawl  
suburbs  
transit-oriented development  
urban ecology  
urban growth boundary (UBG)  
urban heat island effect
Teaching Tips

1. Provide students with information about the four categories of public park lands:

   City parks—all lands and water acquired by a city for park or recreational purposes

   County parks—anyparkland managed by a county

   State parks—land preserved because of its natural beauty, historic interest, or other reason, and under the administration of a state

   National parks—tracts of land declared public property by a national government with a view to its preservation and development for purposes of recreation and culture

   Ask students to research a park in the area and tell what category it fits into and why. Alternatively, ask them to compare and contrast two of the park types: their purpose, where they are located, their intended use, their visitor numbers, or other pertinent information.

2. Ask students to conduct Internet research on the Chicago Wilderness, which was preserved as part of Burnham’s Plan of Chicago. Ask students, “What ecosystems are preserved?” Information can be found on the Chicago Wilderness site: (www.chicagowilderness.org). This website contains information about the regional nature reserve in the Chicago area. There are descriptions of the prairies, woodlands, wetlands, and water that are protected as well as highlights of things to do and see.

3. Ask students to investigate land cover patterns in your state. There is a National Land Cover Data Set available online at http://landcover.usgs.gov/index.asp, as well as a World Data Center for Land Cover Data. The World Data Center system works to guarantee access to solar, geophysical, and related environmental data. The site can be accessed free of charge.

   Ask students to compute the percentage of cover for each land cover class. Ask them these questions: What are the dominant land cover classes? Do residential and commercial development cover a large percent of land in your state?

4. Use the following scenario to get students to think about land use patterns:

   A military base, situated near a small but rapidly growing city in your state, has been decommissioned, and the land and buildings will be turned over to the county. The base land includes a lake, undisturbed wetlands that are a major resource for migratory birds, a large grassland, and forested hills. There are roads over 20% of the land, which includes housing for 2,000 families, plus schools, a hospital, offices, and many other buildings. A railroad spur comes into the main building area.
Divide students into groups and have each group prepare a position paper on the best way to use the land. Some ideas might be to provide a medium-sized planned community, build a sports and recreation center, create a manufacturing hub, or make available only a few luxury homes in a gated community. Groups must present arguments for and against their proposal. These can be presented to the class or turned in as a written assignment.

One way to do projects such as this is through the use of “jigsaw learning groups,” with each group consisting of four members. To establish the groups, have the students count off 1 through 4. Members numbered 1 from each group would then receive certain materials (maps, for instance, of land use and topography). Members numbered 2 would receive information of an economic nature—the county tax base and possible revenues from various proposed activities. Members numbered 3 would receive information regarding the impacts to the ecosystem of the various proposals. Members numbered 4 would receive information about the county infrastructure and needs—population increases, current levels of housing, jobs, schools, and businesses.

If class size and time permit, all the number-1 students would meet to discuss the maps and how to decipher them; the number-2 students would discuss the economics; and so on. Then each student would return to his or her group to share the information gained from the materials. This exercise promotes positive interdependence. The information provided could be made up to fit an imaginary scenario, or the students could be required to find information about an actual military base in your state and its associated city.

5. Each county in the country typically has a planning and zoning board. Encourage students to attend a meeting and take notes on what issues are discussed. Determine if any of the issues involve additional plans for development, such as annexation of unincorporated areas so that the land can be zoned for development. Have students report back to class and then examine through Geographic Information Systems (GIS) technologies, often available on the Web from each state’s department of natural resources, if any critical habitat or natural resources areas are under threat.

Additional Resources

Websites


Edward Glaeser and Jesse Shapiro, both of Harvard University, examine the U.S. Census of 2000 and use the data to discuss growth in cities over 100,000 in population.

   This website has a wealth of information about the national parks managed by the NPS, including the nature, culture, history, and science of each park, as well as online resources for educators.

3. *Smart Growth Online*, Smart Growth Network (www.smartgrowth.org)

   In 1996, the EPA joined with several nonprofit environmental groups and government agencies to form the Smart Growth Network. Their website provides basic information about smart growth and current projects undertaken across the country.


   This online journal contains many articles about city planning, including a number of articles on sprawl.


   This resource provides an extensive listing of books and articles about urban open space, compiled by William Ted Johnson of the Scottsdale (Arizona) Public Library.

**Audiovisual Materials**

1. *Toward a Livable City*, distributed by Films for the Humanities and Sciences (www.films.com)

   This video follows the growth and development of Barcelona, Spain, as the city works to solve the problems of rapid growth after World War II.


   This program examines past and present cities, both emergent and planned, to investigate the problems of transportation, electricity, light, water, sewage, and trash.


   Three teenagers electronically discuss perceived urban problems in their home cities, then investigate the problems firsthand.


   This program shows cities that have taken measures to become more sustainable: East Los Angeles; São Paulo and Curitiba, Brazil; Vancouver, British Columbia; and Portland, Oregon.

This 27-minute video, narrated by Dennis Weaver, describes how sprawl affects people and the environment, and shows ways to build more livable cities. A 56-minute version is also available.

Weighing the Issues: Facts to Consider

What Made Your City?

**Facts to consider:** Many aspects of this question require an individual response. Prior to this question, the text discusses the geography of cities, so many answers may concentrate on the their geographical location (e.g., proximity to waterways, mountain passes, and the like) and how they may have funneled people and trade goods through. While economic advantages may have initially been responsible for a city’s growth, other considerations for modern times may be mentioned as well, such as a continued healthy and thriving economy, good municipal infrastructure, and a positive cultural atmosphere. Environmental conditions, such as clean air and water, as well as mild climate, are becoming more important as more of the population reaches an active retirement age. Opinions will vary according to each student’s background, experience, and priorities.

Sprawl Near You

**Facts to consider:** Many aspects of this question require an individual response. The text offers some good indicators that may help students answer the questions for this issue. A possible source for what the community deems important may be the local newspaper. Some student answers may concentrate on these questions:

- What issues have the city council or county board of supervisors taken up?
- What issues are most important to state legislators?
- Do state and local budgets focus on roads, highways, sewers, water, and electrical service in the inner city or in suburban areas?
- Has air quality decreased? If so, in what areas, and has the area affected spread in the past few years? How much traffic congestion is there? How much do people complain about the time spent in traffic?
- What is the price of housing, and where is housing least and most expensive?

Opinions and ideas will vary according to each student’s background, experience, and priorities.

Your Urban Area

**Facts to consider:** Many aspects of this question require an individual response. Student answers should be based on opinions and their own views of what a livable neighborhood will look and feel like. Discussion may surround access to transportation, work, businesses, eating establishments, and cultural activities. Safety may also be an issue,
with access to law enforcement, emergency services, and medical facilities. Availability of open space or urban parks may be important. Affordable, safe, and well-maintained housing close to all these venues may also be brought up in student answers.

**Zoning and Development**

**Facts to consider:** The background for answers to these questions may be found in Chapter 3. The purpose of zoning ordinances was to provide a way to regulate the development of industry, commerce, and housing within urban boundaries, controlling the physical development of land and the kinds of uses for each individual property. What is important to remember is that zoning ordinances are land use laws regulated by a zoning board, and that there is due process to appeal zoning board decisions. In the first scenario, the land was rezoned to prohibit housing developments. A citizen can dispute and appeal such a decision by taking his case to the local appeals board. The housing development proposal can be modified to fit the new zoning regulation, or the undeveloped land can be sold and the owner can look for land that will allow development.

Finally, the landowner could apply for a variance to the rezoning, which is a request to deviate from current zoning requirements. If granted, it permits the owner to use his land in a way that is ordinarily not permitted by the zoning ordinance. In the second scenario, the citizen can take the case to the local appeals board. However, citizens can take a proactive approach by attending public hearings, which are required prior to any change being made in zoning ordinances. Protests can be lodged at these hearings, and disputing citizens can ask the board to consider the compatibility of their project with the existing community structure and goals.

**The Science behind the Stories:**

**Thinking Like a Scientist**

**Measuring the Impacts of Sprawl**

**Question:** Sprawl in cities has been blamed for many societal ills. How is sprawl defined?

**Study:** Reid Ewing and his team from Rutgers University surveyed the literature and found many different ways to assess city sprawl and to rank cities based on the amount of sprawl present. Ewing, Rolf Pendall of Cornell University, and Don Chen of the nonprofit Smart Growth America defined *sprawl* as when development of land is far faster than population growth. To rate cities for their amount of sprawl, they developed a characterization of sprawling cities that examined 22 variables, then devised a way to analyze the data to produce an index of sprawl that also corrected for city size.

**Results:** Cities that expanded in population and area quickly over the past decade had the highest sprawl scores. Increase in population without an increase in developed area usually led to a low sprawl score.
Question: What impact does sprawl have on transportation and health?

Study: Ewing, Pendall, and Chen correlated their city sprawl scores with a number of transportation variables.

Results: People in the most-sprawling cities, as compared to the least-sprawling cities, owned more cars per 100 households, drove a longer distance per day, used public transit less, had 67% more traffic fatalities, had 40% higher ambient ozone levels, and had a heavier average weight and higher average blood pressure. However, there was no significant difference in commute time or in the incidences of diabetes or cardiovascular disease.

These studies do not show causality, but the patterns and trends they show do suggest that spatial patterns in city development have some influence on people’s behavior, choices, and impacts relative to transportation.

Baltimore and Phoenix Showcase Urban Ecology

Observation: These two cities are very different: Baltimore is an Atlantic port city on Chesapeake Bay with a long history, while Phoenix is a young and fast-growing southwestern metropolis sprawling across the desert.

Question: What are the impacts of sprawling urbanization?

Study: Research teams in both cities combined old maps, aerial photos, and new remote sensing satellite data to reconstruct the history of landscape change. Biological impact was measured and recorded in the landscapes of the two cities. Urban ecologists in Phoenix and Baltimore studied social and demographic aspects of the urban environment as well.

Results: The study first determined that the fast flow of water, a result of development, through the watershed was causing environmental damage in Baltimore, and worsening pollution. The study also determined that urbanization affects species and ecological communities, as cities and suburbs facilitate the spread of non-native species (because people introduce exotic ornamental plants and because urbanization’s impacts on the soil, climate, and landscape favor weedy generalist species over more specialized native ones). Also, community ecologists studying the wild animals and plants that persist within Phoenix are finding that urbanization alters the relationships among them. In regard to social and demographic aspects, the researchers found that living closer to a park increases a home’s property values, and in Phoenix, environmental justice comes into play, as those neighborhoods exposed to industrial pollution are populated by the less affluent, as well as by racial and ethnic minorities. In Baltimore, the reverse was witnessed, with toxic release sites in working-class white neighborhoods.

Implications: Whether addressing the people, natural communities, or changing ecosystems of the urban environment, studies on urban ecology like those in Phoenix and Baltimore will be vitally informative in our ever-more urban world.
Answers to End-of-Chapter Questions

Testing Your Comprehension

1. Urbanization has been driven by industrialization and by population growth. Cities grow quickly if their climate, topography, and configuration of waterways are attractive, and/or they are surrounded by land that people are leaving. Developing countries tend to have the highest population growth rates overall, and the highest urban growth rates as well. This is because they are in the midst of their demographic transition, with their populations often fleeing conflicts and ecological degradation in the countryside in search of economic advancement in the city.

2. Affluent city-dwellers fled inner cities they perceived as crowded and crime-ridden to suburbs they considered safer, more spacious, and more attractive.

3. Sprawl may be defined as the spread of low-density urban or suburban development outward from an urban center, or as the physical spread of development at a rate greater than the rate of population growth. Its impacts include a greater reliance on cars for personal transportation, more pollution, negative health effects, habitat alteration as rural land is converted to developed land, and a drain of tax dollars from maintaining existing infrastructure to financing more growth.

4. City and regional planning processes provide advice to policymakers on where different types of development should be allowed, transportation needs, and other matters. Zoning, however, legally restricts the use of particular plots of land to a certain range of uses (residential, agricultural, industrial, and so on). Zoning can be used to enact a development plan. Daniel Burnham’s 1909 Plan of Chicago and Edward Bennett’s 1912 Greater Portland Plan outlined park systems, traffic systems, and other planned improvements to city infrastructure to accommodate and even facilitate growth.

5. Sprawl slows in the face of zoning or regulatory restriction, and/or incentives for redevelopment of the urban center. “Smart growth” encourages multiple land uses, compact building designs, diversity, “walkability,” and community collaboration, among other principles. Urban growth boundaries protect farms and natural areas near urban areas, and reduce expenditures on infrastructure, but they also seem to increase housing prices.

6. If the urban center is large enough, rail systems will be cheaper, more energy efficient, and cleaner than roadways full of cars. They are expensive to add to a city that is already functioning with automobiles, and may be especially expensive for smaller cities.

7. City parks offer escape from the noise, commotion, and stress of urban life, and may provide significant ecological services to the city. Even smaller spaces such as playgrounds, community gardens, and greenways can provide significant benefits to urban residents.

8. Urban centers must import most of their food, raw materials, and purchased goods,
and then export their wastes. The transportation required for those goods and services adds cost and additional resource use to an economy that is mostly consumptive, and not productive in the ecological sense. Urban dwellers also tend to be wealthier than those in rural areas, and increased wealth correlates well with resource consumption.

9. Urban ecologists study the city as a system, and contribute to redesigning that system to function more sustainably within the environment.

10. Urban centers concentrate people and thus preserve land for agricultural use or as wilderness, and they foster innovation in such technologies as recycling and resource conservation.

### Calculating Ecological Footprints

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1. Bicycle travel gives the most miles per unit of carbon dioxide emitted.
2. Answers will vary.
3. Answers will vary. There are many ways we can all reduce our emissions (for example, see Chapter 18), but with regard to transportation options, these include driving less, taking public transportation, walking and biking more, and driving in carpools when driving cars is necessary.