SECOND EDITION

Environmental Land Use Planning and Management

JOHN RANDOLPH

Creating Sustainable Communities, Watersheds, and Ecosystems

2 ■ Environmental Planning for Sustainability

To formulate effective strategies, environmental management for sustainability must integrate scientific, engineering, economic, and demographic information and analysis as well as stakeholder values. Therefore, it requires a unique approach, and planning provides the necessary interdisciplinary perspective, analytical tools, and participatory process. Planning is a critical part of environmental management. This chapter introduces environmental planning, including its range of disciplinary perspectives, the generic planning process, and the multiple roles of the planner.

As introduced in Chapter 1, planning is essentially a matter of figuring out what needs to be done and how to do it. It is basic problem solving or "applying knowledge to action" (Friedmann 1987). It requires determining ends-and-means relationships. Simply stated, planning involves setting objectives, gathering and analyzing information, and formulating and evaluating alternative policies, projects, and designs to meet the objectives. Its future orientation sometimes requires a crystal ball, but good analysis and effective collaboration can help clarify the vision.

Environmental planning applies the process of planning to environmental protection and problem solving. This may entail any of the human–environment interactions discussed in Chapter 1: natural hazards, human and environmental health, natural resource use, productive natural systems and ecosystems, and sustainable communities.

Historical Perspectives on Urban and Environmental Planning

Planning human settlements began when agriculture allowed people to aggregate in permanent communities. Old Jericho is said to have been the first city, but ancient cities in the Middle East, China, Greece, Italy, India, Central America, and Africa all date from 7000 BC to 200 BC. While urban planning was practiced

in some form in succeeding centuries, modern urban planning emerged in the last part of the nineteenth century in response to rapidly growing, polluted, and chaotic cities in Western Europe brought about by the industrial revolution (UNHSP 2009).

After 1850, planning was directed at protecting public health through sanitation and separating land use activities, especially residential zones from polluting industry. But planning also had ideological goals of the ruling class to exclude low-income residents and other lower classes from their areas. **Master planning** emerged as the basis for urban planning. It was an exercise in the physical planning and design of settlements that responded to the social, economic, and political issues but did not intervene directly in these matters. This physical master planning was anchored in design and became manifest in large-scale projects and government control of land use through zoning, which varied according to how vested property rights were determined. In the United States, for example, private property rights enjoyed more legal protection than in the United Kingdom, where rights were subject to more government control. The U.K.'s 1932 Town and Country Planning Act established its approach to master planning and development controls, which diffused around the world through colonialism (UNHSP 2009).

In the United States, planning evolved from a design profession applied to urban form to a broader skill set applied to a range of problems and objectives, including environmental quality, as shown in Table 2.1. In the late nineteenth and early twentieth centuries, the master planning tradition was well established, as noted urban designers laid out large-scale master plans for cities. During the 1920s through the 1940s, with the growing use of zoning, urban planning became more regulatory. With the growth of government planning in the 1930s (e.g., the federal New Deal), planning became more bureaucratic, fact-finding, and analytical, in both scientific and economic terms.

The U.S. postwar housing, highway, and development boom of the 1950s and 1960s brought further physical development challenges, but the social movements of the 1960s also made planning more political. As a result, public partici-

TABLE 2.1 The Evolution of Planning in the United States

Emphasis	*Era*	*Description*
Planning as Design	1850–1950	Urban designers/planners create our cities.
Planning as Regulation	1925→	Zoning/command/control is core of government action.
Planning as Applied Science	1940→	Scientific/economic/policy analysis is problem solving.
Planning as Politics	1965→	Social movements and political action affect decisions.
Planning as Communication	1975→	Public information/participation broadens perspectives.
Planning as Collaboration	1990→	Stakeholders are engaged to reason together.
Planning as Integration of Policy, Science, Collaboration, and Design	2000→	Information revolution and rebirth of design innovation is informed by science, policy, and collaboration.
Planning Sustainable and Livable Communities	2010→	Science, design, collaboration, and policy are applied to community ecology, economy, equity, and livability.

pation grew in the 1970s, "communication" became the emphasis in the 1980s, and the 1990s and first decade of the twenty-first century saw more collaborative approaches involving stakeholders and partners reasoning together using social networks and other emerging means. In the 1990s, planning critics began to lament the loss of the earlier design emphasis of urban planning and its future orientation, and they suggested that the character of our communities had suffered. In the past decade, urban design has reemerged as an important element of urban planning. Today, the evolving skill set for planning integrates all of these approaches and includes technical and policy analysis, collaborative communication and process, and innovation and creative design—all of which are necessary in planning for sustainable and livable communities.

In 2009 planners celebrated the ceremonial 100th anniversary of urban planning in the United States, dating back to the first National Conference on City Planning held in New York in 1909. For the occasion, Birch and Silver (2009), Daniels (2009), and Berke (2008) provided retrospective looks at urban and environmental planning. Birch and Silver note the demographics of America have changed considerably in 100 years, from a population of less than 100 million to more than 300 million, from less than 50% urban to more than 80%, from about 50 cities with a population of more than 100,000 to 250. Of course, the spatial coverage of American cities has expanded far more than the population, as automobile mobility has extended the reach of the city. And the ethnic complexion of the U.S. and its cities has become far more diverse, and life expectancies and aging populations have increased. Domestic migration and shifting economic hubs have created rapid growth in some regions and shrinking cities in others. New imperatives for infrastructure and environmental protection resulting from these changing demographics have created continuing challenges for urban planners.

The progression of environmental planning links the history of planning with the history of environmentalism presented in Chapter 1. We will discuss the evolution of the many components of environmental planning in subsequent chapters, including land conservation, environmental design, stormwater management, urban ecology, urban forestry, watershed management, and ecosystem management. Tom Daniels (2009) provides a nice conceptual overview of the history of environmental planning in five labeled eras, which are summarized below, along with Philip Berke's (2008) historical focus on **green community planning**.

1. **Nineteenth and Early Twentieth Century: Getting on the Green Path.** This period includes the Preservation and Conservation Movements, as well as the City Beautiful Movement, urban parks, and garden cities. Frederick Law Olmstead's plans for Central Park in New York (1857), Boston's Emerald Necklace (1878), Chicago's World Exhibition (1982), and San Francisco's Golden Gate Park exemplified this era in cities. Ebenezer Howard's Garden City design concepts in London (1902) for small, mixed-use, work-live-recreate cities designed in harmony with nature share design characteristics of contemporary New Urbanism and are what Register (2006) refers to as the first "ecocities."

Berke's "Early Utopian Visions" period (1898–1930s) of green community planning distinguishes the polycentric form of Howard's independent cities, from the centrist urban form of Le Corbusier's radiant city, and from the decentrist suburban form of Frank Lloyd Wright's broadacre city.

2. **1920–1969: Regional Ecological Planning and Putting Science in Environmental Planning**. Clarence Stein, Patrick Geddes, Benton MacKaye, and Lewis Mumford (1961) were instrumental in advancing a regional environmental perspective to city planning. In the 1930s, the birth of cost-benefit analysis brought economic science to planning, and by 1969, land suitability analysis popularized by Ian McHarg (1969), ecological studies, engineering technology, and environmental impact assessment established by the National Environmental Policy Act (NEPA) enhanced scientific analysis in environmental planning.
3. **1970–1981: The Birth of Modern Environmental Planning**. Daniels sees the environmental decade of the 1970s and its plethora of federal environmental laws as the birth of modern environmental planning, at least at the federal level (see Chapter 1). This period was a culmination of prior movements, so it may be considered more the "adolescence" than the "birth" of the field. In addition to this federal action, in the 1960s and 1970s, several states experimented with state (e.g., Hawaii, Vermont, Maine, Oregon) and regional (e.g., San Francisco Bay, Twin Cities, Pinelands, Adirondack Park, Lake Tahoe) growth management programs with clear environmental objectives (Bosselman and Callies, 1971). Berke's "Design with Nature and the Environmental Movement" period (1940s–1970s) conforms to Daniels's eras 2 and 3.
4. **1982–2011: Backlash or a Bridge to Sustainability**. Daniels argues that the Reagan (1981–1988) and George W. Bush (2001–2008) administrations created a political backlash against federal environmental programs, especially environmental regulations and federal expenditures for environmental protection. But during this period, most laws prevailed against efforts to weaken them, and some innovative provisions were added to integrate economic mechanisms into regulations, such as the very successful cap-and-trade program for sulfur emissions in the 1990 Clean Air Act amendments, and wetland mitigation banking and water effluent trading in the 1987 Clean Water Act. The George H. W. Bush and Clinton administrations worked to advance the environmental agenda through no-net-loss wetlands policy, habitat conservation planning, energy policy, and voluntary and negotiated regulation to exceed emissions standards. Still, the federal inertia for environmental protection slowed during this period, and this led many states, localities, and NGOs to advance their own environmental planning and policy initiatives for land conservation, water and wetland protection, natural hazard mitigation, growth management, energy planning, and climate change mitigation. By 2005, nongovernmental land trusts numbered 1,667 and conserved more than 37 million acres in the U.S., double the

2000 acreage (LTA 2005). Although these nonfederal activities and the first years of the Obama administration seemed to be building a strong bridge to sustainability, a new backlash against federal environmental programs emerged in 2011 within the U.S. House of Representatives (after the 2010 midterm election) and among several states that adopted a strong political stance for states rights.

5. **1992–Present: Sustainability and the Global Environment.** As discussed in Chapter 1, sustainability at both global and local scales became a tenet of environmental planning with the 1987 United Nations Brundtland Commission report "Our Common Future," and subsequent Earth Summits in Rio and Johannesburg. The growing emphasis on climate change in the past twenty years elevated energy and climate as critical environmental planning objectives. These emerging global, energy, and climate concerns, along with advances in urban ecology, community design, watershed protection, and environmental justice, have created an integrated perspective in environmental planning for sustainable and livable communities.

Berke's "Linking Local Actions to Regional and Global Solutions" era (1980s–2008) starts with a critique of decentralized urban form as socially, economically, and environmentally nonsustainable urban sprawl, and advances more compact centrist and polycentrist forms with regional integration. Berke suggests this current green community planning movement for compact, mixed-use, walkable, transit-oriented, regionally connected, and green infrastructure designs fosters the ideals of harmony with nature, human health, spiritual well-being, livability, and low-impact, fair-share communities.

To achieve the multiple objectives of sustainability, planners must resolve tensions among competing objectives and values. Scott Campbell (1996) suggested that sustainability's 3-E objectives create three potential conflicts in community planning:

1. The **property conflict** between economic growth and equitable distribution of opportunities (e.g., government intervention requiring affordable housing in private development).
2. The **resource conflict** between economic development and environmental values (e.g., land development for profit versus land conservation for ecological protection).
3. The **development conflict** between equity and environment (e.g., affordable housing and commercial development versus nondevelopment environmental interests).

David Godschalk (2004) elaborates on this theme adding "livability" to make a four-objective **sustainability prism**. His prism shows three additional potential conflicts:

4. The **growth management conflict** between livability and unmanaged economic growth.

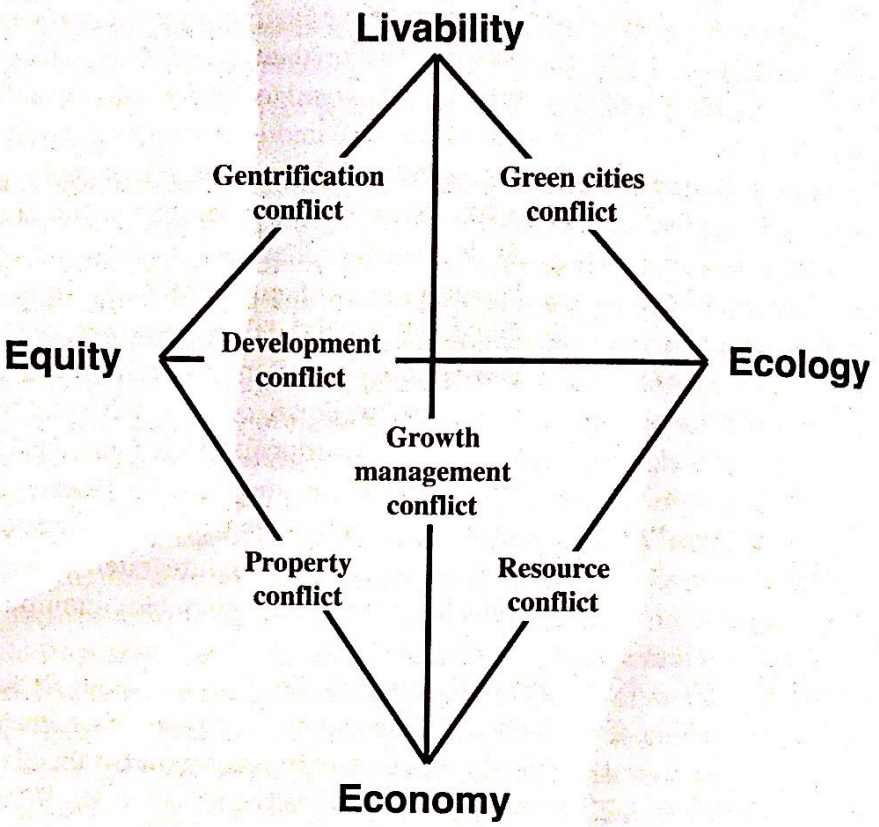


Figure 2.1
Godschalk's Community Sustainability Prism. Tensions occur among the four objectives. (*Source:* Adapted from Godschalk 2004, with permission of David Godschalk.)

5. The **green cities conflict** between livability and ecology, between the primacy of natural factors and the primacy of built environment design in determining urban form.
6. The **gentrification conflict** between livability and equity, between redevelopment and existing neighborhood preservation.

Figure 2.1 illustrates Godschalk's sustainability prism, containing Campbell's triangle, and shows the six conflicts along the axes of the prism. While these tensions are real, the challenge for environmental and urban planning is to seek common solutions that provide multiple benefits for the four objectives and avoid conflicts between them.

Keep in mind Godschalk's and Campbell's sustainability tensions, as well as Daniels's and Berke's views of the current state of environmental planning for sustainable communities, as you read through the detailed analytical techniques, design principles, planning processes, and policy approaches presented in later chapters. Also remember that although environmental planning has come a long way, its evolution is not complete. It will continue to adapt to changing conditions, both environmental and cultural. It is up to you to continue this evolution and improve the next generation of environmental planning for sustainability.

Approaches to Environmental Planning and the Planning Process

Environmental planning and management can be reactive, proactive, or integrative.

- **Reactive measures** try to correct prior environmental damages, like cleaning up the British Petroleum oil blowout in the Gulf of Mexico or remediating old toxic waste dumps.
- **Proactive measures** are taken explicitly to enhance or protect environmental quality, like banning deep-water oil drilling or land use controls to preserve wildlife habitats and wetlands, protect aquifer recharge areas, or restrict future floodplain development.
- **Integrative measures** involve early and substantive consideration of environmental, social, and contingency factors in the formulation of development plans and projects, like offshore oil operations, a new highway, or a new subdivision. Not only is it less costly and more effective to consider environmental factors early in the development process, but this integration is also essential to achieve the multiple objectives of sustainable development.

Environmental planners usually have specialized expertise in one or more subareas, such as land use and development, air quality, water quality, energy and water resources, waste management, wildlife, or forestry. But they are also generalists, applying planning and problem-solving skills and a wide range of disciplinary perspectives to a variety of environmental concerns.

Although "figuring out what needs to be done and how to do it" is a simple definition of planning, the process is, of course, not quite that straightforward. There is an extensive literature on the theory of planning, and a scholarly debate continues about the merits and needs for different planning approaches. Like environmental management, planning has and is evolving in efforts to better meet society's needs.

Four Classic Approaches to Environmental Planning

There are many conceptions of the theory of planning, which can be summarized in four basic planning approaches: rational-comprehensive, incremental, participatory, and advocacy. Environmental planning generally requires a rational-comprehensive and participatory framework, with elements of adaptive-incremental management and advocacy planning as appropriate (Braisoulis 1989).

- The **rational-comprehensive approach** is based on the scientific method and has five basic steps that focus on objectives, information, alternatives, impact assessment, and evaluation.

- The **incremental approach**, or what Lindblom (1959) called the "science of muddling through," accepts limitations in human knowledge and understanding, and as a result, focuses on short-term goals and objectives and small sequential actions. Adaptive planning is a modern-day form of incrementalism. It recognizes limitations on knowledge and aims to learn by doing: Develop the best plan within limits, implement the plan, monitor the results, and make changes based on monitoring.
- The **participatory approach** suggests that neither the rational-comprehensive nor the incremental approach deals explicitly with the diverse stakeholder perspectives and conflicting values. The participatory approach aims to inform and involve the public in planning and decision making.
- The **advocacy approach** recognizes that interested stakeholders do not speak with one voice but often line up in entrenched camps and fight for their special interests. This situation often requires some advocacy of the underrepresented groups (such as the poor) and values (such as nature) and mediation to resolve differences.

Box 2.1 contains a generic planning process that fits most environmental planning applications. It begins with scoping, a preliminary step to scope out stakeholders and issues and develop a work plan. It continues with the key steps of identifying important issues and objectives, analyzing the planning situation, formulating alternatives, assessing impacts, and evaluating impacts—all of which are elements of the rational-comprehensive process, but with strong stakeholder participation. It concludes with an adaptive element: implementation, monitoring, evaluation, and modification. This basic process can be applied in a simple form (Box 2.2).

The details of the process, the range of issues, the depth of analysis, and the comprehensiveness of the alternatives and impacts all depend on the planning context, which includes the needs and objectives, the political climate, and the available data, resources, and time (Braisoulis 1989). As discussed in the next section, many environmental problems and planning issues are complex and require a variety of disciplinary perspectives, and each step may involve considerable effort. On the other hand, in a focused or incremental application, all the basic steps will occur but in an abbreviated way. Many processes start with a rapid assessment, which is a quick look at problems and available information, and for the purpose of moving quickly from assessment to action (Sayre et al. 2000).

Although the environmental planning process appears as a sequential process, in reality it is somewhat iterative, as all steps are considered simultaneously with changing emphasis as the process proceeds. The process is always open to new information about subsequent or previous steps at any time. Several of the planning tools highlighted in the process for participation, negotiation, assessment, and evaluation are discussed later in this chapter and in subsequent chapters.

BOX 2.1—A General Process for Environmental Planning

0. Scoping

Stakeholder Issues

- Scope out fundamental issues, stakeholders, opportunities for participation, needs for conflict resolution, and needs for data and analysis
- Draft preliminary work plan for process
- Draft preliminary design for stakeholder involvement and participation

1. Identification of Issues, Opportunities, Concerns, Objectives, Criteria, Uncertainties

Stakeholder Criteria

- Identify IOC (issues, opportunities, concerns), evaluative factors, including institutional, legal, technical criteria
- Participation tools (advisory committees, meetings, workshops, surveys) determined by scoping
- Conflict resolution and negotiation tools (advocacy) depending on degree of controversy

2. Analysis of Planning Situation

Stakeholder Local Knowledge

- Scope of data gathering and analysis determined by evaluative factors
- Identify data limitations and uncertainties
- Participation tools (workshops, surveys)
- Conflict resolution and negotiation tools (advocacy) depending on degree of controversy

3. Formulation of Alternatives

Stakeholder Alternatives

- Scope of alternatives (comprehensive vs. incremental) determined by IOC, planning situation, degree of uncertainty (adaptive)
- Participation tools (workshops, workbooks, surveys)

4. Assessment of Impacts

Stakeholder Assessment

- Economic, environmental, and social effects
- Scope of assessment (comprehensive vs. incremental) depends on evaluative factors, planning situation, and alternatives
- Impact assessment tools (cost-benefit analysis, environmental impact assessment [EIA], social impact assessment [SIA])
- Organization and evaluation tools (matrices, indices, etc.)
- Participation tools (workshops, surveys)

5. Evaluation and Selection of Plan

Stakeholder Evaluation

- Organization and evaluation tools (matrices, etc.)
- Participation tools (workshops, surveys, review and comment)
- Conflict resolution and negotiation tools (advocacy) depending on degree of controversy

6. Implementation, Monitoring, Postimplementation Evaluation, Modification (Adaptive)

Stakeholder Implementation

- Timing and extent of monitoring and modification (adaptive) determined by level of uncertainty and degree of controversy
- Participation tools (citizen monitoring, workshops, annual conferences) determined by level of uncertainty and degree of controversy

BOX 2.2—A Simplified Planning Process

1. Inventory (steps 0, 2)	What do we have?
2. Needs Assessment (steps 1, 2)	What are our problems, objectives, priorities?
3. Management Strategies, Plans, Programs (steps 3, 4, 5)	What should we do?
4. Implementation and Monitoring (step 6)	Let's do it! (and learn from it)

Interdisciplinary Considerations of Environmental Planning and Management

The complexity of environmental problems requires interdisciplinary solutions. Environmental management is an exceptionally diverse field, borrowing heavily from several disciplines, including natural science and engineering, economics, law, politics, and ethics. Growing interest in environmental and sustainability issues has added to the participants and disciplinary perspectives, which have further increased the diversity and complexity of the field. Environmental planners are often grounded in a discipline, but as generalists, they must understand and apply a range of disciplinary perspectives to the planning process, including the ones described below.

Environmental Science and Engineering

Though interdisciplinary, at its roots environmental planning and management are based on scientific and engineering principles. Achieving sustainability requires an understanding of how natural systems work and how designed systems and technologies can lessen the adverse impacts of the built environment. For example:

- Soil erosion control requires a basic understanding of soil mechanics, available soils information, erodibility analysis, and the effectiveness of various land use practices in reducing erosion potential.
- Management of air quality requires knowledge of the effects on human health of pollutant levels, obtained from laboratory and epidemiological studies; the cost and effectiveness of various engineering treatment systems; and the relationship between levels of emissions at the stack and the quality of air people breathe.
- Watershed management requires knowledge of hydrology, climatology, topography, and soil properties; assessment of land cover effects on runoff; and engineering design of conveyance, storage, and infiltration.
- Mitigating climate change requires reducing greenhouse gas emissions by reducing fossil energy consumption through energy efficiency in buildings, transportation, and electrical systems, and by developing non-carbon energy sources with as little environmental impact as possible.

Environmental planning applies science-based technical knowledge to problem solving, and as such, it aspires to approach Brand's (2009) less romantic and more pragmatic environmentalism. Much of Part II of this book describes in detail the scientific and engineering principles of environmental land analysis and technologies for mitigating environmental impacts.

Environmental Design

The technical aspects of environmental planning make a transition from natural and physical sciences and engineering to the design of the built environment, for

the purpose of enhancing environmental quality, human health, livability, and overall sustainability. This book details the applications of environmental design, especially in Part II and Chapter 16.

Sustainable environmental design principles are adopted from architecture, landscape architecture, horticulture, civil engineering, and urban design. For example:

- Transit and pedestrian developments and mixed-use neighborhoods require urban design that accounts for people and the environment, creating more livable, walkable, and healthy communities.
- Low-impact development requires knowledge of onsite engineering hydrology, but also landscape design that mimics natural drainage and infiltration of stormwater.
- Adapting to natural hazards and climate change requires understanding the impacts of uncertain events, such as extreme weather, drought, sea-level rise, excessive heat, and water supply disruptions, as well as designing adaptive means to lessen their impact.

Environmental Economics

Economics play a significant role in any public and private decisions, and environmental planners need to understand basic microeconomics, economic efficiency, cost-effectiveness, welfare economics, and market failure. Public policy decisions have long been based on the theory of welfare economics and economic efficiency. This largely utilitarian theory states that social welfare is improved if the total gains among those who benefit exceed the total losses by those adversely affected. The price and exchange mechanisms of the free market generally fail to effectively allocate resources according to this social welfare test of economic efficiency.

Many effects of market activity occur as **market externalities**: These are goods (positive) or damages (negative) that flow from the market to individuals or firms whether they want them or not, and without their paying for them or being able to avoid them by making a payment. Many environmental impacts, such as pollution, wetland destruction, groundwater overdraft, and overgrazing, are negative externalities.

As a result of externalities and other market failures, public policy decisions determining natural resource use and pollution control have relied on more than the dictates of the free market. In many cases, they have been based on the explicit comparison of benefits and costs, including certain nonmarket effects. Economic **cost-benefit analysis** is limited to the costs and benefits that can be measured or estimated in dollar terms. Requirements such as those set forth in NEPA broadened the objectives and definitions of costs and benefits in resource planning, but federal decisions are still based primarily on the economic efficiency test of net dollar benefits.

Cost-benefit analysis makes sense conceptually, but it is plagued with some basic problems in practice. One concerns *equity*, or the distribution of costs and benefits. The comparison of costs and benefits "to whomsoever they may accrue" does not consider who benefits and who loses. A second problem is that many costs

and benefits involve considerable *risk or uncertainty*, and these are not well considered in cost-benefit analysis. A third problem is *how effects are valued over time*. The time value of money tells us a dollar today is worth more than a dollar tomorrow, because it can be invested. Future dollar effects are therefore "discounted" to a present value to be compared with today's dollars. But how do we treat environmental and human health effects? Do we discount the value of a future wilderness preserved or destroyed by today's decisions, or of future cancers resulting from today's management of toxic substances, or of the devastating effects of climate change?

Finally, it is difficult to place economic value on *noneconomic effects*, such as habitat destruction. In recent years, the field of **ecological economics** has emerged to improve the economic valuation of environmental resources so that they can be better accounted for in cost-benefit analysis and in planning and decision making. Environmental resource and amenity values are usually measured in terms of their use and option value. In this context, **use** can be consumptive (e.g., cut and use a tree), nonconsumptive (e.g., look at a tree), or functional (e.g., ecological carbon sequestration of a tree). **Option value** refers to the value that nonusers place on a resource, simply to know it exists (*existence value*), for future generations (*bequest value*), or for unforeseen future purposes (*insurance value*, say for a now unknown floral species that might be a cure for cancer).

However, the methods used to quantify these values, such as contingent valuation to measure the willingness of people to pay to protect a resource or the cost of replacing the ecological function with an engineering work, have limitations, and many analysts and economists admit that some societal values cannot be put in economic terms. The evaluation methods discussed in the next sections provide a broader perspective.

Other economic issues in environmental planning include using **market mechanisms** to advance environmental protection (such as emission cap-and-trade programs), **cost-effectiveness** of environmental measures (getting the most environmental benefit for the least cost), and **financing** environmental projects (who pays and how to pay).

Despite the analytical limitations already discussed, economic market forces remain among the most important determinants of consumer and producer decisions. Market mechanisms can work in concert with regulatory approaches to protect the environment. For example, stricter regulations on land-filling of wastes raise the cost of disposal so that recycling programs become more cost-effective. Higher fuel efficiency standards on vehicles not only reduce fuel consumption but also reduce carbon dioxide emissions. Carbon cap-and-trade programs put a price on carbon, which many believe is necessary to adjust the market toward clean energy.

Financing involves how to pay for environmental improvement. Private industry and land development generally must obtain private financing and venture capital. Local government programs have long relied on general obligation (tax-based) or revenue (user-fee-based) bonds to finance such programs as waste management, greenways, and parks. Innovative programs, such as development rights transfers and partnerships with private firms, have enhanced the financial re-

sources available for environmental preservation. Land trusts have been especially innovative in stretching their financial resources through the use of conservation easements, bargain sales, and associated landowner tax benefits.

Environmental Evaluation

Evaluation involves using objective assessment to assign values to options, compare trade-offs, resolve conflicts, and make choices. It is perhaps the most important, yet most difficult, element of environmental planning. Economics alone cannot provide the basis for making decisions because of analytical limitations and, more importantly, the failure of economic assessment to fully capture nonuser and nonutilitarian environmental values.

Assessing and evaluating environmental data are both complicated by the frequent need to combine and compare information that is often subjective and noncommensurable. How do you determine a measure of the visual quality of a wetland, the habitat value of a woodland, or an acceptable level of risk from a hazardous waste facility? How do you compare these measures with one another and with more quantifiable factors, such as economic costs and benefits, to compare and select from alternative courses of action?

Evaluation uses a number of assessment methods. It is useful to distinguish between the following:

- *Partial techniques*, for determining the relative importance, quality, or value of a specific environmental component, such as wildlife habitat, visual amenity, or agricultural land.
- *Comprehensive techniques*, for assessing a wide range of economic, cultural, and environmental effects of alternatives, plus comparing and often combining them to rank alternatives on their relative social worth.

Partial evaluation techniques are used to evaluate changes in specific environmental conditions and thus can compare the effects of alternatives on that specific factor (e.g., comparing habitat conditions A and B predicted to result from alternatives A and B). As such, partial techniques are used in impact assessment and as inputs to more comprehensive methods. Alternatively, partial evaluation techniques can be used to rank specific areas as, for example, habitats, views, agricultural land, historic buildings, or potential recreation areas, to prioritize them for protection programs or for specific uses.

Many of the partial techniques use a sum-of-weighted-factors approach to evaluate and combine environmental information into an index. Examples of these methods are the Land Evaluation and Site Assessment (LESA) procedure for agricultural land evaluation (see Chapter 6), the DRASTIC method for assessing groundwater contamination potential (see Chapter 9), wetland and habitat evaluation (see Chapters 10 and 11), land suitability analysis (see Chapter 14), and certain environmental impact evaluation techniques (see Chapter 14). The sum-of-weighted-factors evaluation method, hypothetically shown in Table 2.2, involves four steps:

1. Selecting a number of factors deemed relevant to the assessment.
2. Measuring the factors and assigning a value to that measurement on a common scale (e.g., 0–10).
3. Assigning weights to each factor based on its relative importance in the assessment (e.g., 1–5).
4. Combining the products of the factor value and weight to produce a final score.

Although it is often appropriate to try to combine information to provide such a final score that gives a synthesis or integrated view of various impacts or factors, these aggregating techniques require distinct value judgments by the analyst. The hypothetical sum-of-weighted-factors example in Table 2.2 shows that the first three steps involve value judgments. In most cases professional planners and technical specialists can supply appropriate values, as long as the assessment is sufficiently bounded to fall within a specific area of expertise (e.g., forest habitat quality). Still, such techniques are often criticized for including arbitrary or hidden value judgments. Usually a broader range of perceptions than those of specialists should be tapped. For example, the LESA procedure includes a local committee to provide a broader community perspective in the assignment of weights and values to site assessment factors.

Whereas partial techniques are normally constrained to one or a small set of environmental components, **comprehensive evaluation techniques** consider a broad range of effects so that alternative solutions can be compared and ranked in terms of their relative overall merits or social worth. Thus, comprehensive techniques are intended to guide decision making and are used in the key step 5 of the planning process given in Box 2.1. Traditional cost-benefit analysis was designed as such a method. However, because of its limitations discussed earlier, its practice is usually relegated to a partial technique.

A number of other comprehensive techniques for comparing impacts have been developed. Loomis (1993) describes several ways to integrate evaluation criteria. The first step in evaluating alternatives to assist decision making is the selection of evaluation criteria or the factors that should determine the best choice. Like choosing factors for the sum-of-weighted-factors method, selecting criteria involves judgment. Loomis suggests five generic criteria for public lands manage-

TABLE 2.2 A Hypothetical Example of the Sum-of-Weighted-Factors Method

	Unweighted Factor Values					Weighted Factor Values				
Factor	*Scale*	*Area 1*	*Area 2*	*Area 3*		*Weights*		*Area 1*	*Area 2*	*Area 3*
Factor A	1–10	7	4	1	×	1	=	7	4	1
Factor B	1–10	3	8	5	×	3	=	9	24	15
Factor C	1–10	1	4	3	×	4	=	4	16	12
						Final Scores		20	44	28

TABLE 2.3 **Evaluating Alternatives Based on a Set of Criteria**

	Alternative A	*Alternative B*	*Alternative C*	*Alternative D*
Criterion 1	*	*	*	*
Criterion 2	*	*	*	*
Criterion 3	*	*	*	*
Criterion 4	*	*	*	*
Result	**	**	**	**

* Boxes are filled with a description, indicator, or index score (resulting from a partial evaluation technique) of the alternative's effect on the criterion.

** Result indicates selection, ranking, or score of the alternative based on the decision method.

Source: Adapted from Loomis 1993.

ment: physical and biological feasibility, economic efficiency, distributional equity, social and cultural acceptability, and administrative feasibility.

In practice, the evaluation criteria are case-specific and based on professional expertise and the planning process, especially step 1 in Box 2.1. Table 2.3 shows the evaluation framework, using a matrix of four alternatives and four criteria.

The alternative evaluation and selection process (step 5 in Box 2.1) depends on the method used to integrate criteria to provide a basis for the decision. Here are six different methods or decision rules (Loomis 1993):

1. *Maximize one criterion.* One criterion supersedes all others as the basis for selection.
2. *Meet minimum levels of all criteria.* Set minimum thresholds for each criterion, and select the alternative(s) that meet all of these thresholds.
3. *Maximize one criterion while meeting minimum levels of others.* Select the most important criterion, set minimum thresholds for all other criteria, then select the alternative that meets all thresholds and provides the greatest contribution to the most important criterion. This approach often uses linear programming or other optimization techniques.
4. *Rank criteria and maximize from high rank to low.* Prioritize the criteria and select the alternative that provides the best combination of contributions to the most important criteria.
5. *Numerically weight each criterion, rate each alternative's contribution to each criterion, and use the sum-of-weighted-factors method to score each alternative.* This produces an aggregate score or "grand index" for each alternative.
6. *Use the matrix approach.* Fill in the matrix with the best description, indicator, or index of each alternative's contribution to or effect on each criterion, then let reviewers, stakeholders, and/or decision makers apply their own judgments to rank the alternatives.

The choice of integration method depends on the planning situation and needs identified in steps 0–4 of the process (see Box 2.1). Methods 1–5 all require

judgments for setting thresholds and/or ranking or weighting criteria. If the criteria are very broad (such as Loomis's, listed above), it is difficult to come up with a universally acceptable ranking or weighting of criteria.

Method 5 aims to aggregate estimates of effects to produce a "grand index" to rank alternatives and help guide decisions. Techniques that use this approach require that effects be measured on a common scale to permit aggregation. This requires some type of sum-of-weighted-factors approach. The comprehensive techniques that aggregate factors thus involve the same problems of value judgments and mathematical manipulations that the partial techniques do. In most cases, the problems are more substantial because the comprehensive "grand index" methods attempt to combine a far broader set of criteria than do the partial techniques. In general, the broader and more diverse the factors or effects to be combined, the more arbitrary and judgmental the choice, measurement, and weighting of the factors become.

Method 6 includes a broad range of factors but does not attempt to aggregate them into a grand index (e.g., the Simple Trade-Off Matrix; see Westman 1985). Instead, the matrix approach displays the effects and trade-offs of alternatives concisely to help reviewers and decision makers reach their own conclusions based on their own values, without the judgments of analysts. This method asks more of reviewers and decision makers than the aggregation methods, but perhaps this is the way it should be. As McAllister argues: "The central purpose of evaluation should be to help individuals—both citizens and public officials—reach personal judgments regarding the desirability of plans on the basis of the best obtainable information, not to compute grand index scores that seem to tell people what their attitudes ought to be. Transforming personal judgments into group decisions is a political problem that should remain within the realm of accepted democratic procedures" (1980, 277). It is the public forum, not an analytical formula, that should decide on how best to manage the environment.

Environmental Politics

That public forum is the political process. Despite requisite scientific, engineering, economic, and evaluative analysis, planning and decision making still end up being a competition of ideas and alternatives. Certainly, technical analysis is essential in that competition, sort of like the quality of the team "on paper" in a sports match. But how the match is actually played determines the outcome, and not always does the best team on paper win. Often utilitarian values of economic growth and development win the analytical competition; for effective decisions, other values need to be represented in the political process.

Although it is sometimes referred to as political science, politics is often more art than science, especially in the give-and-take legislative process of adopting effective environmental action. Compromise is often the name of the game in efforts to pass incremental policies that may not be perfect, but that provide some progress toward sustainability goals. Pragmatism in environmental politics may require giving in on one issue to advance a larger cause. For example, in the spring of 2010, President Obama issued orders for federal support of new nuclear power plants and for relaxing the federal ban on offshore oil and gas development, much

to the ire of many romantic environmentalists. But these political acts were designed to win support for a larger initiative for green energy and climate change policies that stood no chance of passage without the support of nuclear and oil and gas advocates. Events often influence the political debate. The 2010 Gulf of Mexico Deepwater Horizon oil spill and the 2011 Fukushima nuclear power plant disaster in the wake of the Japanese tsunami both cast new shadows on the political discussion of U.S. energy policy.

Case studies of local political processes have repeatedly shown that there are three ingredients for success in the political process of environmental decision making: *good technical information* provided often by a dedicated planner, a *strong constituency* provided by advocacy groups, and a *champion* provided by an elected or appointed official (Corbett and Hayden 1981). This formula holds true in land use decisions and environmental protection program/policy adoption, as well as state and federal agency decisions.

The effectiveness of the political process also depends on the "level of democracy" applied to the decision making. The spectrum of democracy ranges from nondemocratic authoritative decision making to representative democracy (often called "weak" democracy) to participatory or "strong" democracy. While we pride ourselves in the United States on our democratic principles, too often public decision making is more authoritative or democratically weak than democratically strong.

Participatory, strong democracy depends on an open planning process and the engagement of the public. The process shown in Box 2.1 incorporates opportunities for engagement at each step. For effective engagement, the stakeholders need to care and to believe that their political participation will affect decisions.

Participation, Collaboration, and Conflict Resolution

The democratic political process is manifested in the planning process through mechanisms for public participation. Environmental planning requires difficult public policy decisions, such as the extent to which natural resources are to be developed or preserved, at what levels and through what means pollution is to be controlled, where major facilities are to be located, and what levels of risk are acceptable. Since most of these determinations are based not only on expert judgment but also on perceptions and values, effective environmental decisions require considerable participation of interested parties.

The rationale for public participation is both philosophical and pragmatic. As discussed previously, in our participatory democracy, decisions affecting the public and public resources, like the environment, should be made in the public forum, in consultation with public stakeholders. More importantly, the implementation success of projects and programs depends on their public acceptability. Collaborative decision making and public-private partnerships have enhanced public and political acceptability by giving stakeholders not only input into planning but also a more active role in decisions and implementation.

The spectrum of public involvement ranges from nonparticipation and manipulation to citizen control and power, as described in Susan Arnstein's (1969) well-known ladder of citizen participation (for a variation of the ladder, see Figure 4.1).

Although different situations may call for different levels of participation, most environmental planning cases demand higher levels of involvement. This tendency toward citizen power is what Barber (1984) refers to as "strong democracy" and King et al. (1998) call "authentic participation."

The nature of participation has changed over the past 30 years. Just a few decades ago, participation by public agencies was characterized by "Tell us what you want, and we'll go away and decide what to do." This approach did much to breed contempt and conflict between agencies and their constituents. It also wrongly assumed that publics speak with one voice. Planners often found themselves having to resolve conflicts among competing interests. A decade or two ago, conflict resolution stressed compromise, which often left competing interests dissatisfied.

More recent advances in collaboration and stakeholder involvement go beyond traditional modes of participation and conflict resolution. Collaborative approaches, characterized by "Tell us what you want and we'll all figure out what to do together," involve stakeholders in a deliberative process of collective understanding and learning, in order to develop innovative solutions to conflicts and problems that serve multiple interests (Forester 1999).

Box 2.1 shows stakeholder involvement occurring throughout the planning process. A number of participation techniques can be used, including public hearings, advisory committees, interactive workshops, collaborative partnerships, and Internet social networking. These methods are discussed in Chapter 4, with special attention to collaborative planning.

Although collaborative methods can resolve many conflicts, often more sophisticated alternative dispute resolution (ADR) methods, negotiation and mediation, are necessary for major environmental disputes. The objectives of conflict resolution are to reach an agreement efficiently, satisfy the interests of those involved, ensure the legitimacy of the process, and improve relationships.

Environmental Law

Environmental planning and management are based on technical principles and public values, but the processes operate through the legal system. **Environmental law** encompasses those legal principles and prescripts that have been used through the judicial system to protect human health and environmental quality. It is a composite discipline drawing from a number of legal subjects, including common law, property law, torts, constitutional law, administrative law, and the writing and interpretation of legislation (Salzman and Thompson 2006).

In the United States, prior to 1970 and the plethora of federal environmental protection legislation, environmental recourse through the courts relied primarily on the principles of common law and property law. Under **common law**, the doctrines of nuisance and public trust have served as the focus of efforts to control pollution and protect natural areas, respectively. A **nuisance** is a substantial and unreasonable interference of the use of one's property without a physical trespass and is often used to stop or seek damages from a polluting source. There are private and public nuisances, and these are addressed through state courts, which vary considerably. A private nuisance involves effects on the property of one indi-

vidual, or a small number of people, and is judged by a balancing of the interests presented. A public nuisance involves effects on the community at large, but to claim a public nuisance in court, a private claimant must show special damages beyond those borne by the general public.

The **public trust** doctrine, dating to Roman and English law, holds that the government has a duty as a trustee to protect publicly owned resources. Besides specific public land holdings, these resources include navigable waters and tidelands, and it is in these areas that the doctrine has been used for environmental protection, albeit rarely. Like nuisance, public trust is addressed in state courts, and there is high variability from state to state. To constitute a violation of the public trust, the land or resource must be transferred from public to private use, and there must be consequences that impair the public interest. In California, courts have extended the trust to lands other than tidelands by ruling that all navigable waters plus nonnavigable tributaries affecting navigable waters are subject to the trust. In the landmark 1984 public trust case *National Audubon Society v. Superior Court*, the state was required to revoke some previously granted water rights to Los Angeles Water & Power for the withdrawal of Owens River water to the Los Angeles Aqueduct because it caused lowering of water levels in Mono Lake, with resulting increases in salinity and ecological impacts. A final settlement in 1994 provided for restricted withdrawals that would return the lake to nearly historic levels (Hart 1996).

Property law also provides a basis for environmental law. While the U.S. Constitution provides significant **property rights** to private landowners, it also provides government with the power of **eminent domain**, to take or condemn property for a public purpose without the consent of the owner as long as just compensation is provided. Specific applications of eminent domain are a matter of states' jurisdiction and have often been controversial. In 2005, the U.S. Supreme Court ruled in *Kelo v. City of New London* (CT) that the City had authority to take property with compensation and transfer it (for $1 per year) to private use for development. The political backlash from this decision caused some states to restrict such uses of eminent domain.

In addition, governments also are granted **police power** to regulate private activities, including the use of private land property, to protect public health and welfare. Under the Tenth Amendment to the U.S. Constitution, most police powers are reserved to the states. The federal government does not have general police power, except for its military authority for national security and its authority to regulate interstate commerce under the Commerce Clause of the Constitution. It is within this latter authority that most federal environmental laws and regulations fit. States delegate their police powers to localities. In some so-called Dillon Rule states, localities only have authority that is specifically enabled by the state. In other so-called Home Rule states, localities have police power authority unless specifically excluded by the state. Not all states fit neatly into either category.

Due to the property rights provided by the Fifth and Fourteenth Amendments, however, this police power has limits. Indeed, property owners frequently file **inverse condemnation** suits against local governments, alleging that land use restrictions unjustly "take" or diminish the value of their property without compensation. Based on the standard of review established by the Supreme Court in

1922—"while property may be regulated to a certain extent, if regulation goes too far, it will be recognized as a taking" (*Penn. Coal Co. v. Mahon* [260 U.S. 393, 415])—courts have since debated at what point regulations go too far.

The **takings issue** is extremely important to environmental and land regulation, and it has affected local land use controls and federal regulatory programs for wetlands and endangered species. Several Supreme Court cases in the 1980s and 1990s helped clarify the issue, although it remains a moving target and depends on the specifics of the case. Property law remains one of the most important legal principles for land use planning, which has remained largely a state and local enterprise since Congress failed to pass a comprehensive National Land Use Policy Act in 1974 (Nolon 1996; Nolon and Salkin 2011; see Chapters 17 and 18).

A large number of judicial actions to protect the environment have used the principles of **administrative law** and **legislative review**, particularly since the passage of federal environmental laws in the 1970s and innumerable state and local environmental laws since. The federal National Environmental Policy Act, Clean Air Act, Clean Water Act, Safe Drinking Water Act, Endangered Species Act, Surface Mine Control and Reclamation Act, Resource Conservation and Recovery Act, and many other detailed environmental statutes are subject to judicial interpretation. Both environmentalists and regulated industries have used the courts effectively to challenge federal agency decisions and influence judicial review of the laws, thereby fine-tuning their implementation. This judicial oversight is guided by the Administrative Procedures Act of 1966, which states that federal agency actions are subject to judicial review except where clearly precluded by law. For example, NEPA has been the subject of thousands of lawsuits since its passage in 1970. The court cases have focused primarily on the administrative or procedural requirements of the Act, particularly the preparation of environmental impact statements by federal agencies.

The U.S. environmental laws of the 1970s, in addition to providing the statutory basis for judicial argument, have also enhanced the "standing" of citizens and environmental groups in court. To bring a lawsuit, the claimant or plaintiff must demonstrate specific injury or other adverse effect (which may be aesthetic, conservational, or recreational). Despite arguments made for people to represent the rights of nature in court (e.g., *Sierra Club v. Morton* 1972; Stone 1974), standing in court still requires human plaintiffs to show human injury in fact.

Most of the federal pollution control laws call for state administration of their provisions under the primacy principle, and state laws have thus been passed to conform to federal minimum standards. Many states and localities have gone further with innovative laws and programs for land use regulations, wetlands, stormwater, floodplain management, aquifer protection, wildlife habitat protection, natural hazards mitigation, tree preservation, and other initiatives (Nolan 2002).

The above discussion has focused on environmental and land use law in the United States, but legal structures vary around the world. Box 2.3 gives a brief comparative view of environmental and land use planning law in other countries.

BOX 2.3—Environmental and Land Use Planning Law Around the World

Most nations followed the lead of the United States in 1970s pollution control legislation and environmental impact assessment requirements. However, many nations have caught up, and in some cases surpassed the U.S., in environmental law. For example, in 1969 Congress debated the National Environmental Policy Act with its original call that citizens "have a right to a healthy environment" and ultimately replaced it with "should have a healthy environment." Several countries have included that "right," although it is unclear what effect that wording actually has in practice and in judicial rulings. In addition, many countries have responding more substantively than the U.S. to global agreements fashioned by the United Nations. While the 1992 Rio Earth Summit's Agenda 21 has been a guide for environmental laws in many countries, it had little influence at the federal level in the U.S., and the 1997 Kyoto Protocol for reducing greenhouse gases was ratified by every developed nation in the world except the United States.

With regard to land use law, John Nolan (2005) reviewed the historical background and more than 100 laws related to land use and sustainability from countries across the globe, albeit a sample from the world's 200 independent nations. These legal frameworks, summarized below, determine how land use planning is done in these countries.

- European comprehensive town planning dates back to Sweden's 1874 town planning law. Germany's long tradition of top-down state, regional, and local planning has evolved to give localities authority to adopt plans and zoning to control development around preserved historic centers with open space at the perimeter. In France, city infrastructure planning was conducted at the national level until 1982 when a new law transferred significant authority to the nation's 35,000 municipalities. The formation of the European Union (EU) made environmental laws and standards far more uniform in Europe, and the 1999 European Spatial Development Perspective provided a voluntary strategic plan to guide national, regional, and local authorities in economic development, transportation, and natural and cultural heritage. Still, legal and regulatory authority remains in the national governments of the EU.
- The United Kingdom practiced town and country planning since 1909, but the 1947 Town and Country Planning Act delegated authority to local governments to control all land development, while the central government retained power to approve local plans after public inquiry. The UK's town and country planning traditions had a far-reaching influence on its commonwealth in Asia, Africa, and the Caribbean. The Town and Country Planning Act was amended in 1990 and consolidated with the 1999 Building and Conservation Areas Planning Act and the 1990 Hazardous Substances Planning Act.
- China's 1989 Environmental Protection Law indicated that targets and tasks for protecting and improving the environment must be defined in urban planning.
- Australia's 1991 Land Act established a nationwide system of planning and regulation designed to balance development and environmental protection.
- Environmental and land use laws in many emerging nations were heavily influenced by the 1972 Stockholm Conference on the Human Environment and the 1992 Rio Earth Summit. The latter established Agenda 21, which emphasized the relevance of land use law and regulation to achieving sustainable development. Argentina amended its constitution two years after Rio recognizing the right of all citizens to a healthy environment. Brazil's 2001 Statute of the City gave significant authority to municipalities to regulate the use of urban property for safety and well-being, environmental equilibrium, and the good of the community. Mexico's 2004 General Law of Social Development declares citizens have a right to a healthy environment.

The Role of the Planner

Planners must play a variety of roles in integrating these disciplinary perspectives into the activities involved in the planning process. Figure 1.1 presented environmental management as the interaction of people and institutions in the private sector, government, and civil society. Where does the planner fit into this scheme? Many environmental planners work in the government sector for local, regional, state, or federal agencies. However, professional planners also work in the private sector for development firms and consultants, and in the civil society sector for land trusts and other environmental groups. Although the planner's role varies according to the context, it is always influenced by growing democratization, increasing public value for the environment, the information revolution, and the movement toward more ecological, equitable, and sustainable forms of development. The following overview of the diverse roles of the planner was inspired by John Forester's classic treatise *Planning in the Face of Power* (1989).

The Planner as Technician, as Information Source

Perhaps the most traditional and fundamental role of the planner is as a source of information. If nothing else, the planner is a technician, providing data and information that serve as a basis for decisions. Information is a source of power for planners because their specialized knowledge and technical expertise make them what Forester (1989) calls the gatekeeper of information and access.

Information has continued to be a critical part of planning, especially as planning evolved from design to "applied science" in the 1960s and to political communication during the 1970s through the 1990s. It is difficult for decision makers to ignore good information. Yet misinformation abounds, often presented by certain interests in support of their case. Planners must not only provide information but also manage misinformation that inhibits informed and participatory planning.

As a result of the information revolution, there has been a huge increase in the quantity and quality of environmental and planning data. The Internet provides instant access to data previously unavailable. The planner must convert this expansive data into information, analyze information into knowledge, and translate knowledge into intelligence to develop the best technical understanding of problems and potential solutions.

Advanced information technologies have helped planning meet this challenge. Spreadsheets, statistical software, and computer models have eased data analysis and enhanced the presentation and communication of information. Geographic information systems (GIS) facilitate spatial data collection, storage, retrieval, and analysis. GIS amplifies the visualization of information, alternative actions and scenarios, and impacts to elected officials and citizens. The geospatial revolution, represented by Google Earth and global positioning systems (GPS), and the social network revolution, represented by Facebook, Twitter, and mobile devices, have increased access to more and better information and enhanced communication

and dialogue. In turn, improved information and communication make possible a direct basis for decisions and inform citizens of problems and possibilities, thereby indirectly advancing decisions politically by building community support (see Chapter 5).

The Planner as Facilitator of Public Involvement, Builder of Community Support, Champion of Citizen Empowerment

Although it is grounded in technical and economic information, environmental planning is political. Market forces, powerful development interests, and even many elected officials have long been biased toward development at the expense of the environment and underrepresented groups.

Community action runs counter to this so-called growth machine, trying to compensate for the social imbalance of the market. Action by civil society is viewed as a third system of political power in the democratic competition of ideas, joining governments (the state) and economic powers (the market) (see Figure 1.1). Environmental planning enlists citizen action and encourages a process of citizen empowerment. **Collaborative environmental planning** has emerged as an approach for the engagement of citizens and other stakeholders. It begins with participatory planning and joint decision making, but also includes environmental education, encouragement of counterplanning by citizen groups, and citizen involvement in program implementation (see Chapter 4).

The Planner as Regulator

Many government planners spend more time enforcing regulations—permitting and approving, negotiating, or denying development proposals—than they do in actual planning. In this position as the gatekeepers for development projects, planners have been accused of accommodating development rather than managing it. It is true that planners must react to the proposals submitted, often performing little more than ministerial review and approval. And when development plans do not conform to existing regulations, variances and rezonings are commonplace.

All enforcement officials should exercise what discretion they have in a consistent and equitable manner, to improve the quality of projects and reduce their impacts. Enforcing regulations gives planners some authority in negotiations with resource developers. Therefore, planners need to have communicative and argumentative skills to utilize this regulatory authority to its fullest. They need to represent the interests of the community, to counter misinformation, and to foster inquiry.

The Planner as Negotiator Among Interests, Mediator of Conflicts

As regulators, planners must take a position in negotiations with developers. However, planners must also play a more neutral negotiation and mediation role in resolving conflicts among interests in the advocacy planning or development process. Conflict abounds in environmental decisions. The objective of negotiation and mediation is to involve disputing parties in developing agreements that

benefit both sides. As citizen involvement increases, so does the need for conflict resolution.

Negotiation and mediation are necessary skills in the planner's quest for the best alternative. Some planning scholars, especially proponents of advocacy planning, argue that the public interest cannot be captured in one unitary statement, and the planner must give voice to the many "publics" who are affected by any public resource allocation decision. Planning can then be looked at as a competitive marketplace of ideas and alternatives (Susskind and Ozawa 1984). In such a context, an alternative reflecting a negotiated agreement between conflicting parties stands the best chance of winning the competition for acceptance, and therefore potentially being politically adopted and successfully implemented.

The Planner as Political Adviser, as Politician

Environmental planning has become increasingly political, as controversy surrounding particular issues escalates, as the process becomes more open, and as elected officials turn to planners for advice. As Forester points out: "If planners ignore those in power, they insure their own powerlessness. Alternatively, if planners understand how relations of power shape the planning process, they can improve the quality of their analyses and empower citizen and community action" (1989, 27). To be most effective, planners must recognize the political context in which they operate and adapt their strategies accordingly.

The Planner as Designer, as Visionary

It is planning's future orientation, the "vision thing," that lured most prospective planners into the field. There is a long tradition of utopianism in environmental planning, and despite all the mundane daily activities planners must engage in, it is their potential contribution to the future that keeps them going. These day-to-day planning actions do cumulatively affect the future, but the development of community comprehensive or management plans offers the best opportunity for planners to help design a community's future. The reemergence of environmental and urban design in planning during the past two decades, along with the synthesis of design with rational science and political participation in planning, enable the development of future scenarios necessary for creating sustainable communities.

Although greater emphasis on design and visual images is needed in planning today, it should not replicate the utopian planning of the past. Rather than designing their own creative vision for the community, planners help the community discover its vision of the future and explore means to achieve it. In this context, as Forester puts it, "designing is making sense together" (1989, 119). It is a collective process, and the vision represented by a comprehensive plan should represent the community's values.

Plan development is a participatory exercise, but this does not mean that planners are just facilitators. By providing good information, by offering creative and visual alternatives, and by clarifying opportunities, planners play a principal role in "organizing attention to possibilities" (Forester 1989, 17). This is no less creative a

task than that of the utopian. Developing scenarios, good and bad, has become an important planning tool to characterize alternative futures, articulate the possibilities, and prompt discussion and action to assist communities in shaping their own destiny; forewarned is forearmed (see Chapters 3, 4, and 17).

The Planner as Advocate

The planner should be an agent of change, working through political and participatory democratic channels to empower the community to improve society. The interest of environmental planners in promoting equitable development in harmony with nature implies an advocacy for sustainability, as well as environmental protection, health, and justice.

All planners can use their authority as regulators, as gatekeepers of information, as negotiators and political advisers, and as designers to promote certain programs, plans, and patterns of development or nondevelopment. However, the degree to which a planner can overtly advocate positions depends on the type of planner he or she is, and the position he or she holds. For example, county and city planners, as part of local government administration, are often constrained in their ability to openly promote new initiatives. Their actions need to be more discreet, working with community organizations and sympathetic elected officials. On the other hand, citizen planners, or counterplanning community groups, are the strongest advocates. However, they have less authority, and their influence depends on building a constituency and using information and community support to affect decisions.

Environmental Planning in the Twenty-First Century

In the twenty-first century, we have new environmental planning imperatives, including energy and climate change, environmental justice, human health, and livable and sustainable communities. These issues are complex, and solutions are constrained by uncertainties, political controversy and disputes, limited government budgets, and countering movements for deregulation and property rights protection.

Despite these constraints, a quiet revolution has been under way in environmental planning and management. As discussed in Chapter 1, the many social movements throughout the world have converged toward the quest for sustainability, which combines objectives for environmental protection, human health, energy efficiency, climate protection, economic development, social equity, and community livability. With growing urbanization, that quest is not more apparent than in our cities where environmental planners must work to create more sustainable communities.

We used to think that planning is knowing; now we realize that planning is learning. We are learning to face new challenges and opportunities through emerging approaches for environmental and community planning, design, and management. Over the past two decades, planners, designers, engineers, managers, and

NGOs have experimented with new ways of synthesizing the broad objectives of sustainability and collaboration. These approaches carry different labels—civic environmentalism, integrated resource management, negotiated agreements, learning networks, community-based environmental protection, active living, ecosystem management, watershed management, New Urbanism, and livable communities, to name a few—but they all share common objectives for engaging people in determining the destiny of their communities, living in harmony with the natural environment, and providing for human health and justice.

Here are five basic elements of these emerging approaches to environmental planning for this century:

1. **Science-based sustainability analysis**. Good decisions require good information, and planning must be based on the best science and research in sustainability, which involves environmental, economic, and human factor analysis, including long-term and global impacts.
2. **Adaptive management or scientific learning**. Despite the best science and research, we cannot know everything. We must learn. Rational-comprehensive approaches, which simply "study and do" and deny uncertainties, are insufficient. Rather, learn and adapt: Study and do and monitor and evaluate and learn and study and do and monitor, and embrace uncertainties along the way. Adaptive management follows the learning-by-doing process. The cyclical process involves not only planning, but also action, monitoring, and evaluation. Learning from results is the basis for further planning.
3. **Collaborative planning, design, and decision making or social learning**. Science and economics do not capture all values, so environmental planning needs participation, consensus building, stakeholder involvement, collaborative design, and learning networks. Collaborative environmental planning builds partnerships, social capital (networks), intellectual capital (mutual understanding), and political capital (constituencies), all of which develop the capacity for learning and resiliency.
4. **Seeking common solutions to multiple objectives**. Sustainability implies broad objectives for the economy, the environment, social justice, and livability. Campbell (1996) and Godschalk (2004) argue that planners must manage the conflicts between these often competing objectives. But the quest for sustainability needs to find the solutions that consider all objectives. Plans and designs for sustainable communities can protect water *and* reduce carbon and air pollutant emissions *and* set aside habitat and open space *and* access affordable mobility *and* provide affordable housing *and* support the economy with green jobs *and* foster human health through active living *and* provide greater livability. Seeking common solutions to multiple objectives enhances cobenefits and cost-benefit analysis and gathers diverse constituents to provide political support.
5. **Link local action to both local needs and global issues**. Many of the vast array of programs for sustainable communities are driven not only by the desire to enhance their local community, but also by the need

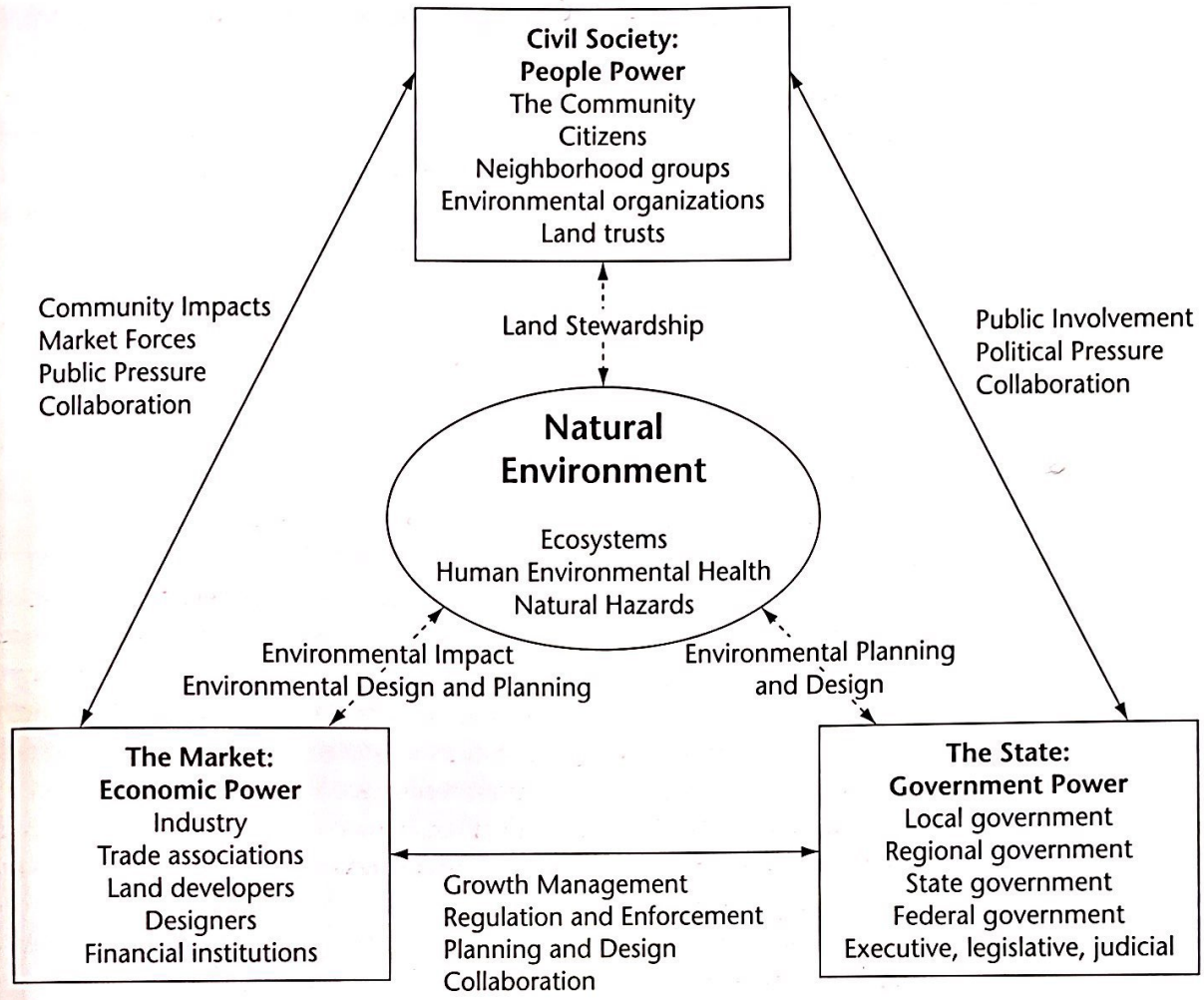
to contribute to the sustainability of their region, nation, and planet. Such is the case for the thousands of communities developing climate change mitigation plans. Berke (2008) and others view this linkage of local to global as a common thread tying together communities around the world in their common quest for sustainability.

Summary

Planning, especially in the public context, is a diverse and interdisciplinary field that is continuing to evolve as society changes, as democracy matures, and as methods of knowledge generation improve. This is particularly true in an environmental context, which is heavily influenced by both science and human and societal values, as well as the interdisciplinary influences of engineering, economics, politics, communication, law, and ethics.

Making sense of it all can be fun but challenging. Planners have modified their quest to know everything before making decisions by engaging in a process of learning. Although this takes the pressure off the search for the "best and only" solution, it raises different problems of process and communication. When applied to scientific learning through adaptive management, additional challenges for monitoring and evaluation are required for learning by doing.

Environmental planning continues to evolve as we improve our capacity to make smarter decisions based on the best information available and the broadest range of public values. We aim to foster more livable and sustainable communities, and this requires a wide range of skills, including information management, technical analysis, urban and environmental design, communication, and conflict resolution. Chapter 3 discusses a framework for applying those skills to land use planning, and subsequent chapters address specific methods of analysis, communication, and design.



ure 1.1 Participants and Relationships in Environmental Planning and Management.

The Market

In our strong market economy, **private** activities—**the market**—determine to a large extent the fate of the environment. Ultimately, the consuming public makes choices about products and designs that shape patterns of production and development. Growing consumer preference for sustainable products has spurred a recent market transformation for more sustainable goods, ranging from green buildings and ENERGY STAR appliances to hybrid cars and organic food. When retail giant Walmart launched an initiative in 2009 to green its stores, products, and delivery systems, the green consumer market movement went mainstream, because of Walmart's significant effect on the global market supply chain.

In addition to retailers, industrial firms, land developers, landowners, and farmers play critical roles as they initiate actions that impact the environment, respond to environmental regulations and programs, and develop innovative technologies and approaches for environmental control. Landowners and farmers have a special opportunity and responsibility for environmental stewardship of their lands and waters. Landowners, developers, and associated firms, including financial institutions, real estate agents, and designers, are sometimes referred to

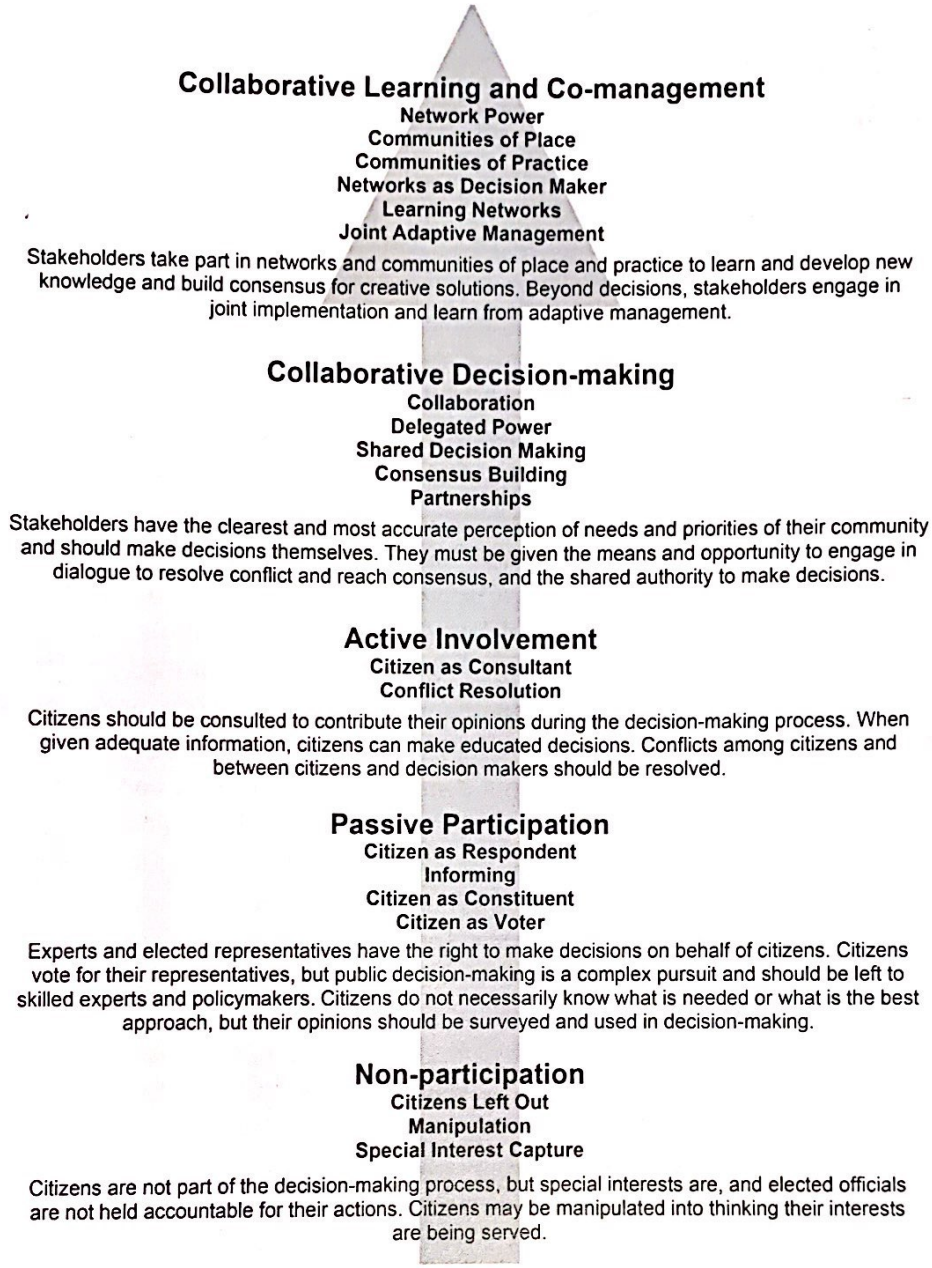


Figure 4.1 Evolving Levels of Citizen Participation. (*Source:* Adapted from Arnstein 1969.)

can develop a shared vision, resolve conflict, build consensus, and formulate creative solutions.

The latest **fourth generation of collaborative learning and comanagement** recognizes that simply tapping the values and knowledge of stakeholders, resolving conflicts, and building consensus to inform decisions are still limited efforts in the quest for better and more creative solutions and effective implementation. This emerging approach focuses on the generation of new knowledge through joint learning and on stakeholder involvement in implementation or comanagement.