1993

# Options for managing resource use

Janet Gail Camel
*The University of Montana*

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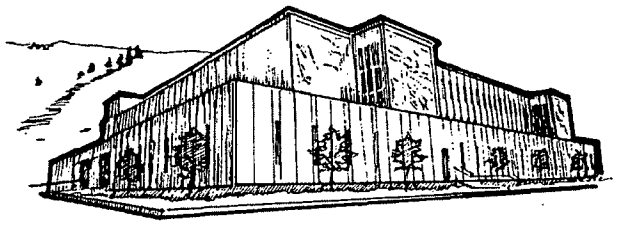

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**OPTIONS FOR MANAGING RESOURCE USE**

by

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B. S., University of Wisconsin-Madison, 1978

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for the degree of

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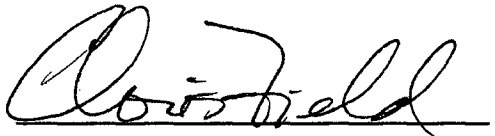

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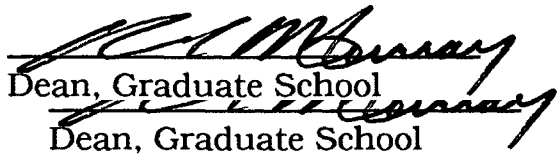

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Options for Managing Resource Use

Director: Chris Field

Numerous impacts to resources are occurring within our global system, ranging from species extinction to ozone depletion. Uncontrolled development in regions such as the Flathead Valley in Western Montana, is causing air and water quality degradation as well as other problems. This paper was developed to provide a proactive means for protecting resources on a local level, within a regional context, hoping that the small steps of each region will reverse these global trends.

The paper includes a discussion on comprehensive planning, resource inventory and analysis, and an overview of regulatory and non-regulatory plan implementation techniques for guiding and controlling development. The techniques described include traditional zoning and zoning-related tools, controls for division of land, numerical restraints on development, land acquisition, public spending and taxation, flexible techniques such as performance zoning, and other resource-oriented methods.

## ACKNOWLEDGMENTS

Having had the chance to work for the Confederated Salish and Kootenai Tribes of the Flathead Nation, I have witnessed some tremendous progress toward development of resource protection programs and policies that attempt to address the physical and cultural effects of man's actions. The Tribes' efforts to provide a source of income for their people, while sustaining the natural environment upon which both Tribal members and non-members depend, are not only commendable, but are standing up to the challenges of politics, litigation, greed and even racism. The holistic approach to resource management is a fundamental component of many tribal cultures in which man and nature are inter-connected. I am honored to have the opportunity to learn more about environmental planning from the Tribes.

I am also honored to have had the chance to work with so many excellent professors and teachers at the University of Montana. Professor Chris Field, my advisor, sparked my interest in planning when he promoted open dialogue on the physical and cultural impacts of population movement and land development in his planning seminar. His office was always open for discussions on any topic, and his concern for my needs as a single parent were greatly appreciated. Professor Darshan Kang taught me some of the technical methods needed to study natural and cultural resource trends; I will always admire his ability to challenge his students with difficult course material supported by friendly encouragement. Kristina Ford, formerly of the Public Policy Research Institute, provided an inspiring research assistantship which not only made it financially possible for me to attend Graduate School, but also gave me the boost in self-esteem I needed to pursue an advanced degree. Professor Jeff Lockwood provided a listening ear and offered his help as the third member of my committee with little advance notice.

I would like to thank my parents for providing the foundation for my studies; our many political arguments and their visionary, waste-recycling efforts taught me to look beyond the status quo. And to my husband, Robert, and my children, Sandi and Anthony, my greatest appreciation for putting up with my impatience and all those hours away from home; you give me strength.

## PREFACE

The following professional paper, "Options for Managing Resource Use," is essentially an overview of land use tools that can be used to guide growth and manage resource use. Its stimulous was the proposed expansion of U.S. Highway 93 through the Flathead Indian Reservation, from Evaro to Polson. The proposed expansion not only raised concerns about the direct environmental and cultural impacts of construction, but also the secondary land use and cultural impacts which could result from an improved four- or five-lane facility.

The Confederated Salish and Kootenai Tribes are currently in the process of developing a Land Use and Growth Projection Study of the corridor in cooperation with Missoula, Lake and Sanders counties. The study will be funded primarily by the Tribes and partially funded by the Montana Department of Transportation, with the counties providing staff time and data. It is divided into four inter-connected phases: (1) a forecasting of development trends and growth projections for areas along the corridor, (2) an analysis of local public opinion about development trends and regulation, (3) an identification of sensitive areas and areas suitable for development within the corridor, and (4) an exploration and identification of a range of regulatory and non-regulatory methods for guiding and controlling development.

This professional paper was written to provide a baseline document for use by the study team in completing the fourth phase of the Highway 93 Land Use and Growth Projection Study.

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## Chapter One -- Introduction

The cultural and physical resources of this planet are humbling. Whether the breath-taking beauty of a mountain lake, the power of a hydroelectric generator, or the millions of plant and animal species sustained by a rain forest, we now know that all development is related to continuity.

Knowledge about resources has been passed for thousands of years between elders, teachers, and young people through experimentation, oral history, physical example, and institutional education. Scale and rate of resource uses have varied from the holistic "respect and replace what you take" practices of many tribal cultures to the intensive, exploitive "develop for highest return" practices of recent consumer-oriented cultures.

While tribal cultures have thrived for thousands of years utilizing holistic resource use methods, the "develop for highest return" strategy now appears to be a practice of industrial society that will only persist for the short-term. We know that some resources, such as natural gas

and crude oil, are nonrenewable. They exist in finite quantities and will most likely be economically depleted within 50 or 100 years at their present rate of use. Most importantly, we have learned that most resources are limited by their interconnection with the earth's intricately-balanced system of air, water, minerals, and landforms that supports multiple subsystems with millions of living organisms. We are seeing that intensive resource use has depleted or tainted water supplies, degraded air quality, destroyed wildlife habitat and exterminated numerous plant, insect and animal species. The environmental impacts of resource-intensive development can be found in nearly every ecosystem on our planet, and some experts predict significant changes of global proportions if ozone depletion and global warming trends continue.

As the implications of these environmental changes to human economies have become publicized, many individuals and groups have advocated the placement of limitations on resource use. Many countries have passed environmental legislation to attempt to control the degree of impact an industry may have on resources, such as air, water, wildlife, and even the ozone layer.

With passage of the National Environmental Policy Act (NEPA) in 1969, the United States began an era of unprecedented federal environmental legislation. This legislation included the Agricultural Act of 1970, the Clean Air Act, the Federal Water Pollution Control Act, the Coastal Zone Management Act of 1972, the Noise Control Act, the Safe Drinking Water Act, the Energy Supply and Environmental Coordination Act of 1974, the Toxic Substances Control Act and the Solid Waste Disposal Act, to name only a few.[1]

Recent amendments to the Clean Air Act, and apparent enforcement of the Endangered Species Act by mediation of the spotted owl controversy, seem to indicate that the United States is renewing a comprehensive policy of environmental protection. State and local governments have both created a variety of planning and regulatory programs to improve protection of natural resources for the health, safety and welfare of their citizens. "Sustainability" of resources has become a buzzword in many planning efforts at all levels.

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1. Federal Environmental Laws, 1988 Edition (St. Paul, Minn.: West Publishing Company 1988) ix-x.

Environmentalists continue to advocate the expression "think globally, and act locally."

But are these resource use controls actually working on a comprehensive basis? Will we be able to sustain present and foreseeable future populations of man, as well as the populations of plants, fish, insects, and animals in the systems upon which we all depend for survival?

There are still many countries with no development or resource use controls whatsoever. And in the United States, many environmental laws have not been enforced because the administration of the 1980s chose not to implement them, or because some polluting industries have enough money to fight environmental regulation through lengthy litigation and appeals processes. Even if enforced, our federal legislation is not comprehensive.

Local resource guidelines are the vital link in the sustainability of regional and global resources. But many rural areas have neither the financial resources nor the political will to develop or enforce environmental planning and regulation. Many, reliant on resource-intensive industry for economic survival, fight for jobs instead of

environmental protection because they perceive few alternatives for feeding their families.

This paper focuses on options for managing resource use. Development activities in Western Montana are described to provide an example of how traditionally weak rural planning can be negated by economic change. The main theme of the paper is a discussion of the planning process: how timely plan updates and resource-use regulation could protect the integrity and sustainability of a region's resources and society.

## Chapter Two -- Comprehensive Planning

During the 1980s, many grants were funded to study the declining economies and communities of rural America, especially those where resource extraction industries such as mining and forestry were being curtailed as a result of resource exhaustion, rising energy costs, international competition, leveraged buy-outs and economic stagnation. Experts advised communities to pursue development of service-related industries, such as tourism and telecommunications, that could be based on local resources but would be somewhat independent of local resource extractive industries.

In Montana, economic development experts urged communities to promote tourism, in order to capitalize on the beauty and natural resources of the state. In the late 1980s, a state bed tax was passed to finance tourism promotion, and a national advertising campaign began. More tourists, and subsequently more residents, have been coming to Western Montana ever since. University of Montana Economics Professor Thomas Power states that approximately 600,000 tourists

from outside of Montana pass through the Flathead Reservation every year.[2] The 1990 Census indicates that population levels in Flathead and Lake counties increased 14% and 10% respectively in the last decade.[3] As a result, the Flathead Valley is booming, and busting.

Water quality in Flathead Lake is declining, as are native fish populations. Air quality particulate levels in larger towns--Kalispell, Whitefish, Polson and Ronan--are rising above established clean air thresholds. Signs are blocking key viewsheds. And children and grandchildren of long-time local residents, wishing to stay in the local economy, are being priced out of the real estate market. Land and housing prices soar as migrants from other parts of the country that have already experienced price inflation are able to pay top dollar for real estate.

And while that boom economy benefits realtors and the housing industry on a short-term basis, long-term, irrevocable impacts are occurring. New houses, roads, shopping centers and fast-food drive-ins

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2. Thomas Power, presentation at the Salish and Kootenai Tribes' Low Impact Tourism Education Conference, November 19, 1993.
3. U.S. Census Bureau, 1980 Census of Population, Characteristics of the Population (Volume 1, part 28, Montana) October 1981. U.S. Census Bureau, 1990 Census of Population and Housing, P.L. 94-171 file.

are constructed over agricultural lands and wildlife habitat. New, lower-paying jobs are being created, but costs of services are rising with increased needs for police and fire protection, landfill space, sewage treatment, water, power, fuel, educational facilities and medical facilities.

Resources in growing areas like the Flathead Valley are being utilized much more quickly than they are being renewed or maintained. Development of a comprehensive resource use plan is the first step toward management of community resources.

**Traditional Comprehensive Planning**

Comprehensive planning in many American communities has traditionally included:

- growth projections to evaluate future needs for employment, housing, retail services and infrastructure (including utilities, schools, streets and other public amenities);
- a review of the location and type of existing land uses, structures and facilities serving those uses; and
- a land use plan to accommodate projected growth.

These urban-oriented plans are not actually comprehensive, for they do not always consider the resources that are being displaced, polluted or even depleted by new development. Few local political powers look at all of the resources of the region and then consider the sustainability of those resources.

**Rural Environmental Planning**

Rural environmental planning takes the opposite approach. It looks at the natural resources of an area first, and then evaluates the probable impacts of continued use of those resources.

According to University of Vermont Professor Frederic Sargent:

> *A rural environmental plan recommends uses for all land with reference to the "carrying capacity"[4] of the land, the need for conservation and the goals of the people.... It puts special emphasis on (1) aesthetic planning, (2) natural area protection, (3) wildlife habitat protection, (4) conservation zoning, (5) provision of extensive recreation facilities, (6) providing public access to public water, (7) protecting agricultural land, (8) improving water quality and (9) controlling the rate of growth.*[5]

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4. Carrying capacity is generally defined as an environment's ability to withstand population growth without significant degradation. Methodologies for determining carrying capacity can be highly complicated and expensive.

5. Frederic O. Sargent, Rural Environmental Planning (South Burlington, Vermont: 1976) 5.

Sargent notes that while environmental planning emphasizes environmental protection, it does not oppose growth. Growth is permitted "on the basis of land suitabilities[6] and capacities, with restrictions to protect natural cycles and plans to provide compatible public access."[7] He stresses the importance of public participation and education in the rural environmental planning process, and the importance of growth control whose limitations are based on a town's ability to provide and maintain public services.

**Ecological Landscape Planning**

Frederick Steiner, author of The Living Landscape: An Ecological Approach to Landscape Planning, describes an even more comprehensive approach to planning. In addition to emphases on land suitabilities and capacities, public education and participation, and a locality's financial ability to provide services, he asserts the importance

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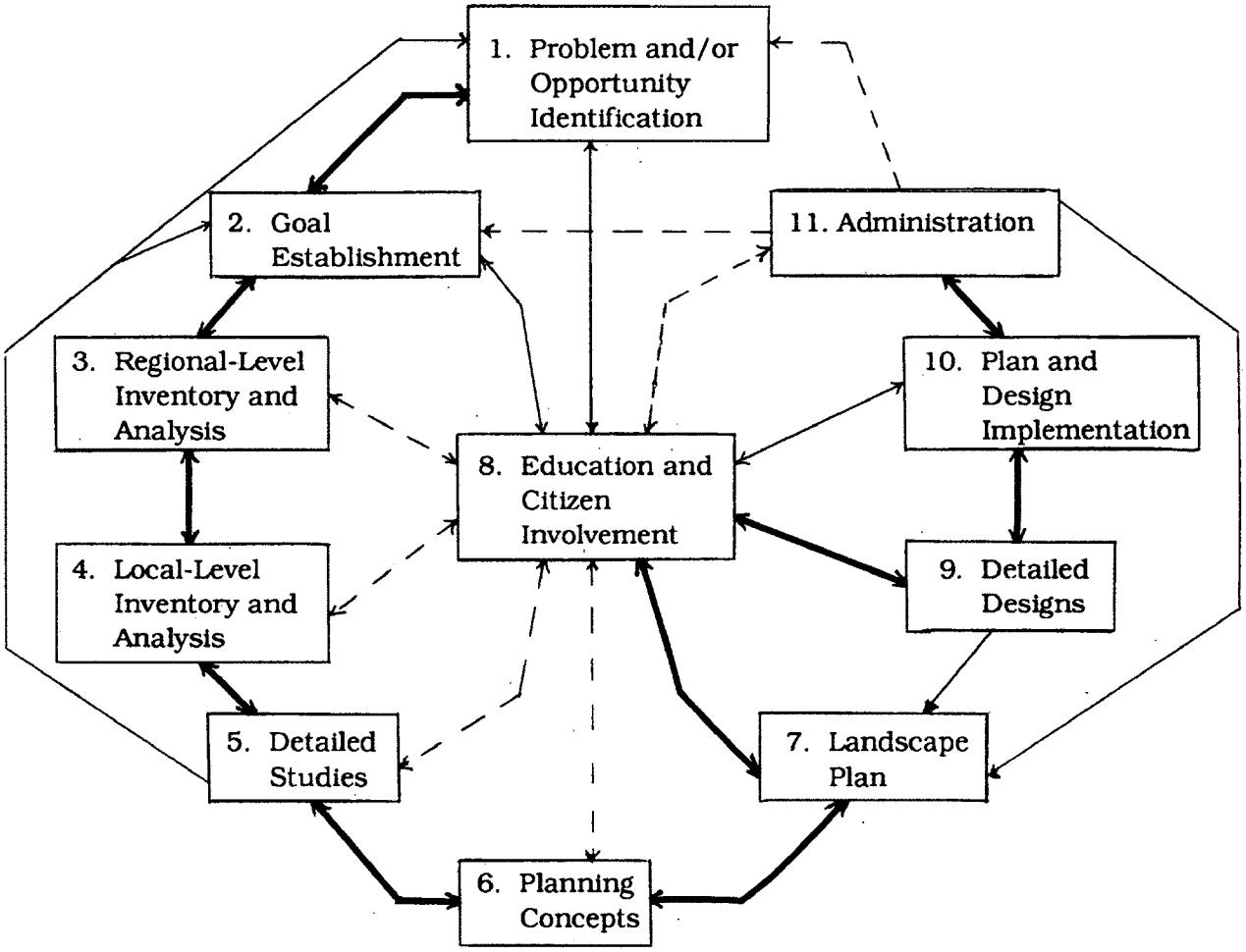
6. "As explained by [Ian] McHarg (1969), suitability analyses can be used to determine the fitness of a specific place for a variety of land uses based on thorough ecological inventories and on the values of land users." As cited in Frederick Steiner, The Living Landscape: An Ecological Approach to Landscape Planning (New York: McGraw-Hill, Inc. 1991) 14.
7. Sargent 5.

of linking the landscape and its problems "to the national and local political economic structure."[8] Step 1 of the approach results in identification of issues that arise from the "interrelationship between people and nature."[9] These issues can be local, national, international or global. Steiner utilizes the model in Figure 2.1 to summarize the ecological landscape planning process. It is adapted from various conventional as well as landscape planning processes, and incorporates the element of design in the methodology. The cycle of decision-making and consultation shown in this diagram represents an ideal procedure for both institutional and individual participation.

Steps 3 and 4 explore three different "levels of scale"[10] for inventory and analysis: regional, local and specific site. By exploring these levels of scale, one can see how resource conditions at a certain location might affect the overall resource conditions of a community and the region therein. For example, when effluent from one town's

8. Steiner 8.
9. Steiner 11.
10. Levels of scale are simply different ways of looking at a resource, either from the "ground's eye" perspective at a specific site, the "bird's eye" perspective of the whole community, or the "satellite" perspective of an entire region, such as a watershed.

**Figure 2.1.** Ecological Landscape Planning Model[11]




11. Steiner 10.

sewage treatment plant is discharged into a stream or river, it accumulates in the river or lake downstream along with pollutants carried by other tributaries. This accumulation could affect the reproductive rates of certain microorganisms, insects and fish. Dwindling fisheries could affect the regional food supply, as well as community recreation and tourism resources.

Step 5 of the landscape planning model links the first four steps together, utilizing a method such as suitability analysis that would look at the planning area's ability to accommodate different land uses, based on ecological constraints or opportunities and human values.

In Step 6, the planning process participants would consider this analysis and create a range of land-use options for accomplishing their established goals. Then, in Step 7, they would identify preferred land-use alternatives in a landscape plan to provide "flexible guidelines for policymakers, land managers, and land users about how to conserve, rehabilitate, or develop an area."[12]

12. Steiner 17.

Step 9's detailed designs would graphically illustrate these policies to help decision-makers visualize their potential spatial organization. Specific examples could include site designs, farm conservation plans and conceptual drawings of new facilities.

Step 10 would employ various techniques to implement the plan, including land use regulation, property acquisition and/or assessment of fees. An overview of these methods is presented in the following chapter. Step 11, administration, would include the ongoing evaluation of these techniques to ensure that the goals of the plan are reached. Plan administration is usually accomplished by the local planning staff and a planning board or commission. Citizen involvement is critical.

> *Citizens should play an important role in administering local planning through commissions and review boards that oversee local ordinances. To a large degree, the success of citizens boards and commissions depends on the extent of their involvement in the development of the plans that they manage.... The Land Conservation and Development Commission [in Oregon] comprising seven members who are appointed by the governor and supported by its professional staff, is responsible for overseeing the implementation of the state land-use planning law. Another group of citizens, 1000 Friends of Oregon, monitors the administration of the law. The support that the law has from the public is evidenced in the defeat of several attempts to abolish mandatory statewide land-use planning in Oregon.*[13]

13. Steiner 19.

**Resource Inventory**

We can see from the previous examples that there are different types of comprehensive planning. And while acknowledgement of community concerns is an important component of planning, it is even more important to thoroughly evaluate the physical and cultural environment if resource sustainability is to be realized. The first step in this evaluation is the resource inventory.

There are two general categories of resources that should be inventoried: natural resources and societal resources. Tables 2.1 and 2.2 provide a broad range of elements that could be included in these inventories, dependent on the area of study and the goals and financial means of the planning effort.

A Resource Inventory Method for Land Use Planning in Montana[14] describes several steps for inventorying resources. First, the planning area is established and a thorough search for any existing information about the area is conducted. Land ownership, use and

14. Montana Department of Natural Resources, A Resource Inventory Method for Land Use Planning in Montana (Billings, Mont.: Allied Printing and Supply Co., 1973) 6, 8, 9, 68, 69, 78.

**Table 2.1.** Natural Resources[15]

Physical

- Regional Climate
  - General Classification
  - Precipitation
  - Temperature
  - Wind Patterns/Velocity
  - Inversions
  - Relative Humidity
  - Air Quality
- Geology
  - Mineral Resources
  - Depth to Bedrock
  - Outcrops
  - Bedrock and Surficial Deposit Characteristics
  - Faults/Earthquake Zones
  - Slope Stability
- Physiography
  - Physiographic Region
  - Elevation
  - Slope and Aspect
- Hydrology/Groundwater
  - Recharge Areas
  - Aquifer Locations and Yields
  - Water Quality
  - Seasonal Water Table Levels
- Hydrology/Surface Water
  - Drainage/Basins/Watersheds
  - Irrigation Systems and Dams
  - Locations of Streams, Lakes, Wetlands, Coastlines and Estuaries
  - Lake Levels/Stream Volumes
  - Locations of Floodplains
  - Water Quality
  - Community Water Supplies

Physical (continued)

- Soils
  - Series
  - Depth
  - Water Holding Capacity
  - Surface Permeability
  - Subsurface Permeability
  - Shrink/Swell Behavior
  - Erosion Potential
  - Strength, Stability and Development Limitations
  - Agricultural Capability
- Microclimate
  - Ventilation
  - Fog and Frost
  - Solar Radiation

Biological

- Vegetation
  - Vegetative Units
  - Species List
  - Physiognomic Profiles
  - Ecotone and Edge
- Wildlife
  - Species List
  - Species/Habitat Matrix
  - Habitat Value Map
  - Food Web

Aesthetic

- Landscape Features and Types
- Color, Form, Definition, Continuity, Discord, Repetition, Light Direction, Distance
- Observer Positions

15. Compiled from Steiner, 43-72, and the Montana Department of Natural Resources, 78.

**Table 2.2.** Societal Resources

Land Use

Cultural Resources
- Prehistoric Sites
- Historic Sites
- Present-Day Use Sites

Agriculture
- Types of Crops Raised
- Cropping Patterns
- Livestock
- Location of Feed Lots
- Dairies

Housing
- Type
- Condition

Location of Employment
Parks and Other Recreational Facilities
Aesthetics, Light and Glare
Transportation
- Type
- Location of Routes and Facilities
- Level of Use

Noise
Use Patterns and Densities
- Historical
- Existing

Ownership
Existing Management Plans/Zoning

Population

Trends
Characteristics (e.g., age, education)
Projections

Economic Development

Industries
Employment Rates
Shopping Facilities

Utilities

Power Generation Facilities
- Substations
- Major Transmission Lines
- Energy Use

Waste Treatment
- Sewage
- Landfills

Recycling Centers
Communications
- Transmission Lines
- Transmission Towers

Hazard Areas

Explosives Storage/Use
Toxic Substances Storage/Use

Care Facilities

Child Care
Elderly Care
Ambulance Services
Clinics - Medical and Dental
Hospitals

Educational Facilities

Elementary and Secondary Schools
Colleges and Training Centers
Libraries

Government/Volunteer Services

Fire Protection
Law Enforcement
Judicial Services
Welfare Services
Food Banks
Homeless Shelters

Land Values, Availability, Tax Rates

historical values are determined. Then subareas are prioritized for further inventory based on the social values of the planning process participants, critical natural resource values (such as air quality and water quality), potential for hazards and rate of development.

Next, a general description of the area is compiled to include size, regional location, boundary, general land use history, topography, overall climate and vegetational characteristics. Third, land capability and constraint factors such as geology, climate, hydrology, soils, vegetation, wildlife, fisheries and ecosystem maintenance areas are inventoried. Then suitability factors such as visual and recreational resources, water quality and air quality are inventoried.[16]

Finally, interpretive maps are developed for each major resource to graphically display any sensitive areas that may need protection from development (e.g., critical wildlife habitat, cultural sites, municipal water supplies), natural resource areas that could be maintained for production (e.g., prime and important farmlands, commercial forest

16. Capability factors are based on physical constraints to or opportunities for resource development in relation to customary or known technologies, while suitability factors are determined in accordance with the community's "quality of life" values.

lands, mineral deposits), areas with development constraints (e.g., steep slopes, high water tables, unsuitable soils) and areas deemed important for recreation or aesthetics.

It is important to note that too much data, as suggested by Tables 2.1 and 2.2, if not relevant to the needs of the community, can over-complicate the planning process although it is important to have sufficient data for accurate analysis. A balance must be achieved during early stages of planning so that local perceptions of problems and opportunities can be refined, not overwhelmed. Caution must be exercised if consultants conduct much of the inventory, since local planning participants need to have knowledge of the resource base if they are to develop rational plans.

Resource inventories are usually only as complete as time and money allow, however. Many plans simply utilize existing data gathered from various sources, such as the U.S. Census Bureau, U.S. Geological Survey, U.S. Soil Conservation Service, U.S. Fish and Wildlife Service, state agencies, and county assessors. Some planning efforts receive financial support through special grants or local fund-raising and are able to conduct field inventories, studies and social surveys to

supplement existing data. But many communities must rely on local government budgets for inventory and plan development, and are thereby limited in the amount of data that can be gathered. Some communities have been successful in organizing volunteer task forces to assist with data collection--a process that helps the participants to "own" the information and the problems, and to eventually develop the solutions.

**Resource Analysis**

After the resource inventory has been completed, projections are developed to determine both the possible and the probable growth rates for the different sectors of an area economy, including the amount of housing, infrastructure and other social resources needed to accommodate the growth. Most comprehensive planning efforts then analyze the capacities of the area's infrastructural resources, such as schools, roads and sewage treatment plants, and by zoning, attempt to delineate areas for future development.

Many of these efforts fail to objectively analyze the capacity of the locality's natural resources to support existing and future development,

however, even though some data, such as soil and slope capabilities and limitations, have been identified. Since many rural communities still have the luxury of abundant open space and rarely experience air and water pollution, the expense of collecting capacity data has not seemed justifiable. Yet, evidence of groundwater contamination is now becoming more widespread, and many communities are running out of space for landfills.

Some communities, such as Missoula, Montana, have begun carrying capacity analyses of their water supplies and landfills, working to control the impacts of waste disposal on their environments. Communities must also consider the environmental effects from the production of those resources, before they are utilized. We often forget that much of our food, clothing, fuel, power and other consumer items is produced outside of our communities, and we do not consider whether their production is based on the sustainability of the resource and the surrounding environment.

The Environmental Planning Resourcebook, prepared for the Lands Directorate of Canada, lists several factors which need to be

considered with regard to development of a resource before it is even utilized:

- *Identification of the resource (exploration, surveying, etc.)*
- *Preparation for its exploitation (e.g. building access roads, clearing and grubbing, erecting facilities, fertilizing the soil)*
- *Extraction of the resource (mining, for instance) or otherwise tapping its potential (e.g. sowing and harvesting)*
- *Disposal of associated wastes*
- *Transport of the derived raw materials to markets or to the next stage of processing*
- *Renewal of the resource, where appropriate (e.g. reforestation) and/or restoration of the site.*[17]

Today, both private and public enterprises must consider such factors before making economic commitments. The resource analysis component of comprehensive planning should, at least in theory, identify all resource uses in the planning area, as well as the impacts of those uses before and after they are utilized, so that we can see and plan for the true comprehensive costs of our actions. Projected human needs must be included in this analysis. Unfortunately, very thorough resource use analysis is extremely complex and would require intensive

17. Reg Land and Audrey Armour, Environmental Planning Resourcebook (Montreal: Lands Directorate, Environment Canada in Association with Supply and Services Canada and Multiscience Publications Limited, 1980) 193.

effort and expense to produce what are usually contingent and indeterminate recommendations. But one must argue its necessity if we are to responsibly accomplish the goal of providing for the health, safety and welfare of our citizens' future generations.

Vern House, author of Using Comprehensive Planning in Montana,[18] compares the potential costs and benefits of comprehensive planning in Table 2.3. If a community truly values the potential benefits of planning, it will find a way to cover the costs. For example, resource analysis could be accomplished in stages as funds become available. Cooperative efforts between local, state, tribal and federal agencies could pool resources for capacity and suitability studies.

Volunteers could possibly utilize computer models to analyze the resource use habits of their families and businesses. Public agencies could analyze their use patterns (as they have for energy efficiency in the past), and a statistical model could be developed to project community resource use trends. As more information about resource carrying capacities becomes available, these community-wide trends

18. Verne House, Using Comprehensive Planning in Montana (Bozeman, Mont.: Montana State University Cooperative Extension Service, 1974) 9.

**Table 2.3.** Potential Benefits and Costs of Planning[19]

| Potential Benefits | Potential Costs |
|---|---|
| More efficient use of private and public funds | Dollars for collecting and analyzing data |
| Better use of natural resources | Time given to deciding on common goals |
| Preservation of amenities, particularly those deriving from the natural environment | Conflict over goal-setting |
| Increased public interest in community affairs | Time given to getting people involved |
| Increased awareness of others' goals, values and quality of their lives | |
| Increased awareness of what to expect | |

19. Verne House, Using Comprehensive Planning in Montana (Bozeman, Mont.: Montana State University Cooperative Extension Service, 1974) 9.

could be plugged into a land suitability model, although the level of detail for this analysis would most likely depend on the value of the resource to the community and the rate at which the resource was being depleted or contaminated.

Analysis for resources produced outside of the community would, of course, be dependent on availability of information. Economic information, power projection studies, and community purchase and recycling policies (e.g., bans on detergents with phosphates, curbside recycling) may be the only factors regarding "imported" resources that are available for use in the model.

The planning officials could provide a series of maps to depict resource use areas, the intensity of those uses, and any other major features affecting those uses. For example, a groundwater use map would delineate general aquifer locations and levels, recharge areas, well locations and potential point and non-point pollution discharge sources. Accompanying information would include estimates on the volume of water pumped from the community's aquifer(s), estimates on the amount of effluent discharged, the rate at which contaminants could potentially reach the aquifers, and water quality data taken from

sample locations. The suitability of a particular area for further development would be determined by water quantity and quality projections for the area, and any use and impact standards developed by the community or other governmental agencies.

Following such analyses of the interactions and relationships between resources, and determination of the capacity and suitability for growth, future development alternatives could be identified according to community goals and objectives. "Goals and objectives should be grouped by development type and landform," providing separate objectives for development on lakefronts, wooded slopes, and farmland, for example.[20]

The community planning team could then draft a plan to address the preferred alternative(s) for accomplishing resource use goals. For example, if a community has a goal to retain the rural features of farmlands, the alternative could be to develop site design requirements that would preserve soils, vegetation, waterways and infrastructure such as homes, barns and silos where feasibile. On lakefronts, for

20. Fred Heyer, Preserving Rural Character (New Jersey Federation of Planning Officials, 1990) 3.

which a community may have a primary goal of retaining water quality, development requirements could include completion of a lake management plan to control pollutants such as pesticides and fertilizers, and standards for on-site wastewater treatment that would protect water quality.[21]

Specific plan implementation measures, to be reviewed in the following chapter, would be discussed by the team, then drafted and proposed at a public hearing to allow another opportunity for those community members not already involved in the planning process to comment. After incorporating community comments, the implementation plan would be proposed to the governing body(ies) at an additional public hearing(s). The level of community participation in the process and the political atmosphere of the locality or region would then determine whether or not the plan would actually be implemented through adoption and then through enforcement of these controls.

21. Heyer 3.

## Chapter Three -- Resource Use Standards and Controls

A multitude of resource use standards and regulations have been developed in the United States. They range from the traditional Indian philosophy of "respect and replace what you take," to the nuisance-based zoning of the colonial era, to the modern-day use of performance standards and impact fees. Dr. Forster Ndubisi, Landscape Architecture and Regional Planning Professor at the University of Georgia, Athens, has compiled a "menu" of standards and controls in his recent book, Planning Implementation Tools and Techniques: A Resource Book for Local Governments. Table 3.1 lists those tools[22] in outline form. This chapter provides an overview of each category in Ndubisi's list, with special emphasis on those techniques that address resource sustainability.

22. Planning professionals sometimes refer to a "toolbox" of plan implementation measures wherein a "tool" is a procedural or legal means of attaining some societal goal.

**Table 3.1.** Ndubisi's Menu of Planning Implementation Tools[23]

I. Traditional Regulatory Tools
- A. Zoning and Related Tools
  1. Conventional Zoning
  2. Bonus and Incentive Zoning
  3. Floating Zoning
  4. Minimum Lot Size
  5. Variances
  6. Special Permits
  7. Exclusive Agricultural or Nonresidential Zoning
  8. Environmentally Sensitive Areas Zoning
  9. Cluster or Average Density Zoning
  10. Building Codes
  11. Planned Unit Development
- B. Division of Land
  1. Traditional Subdivision Regulations
  2. Phasing
  3. Official Mapping
- C. Numerical Restraints or Quota Systems
  1. Total Population Restrictions
  2. Annual Building Permit Limits
  3. Population and Employment Targets

II. Fiscal Tools
- A. Land Acquisition
  1. Acquisition of Less Than Fee Simple
  2. Fee Simple Acquisition
  3. compensable Regulation
  4. Advance Site Acquisition
  5. Transfer of Development Rights

II. Fiscal Tools (continued)
- B. Public Spending and Taxation
  1. Capital Improvement Programming
  2. Urban and Rural Service Areas
  3. Special Assessment
  4. Preferential Assessment
  5. Development Timing
  6. Impact Fees
  7. Exactions

III. Flexible and Impact-Related Tools
- A. Performance Standards
- B. Performance Zoning Systems
- C. Environmental and Fiscal Impact Statements
- D. Carrying Capacity
- E. Impact Zoning
- F. Cost/Benefit Analysis
- G. Rating Systems

IV. Resource-Oriented Tools
- A. Environmental Moratorium
- B. Restrictive Covenants
- C. Historic Preservation Ordinances
- D. Sign Ordinances
- E. Regulation of Mobile Homes
- F. Design Review

V. Other Implementation Tools
- A. Educational Tools
  1. Transfer of Information
  2. Community Education
  3. Technical Assistance
- B. Administrative Processing and Delay
- C. Annexation
- D. Moratorium
- E. Interim Development Controls
- F. Enforcement of Restrictive Covenants

23. Forster Ndubisi, Planning Implementation Tools and Techniques: A Resource Book for Local Governments (Athens, Georgia: Insitute of Community and Area Development of the University of Georgia, 1992) 101-102.

**Traditional Zoning or Zoning-Realted Tools**

Zoning is the most common method of land use regulation. Its general purpose is to separate land uses that are incompatible. For example, **traditional zoning** limits a noise- or odor-emitting industrial development to an industrial zone, away from residential development.

Zones are delineated and labeled on a zoning map. The text of the zoning ordinance is then keyed to different land use zones on the map. In addition to describing the allowed use of the property in a zone, the text of a conventional zoning ordinance also specifies building setback requirements from streets and property lines, building height, lot size and development densities. Some zoning ordinances regulate landscaping, structural design, signage, stormwater management and traffic circulation.[24]

Although conventional zoning promotes orderly development and limits density, it is an inflexible regulatory tool that "restricts the ability to address development quality issues effectively."[25] Changes to the

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24. Michael A. Mantell, et. al., Resource Guide for Creating Successful Communities (Washington, DC: Island Press for the Conservation Foundation, 1990) 180.
25. Ndubisi 19.

type of use allowed in a zone must go through a re-zoning process complete with public hearings.

**Bonus or incentive zoning** allows for variations in building height or other dimensional limitations, in exchange for provision of an amenity such as additional public recreation space. Disadvantages can become obvious when the political process gets corrupted or highly controversial, and the community can be sued. The courts tend to be unsupportive of this technique.[26]

**Floating zones** provide for a use such as a hospital or an airport that is not depicted on the zoning map, but standards for the use have been included in the text of the ordinance. Such zones can alter the character of the area in which it is finally located, sometimes lowering property prices.

**Minimum lot size zoning**, also referred to as **large lot zoning**, requires that lots be of a certain size, often to limit development impacts in a sensitive environmental area. While this type of zoning can protect agricultural lands from being split into tracts too small for farming, it

26. Ndubisi 18.

can also promote residential development sprawl and high capital costs for infrastructure service development.

**Variances** allow a landowner to vary from one or more provisions in the zoning ordinance if he can prove a hardship in his ability to develop his land. For example, he may have an irregular lot size that is not entirely deep enough to meet all of the required setbacks in the ordinance. The procedures for granting variances can be cumbersome and expensive in proportion to their "fairness."

A **special permit, or conditional use**, is granted when a particular type of development needs specific planning or zoning board review. An example would be the establishment of a bed and breakfast business in a residential area. The board would want to review the size of the establishment to ensure that it meets the traffic, setback and signage standards of the zone.

**Agricultural zoning** establishes a minimum lot size in an area to ensure the feasibility of viable agricultural productivity on each tract. There are several forms, such as minimum lot size zoning described previously, and performance-based zoning which is described later on in this chapter under "Flexible and Impact-Related Tools." Another type

is exclusive agricultural zoning, where non-farm dwellings or activities are either prohibited or controlled. "Farm" is usually defined in performance terms linked to property tax appraisal conditions, whereby the parcel must be used for raising or managing crops and livestock, with a minimum annual income produced from that agricultural use.

**Cluster zoning, or open space zoning**, is another tool that can protect farmland, wildlife habitat, or other natural resources. To achieve that protection, residential development is usually clustered on the least productive or least sensitive portion of a tract. "Special permit criteria can ensure that the undeveloped portion of the site is permanently dedicated for agricultural [or other conservation] purposes, and that the preserved land has access, dimension, character, and location that promotes the viable use of the land...."[27] The overall density of development on the parcel can be maintained or enhanced while critical resource areas remain as open to desired uses.

A **planning unit development (PUD)** is another form of cluster

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27. Michael A. Mantell, et. al., Creating Successful Communities: A Guidebook to Growth Management Strategies (Washington, DC: Island Press for the Conservation Foundation, 1990) 9.

zoning that allows mixed uses within one parcel of land. A PUD is often created on a large tract, usually in urban or suburban areas where mixed residential, commercial, industrial, institutional and recreational development could occur. Design options are more flexible than with conventional zoning as lot sizes and densities can vary to better provide for open space and protection of natural or other desired features. Site review is generally more complicated and costly, but clustered development can reduce long-term costs for street and utility development, school bus services, police protection, road maintenance and other services, and still enhance property prices.

**Environmentally-sensitive areas zoning, or overlay zoning**, usually applies to areas with special cultural or physical features, such as historic districts or endangered species habitat.

> *An overlay zone applies a common set of regulations and standards to a specific area that may cross several pre-existing conventional zoning districts. Development within the overlay zone must conform to the requirements of both the overlay and the underlying zoning district(s) or the more restrictive of the two. For instance, overlay historic districts often allow the uses permitted in the underlying zoning district, but at the same time require structures within the historic district to be maintained in conformity with additional standards to ensure compatibility with the character of the historic district.*[28]

28. Ndubisi 18.

**Floodplain regulation** is another example of overlay zoning. Regulations are described in the zoning ordinance (or sometimes in a separate document), but are delineated on separate Flood Insurance Rate Maps most often developed by the Federal Emergency Management Agency to depict a stream's 100-year floodplain. Areas within the floodplain are subject to flood-related development criteria in order to be eligible for federal flood insurance. Some regulations prohibit the development of permanent structures or septic systems in these areas.

Overlay zones can also be used for:

- other hazard areas such as unstable slopes, areas susceptible to wildfire, or areas with high seismic activity;
- ecologically-sensitive areas including coastal zones, lakeshores, wetlands, rare geological formations, old growth forests, rare plant sites, critical wildlife habitat, and migratory corridors or stop-over points;
- renewable resource areas including aquifer recharge zones, prime farmlands, mineral resource areas, commercial forest lands, productive fish and wildlife areas, and air quality protection area;

- cultural resources such as wilderness, recreation and scenic areas, historic buildings and other culturally-significant[29] sites.

**Building codes** are another traditional regulatory tool that specify use and size of building materials to ensure health and safety. The codes regulate strength and stability of a structure, sanitation, ventilation and adequate light. They can also affect resource use by requiring, for example, energy efficient design, solar access, water-conserving plumbing fixtures and systems, and storage areas for recycling.

## Division of Land

**Subdivision regulations** manage the division and platting of land parcels. In many rural areas they are the only means of regulating housing development and protecting the public interest with regard to

29. The word "archaeological" is not used here out of respect for the Indian culture committees with whom I have worked. The term "archaeological site" often implies the presence of artifacts; however, the Flathead and Kootenai Culture Committees of the Flathead Nation maintain that a site can have cultural significance without the presence of "artifacts".

lot layout, access, drainage and construction of public improvements. These regulations may provide standards for road and right-or-way design, pedestrian facilities, stormwater management, utilities, recreational facilities and open space. Lot layout standards can encourage or protect solar access. Landscaping standards can require wastewater reuse, siting to aid building energy efficiency and reduce heat reflection, and buffering to control traffic noise and dust.

It is important to remember that standards can increase some initial housing costs so as to exclude lower- and moderate-income home buyers.

**Phasing** is a method of growth management. Community space is divided into development and holding zones. Growth is allowed and investment encouraged in areas that are already predominantly developed, and also in urban growth areas where extension of services is planned for the future, while the other zones restrict development to agricultural and open space uses.

An **official map**, sometimes referred to as a **master plan**, depicts future locations of streets and other public facilities as a way to reduce the potential for future incompatible development. It depicts existing

public lands and rights-of-way, as well as delineating locations of future parks, streets, utilities and other public facilities. The map is usually implemented by a comprehensive plan or a capital facilities plan, and should be used in concert with other tools to effectively guide growth to physically and economically suitable areas.

**Numerical Restraints**

**Numerical restraints and quota systems** attempt to manage growth according to acceptable levels as determined by the community. For example, limits are placed on the number of building permits issued annually. Projects must then compete for those permits.

**Fiscal Management -- Land Acquisition**

There are two general categories of fiscal techniques a community can utilize for resource management. The first is acquisition of land or development rights.

**Fee simple acquisition** purchases the entire "bundle" of rights that are associated with property, such as mineral, water, hunting and development rights. Although usually the most expensive form of

acquisition, fee simple land is desirable for development of public facilities such as schools or landfills.

It follows that a **less-than-fee-simple acquisition** would not include purchase of all property rights. Those rights not purchased, such as mineral rights, would remain in a taxable status. A party also has the option to acquire one or more rights to a property through the use of easements. There are two types of easements: affirmative and negative.

> *The owner of an affirmative easement has the right to do something with or on property belonging to someone else. An affirmative easement, for example, may authorize a utility company to place electric lines across someone's property or may authorize the public to pass over property to a riverside fishing spot.*
>
> *The owners of a negative easement has the right to prohibit certain activities on property belonging to someone else. A negative easement may prohibit a landowner from constructing a building that would interfere with a scenic view from a neighboring parcel. A negative easement--for instance, an easement that prohibits development but allows a landowner to continue to farm and live on a parcel [also referred to as a* ***conservation easement****]--may provide many of the same public open space benefits as full fee acquisition, but can generally be acquired at a substantially lower cost than a fee interest. In addition, management costs are usually assumed to a large degree by the private landowner, rather than by the public agency or land trust that holds the easement. Another fiscal advantage of easements is that the land remains on the tax rolls, albeit at a reduced value. Negative easements, however, may create long-term administrative, enforcement, and maintenance costs.*[30]

30. Mantell, Resource Guide for Creating Successful Communities, 187.

**Compensable regulations** allow a property owner to be monetarily compensated for the value of his property that has been diminished by the enforcement of the regulations.

**Advance site acquisition** is a method that could be utilized with an official infrastructure map, whereby the purchase of, or option to purchase, all property rights would occur before the property is actually needed. Land trusts sometimes conduct advance acquisition for public agencies as they can often negotiate more quickly and adeptly.[31]

**Transfer of development rights (TDR)** is the legal conveyance of development rights from one parcel of land to another. The concept was developed to offset the economic impacts of zoning. Steiner provides the following example of TDR:

> *A county commission designates two 100-acre (40.5-hectare) parcels of land, A and B. Each parcel is zoned for residential development at one unit per acre. The commissioners later decide that parcel A should remain in its current agricultural use. As a result, to ensure the continued agricultural use, the county permits the transferring of the one unit per acre development rights to parcel B. The property owner can then use those rights to develop parcel B at one unit per 1/2 acre (0.203 hectare), which amounts to the original one unit per acre plus the transferred unit per acre.*[32]

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31. Mantell, Harper and Propst. Creating Successful Communities: A Guidebook to Growth Management Strategies, 186.
32. Steiner 261.

Individuals and public agencies may buy, donate, trade and sell TDRs.

It is important to note that when development rights are transferred, the site to which they are transferred should be suitable for development, based on carrying capacities developed for the comprehensive plan.

**Fiscal Management -- Public Spending and Taxation**

The other category of fiscal tools available to communities is public spending and taxation. **Capital improvements programming** is one example. Public funds must be budgeted and acquired over a period of years for major facilities development or improvements, such as road construction or sewage treatment plant expansion. Planned projects are ranked according to need, priorities and economic feasibility, then financially programmed according to the most efficient development sequence, considering project size, location, construction disturbance and economic return. Whether or not development occurs in a specific area could be largely dependent on capital improvements programming.

An **urban service area** would receive the benefits of public infrastructure and pay in accordance with the time frame spelled out in the capital improvement plan.

A **special assessment** "is a method of raising revenue in which all or part of the cost of a facility is charged to a landowner who derives a special benefit from the facility."[33] The fee could be based proportionately to the length of the facility across the property, the land area served by the improvement, or the value of the improvement to the property served. The enterprise could benefit as well, since public capital is used to support the "up-front" development costs.

**Tax relief measures** for open space and farmland can assist in keeping lands from being sold and developed as a result of rising property taxes. For example, a preferential assessment would tax land according to its present use rather than its development potential or market value.

**Exactions** are land dedications, fees or requirements imposed on a developer by a community to provide the on-site infrastructure needed

33. Mantell, Resource Guide for Creating Successful Communities 186.

to serve a new development. These requirements can include the construction of roads, utilities, drainage facilities and parks. In Montana, a donation of land or cash is often allowed in lieu of actual parkland development.

**Impact or linkage fees** are required by some communities to pay for a development project's impact on off-site public facilities. Fees are based on the project's proportionate share of maintenance and construction for infrastructure such as collector streets and highways, sewage treatment systems, open space, recreational facilities, police and fire protection, transit and stormwater management. Some communities have also required fees for libraries, child care facilities and employment programs.[34] The fees are usually "based on a formula that ensures fairness to both new and established residents," and are collected when building permits are issued.[35] New development pays for the costs of growth, rather than existing residents paying through increased monthly user fees or taxes.

34. Mantell 184.
35. Ndubisi 37.

**Flexible Techniques**

These tools have been developed during the latter part of this century to either supplement or take the place of traditional zoning in order to provide better protection of resources and more flexibility in the development review process.

**Performance standards** were developed to address environmental, economic and social concerns and processes and to measure the effects of development on those processes, rather than simply considering into which zone development should be placed. For example, whereas traditional zoning would classify a manufacturing plant as industrial and restrict it to an industrial zone, performance standards would consider whether or not the plant is relatively pollution free, creates any noise or has moderate traffic generation. If it fits within appropriate standards, it could be located in a commercial area on the periphery of a residential neighborhood.

The standards are measurable and legally-definable and based on current technologies and perceptions. They are applied in some communities through the use of zones where building size, setbacks and density are still considered, as in traditional zoning, but the

existence of differing adjacent uses can be mitigated by landscaping. "The greater the conflict in adjacent land uses, the larger the bufferyard should be, including a greater use of trees to screen out noise, dust, exhaust, and visual effects."[36] Additional site design standards can also be implemented, such as minimum open space ratios, floor-area ratios (for non-residential uses) and maximum impervious surface ratios to protect open space and surface water quality values. Consideration of development density also plays a key role, not only for determining development effects on public facilities (such as increased traffic on local streets and collectors), but also impacts on air and groundwater quality. For example, in rural areas with highly permeable soils and no centralized sewage treatment system, standards could be set for the number and efficiency of septic systems in order to protect the groundwater resource.

Black Hawk County, Iowa, established standards for farmland zoning based on Soil Conservation Service classifications. Parcels with

36. Thomas Daniels, et. al., The Small Town Planning Handbook (Chicago: American Planning Accosiation, 1988) 119.

soils that had high suitability ratings for growing corn were given the highest restrictions with regard to development.[37]

Bucks County, Pennsylvania, developed a methodology for calculating the **carrying capacity** of a development site **based on performance zoning** and open space criteria.[38] The first step is to conduct an on-site inventory and decide which areas will not be usable for development, such as road and utility rights-of-way and areas that have previously been restricted from development or zoned for another use. Natural resources are then mapped and measured to determine open space ratios. For example, floodplains, wetlands, important farmlands, watersheds and key viewsheds would be protected as 100% open space, while forests are given a value of 80% protection, meaning that 80% of the forested lands should remain undisturbed. After these lands are subtracted from the number of potentially developable acres, recreation acreage is calculated at a ratio of 20% of all unrestricted land.

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37. Mantell, Creating Successful Communities: A Guidebook to Growth management Strategies 10.

38. Lane Kendig, "Carrying Capacity: How It Can Work For You," Environmental Comment (December) 4-6, as cited in Steiner.

With this technique, the community or the developer can then determine the net buildable site area by comparing the ratio of restricted lands, determined previously, to the open space requirements developed by the community planning team for that zoning district in the zoning ordinance. If the percentage of restricted lands is less than the open space requirement, additional lands must be set aside. If the percentage of restricted lands exceeds the open space requirement, the greater percentage applies for the site. The maximum number of building units for the site is determined by the density (number of building units per acre) allowed within the zoning district multiplied by the acreage of the remaining net buildable site area. (See Appendix A.)

Performance standards can also be implemented through a **rating system** that permits new development according to the number of points it merits when compared to a checklist that has been developed from community planning goals and objectives. "Absolute" requirements, such as a policy of no structural or septic system development in a floodplain, would be mandated for each permitted project, while adherence to "relative" requirements would be evaluated

under a point-scoring system.[39] For example, if a town's policy is to encourage infill development to maximize capital facilities efficiency and discourage sprawl, a project would receive several points for being close to a major collector street, but no points for being outside of the sewer district.

Under this rating system, once a project obtains a high level of overall points, it may be approved. If not, the project could be redesigned to achieve a higher rating.

**Environmental and fiscal impact statements** are another form of impact-related tools. These assessments identify the environmental, economic and social effects of a proposed development project, and compare alternatives for developing the project based on how each alternative would affect resources. Measures are then developed to mitigate any unavoidable adverse impacts created by the preferred development alternative.

39. Steiner 248.

According to Ndubisi:

> *Concerns with the impacts of a proposed project led to the development of impact zoning in which a project is evaluated based on many considerations, particularly the local growth rate, the capacity and condition of public services, the economic costs and benefits of the project, and the negative and unavoidable consequences of the project on the environment.*[40]

While impact assessments require communities to have up-to-date information regarding the condition and capacity of public services, all of the impact-related tools described here place much of the burden of environmental analysis on the developer. These tools also promote flexible and more expedient development review. Precisely defining standards can be difficult, however, and public participation is critical when developing any techniques for resource management.

**Resource-Oriented Tools**

Resource-oriented tools protect important natural and human resources such as wetlands, farmlands, river corridors, scenic vistas and cultural sites--often referred to as critical resource areas.

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40. Ndubisi 47.

*Critical and environmentally sensitive areas are terms and concepts often used interchangeably. Critical areas were proposed by the American Law Institute's Model Land Development Code, which described them as:*

- *An area significantly affected by, or having an effect upon, an existing or proposed major public facility or other areas of major public investment*
- *An area containing or having a significant impact upon historical, natural or environmental resources of regional or statewide importance (American Law Institute, 1974)*[41]

One or more techniques, some of which have already been discussed, can be implemented to protect critical resource areas. Ndubisi aggregates these tools into three general categories: environmentally-sensitive resource controls, historic preservation ordinances and aesthetic resource controls.

**Environmentally-Sensitive Resource Controls**

Many environmentally-sensitive resource controls are based on **standards** set by federal, tribal and state laws and enforced through tribal, state and local programs. Floodplain management, air quality standards and water quality regulation are examples of these controls.

41. Steiner 248.

Regional and local governments are also utilizing a host of other techniques to **regulate the use** of natural hazard **areas**, ecologically-sensitive areas and renewable resource or economically-critical areas. (Specific resources in these categories are listed on page 32.) Conventional zoning, overlay zoning, performance measures, subdivision regulations, environmental impact assessments and land acquisition can all be utilized to protect sensitive areas.

**Regulations** can also be developed **to protect specific resources** such as wetlands, woodlands or hillsides. These resource-specific regulations generally have several elements in common:

1. *A statement providing the rationale and purpose of protecting the specific resource*
2. *A definition of terms associated with the protection of the resource, including the location and boundaries of the resource*
3. *A list of permitted, prohibited, and conditional uses or performance measures*
4. *An outline of the permit procedures*
5. *A description of penalties and enforcement measures*[42]

Another tool that can be implemented for resource protection is a **moratorium** on all or certain types of development for a specified length

42. Ndubisi 62.

of time, usually until a growth management plan or a capital improvements plan can be developed and implemented. For example, a moratorium on sewage hookups may be necessary if a sewage treatment plant reaches capacity before it can be upgraded.

**Restrictive covenants** are another form of resource protection. For example, homeowners in a new subdivision adjacent to important wildlife habitat could have a restriction in their property deeds that requires all pets be contained in yards or on leashes to avoid wildlife disturbances. Covenants are difficult to enforce, however, unless homeowner associations or local governments are willing to check for compliance.[43]

**Historic preservation ordinances** are generally implemented as overlay zones to protect the historic character of a neighborhood. While the use restrictions of the underlying zones still apply, alterations to existing structures, as well as the design of new buildings, must

43. Steiner 258.

undergo design review by a preservation commission before a building permit is granted in a historic district.

Historic buildings and sites not included in these districts can also be protected from destruction or major alteration if they are placed on the **National Register of Historic Places**, but the process for placement is quite strict.

Other cultural resources, such as some prehistoric, historic and present-day American Indian cultural sites, are protected by **federal, tribal, and state legislation**. This legislation includes the National Historic Preservation Act of 1966, the American Indian Religious Freedom Act of 1978, the Archaeological Resource Protection Act of 1979 and the Native American Grave Protection and Repatriation Act of 1990. The Montana Human Skeletal Remains and Burial Site Protection Act was passed in 1991.

This legislation is not comprehensive, however, and many tribes across the United States continue to work to establish regulations to protect all cultural resources, including traditional plant harvesting areas, religious sites and wildlife and fisheries resources. In 1853, Chief Sealth (Seattle) of the Suquamish Tribe is reported to have said:

> *Every part of this earth is sacred to my people. Every shining needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people. The sap which courses through the trees carries the memories of the red man.*
>
> *The white man's dead forget the country of their birth when they go to walk among the stars. Our dead never forget this beautiful earth, for it is the mother of the red man. We are part of the earth and it is part of us. The perfumed flowers are our sisters; the deer, the horse, the great eagle, these are our brothers. The rocky crests, the flowers in the meadow, the body heat of the pony, and man--all belong to the same family.*[44]

Many non-Indian communities fail to acknowledge tribal cultural resources when developing their comprehensive plans and resource protection strategies. Much could be gained by respecting the traditional cultural values of Indian people who utilized resources throughout this continent on a relatively sustainable basis for thousands of years. Salish and Kootenai leaders state that cultural resources must be protected foremost, because our histories teach us how to live and they remind us of our mistakes.[45] Protection of these resources is difficult to regulate because specific sites are often not disclosed by tribes for fear of exploitation or vandalism.

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44. North Dakota Outdoors (July 1978) 20-25.

45. Confederated Salish and Kootenai Tribes' Tribal Council goal-setting session, 1990.

**Aesthetic resource controls** protect another type of cultural resource, ranging from important scenic vistas to the appearance of buildings and signs in relation to their surrounding environment.

**Sign regulation** considers the type, size, height and location of outdoor advertising in order to protect the appearance of a community, and to prevent traffic hazards from obstructed views. Off-premise signs such as billboards and snipe signs (fastened to poles or trees) advertise a product or business establishment in a different location from the business itself. On-premise signs are posted directly on the building in which the business is located, or on the business property.

On-premise signs are usually regulated in a manner that meets "the needs of the business community and the public without degrading the appearance of the community."[46] Snipe signs are usually prohibited in most communities, while billboard controls vary, ranging from absolute bans to temporary moratoriums, creation of billboard-free zones, limiting the number allowed in an area, development of

46. Ndubisi 71.

guidelines regarding location, spacing, size and height, and removal of nonconforming signs.[47]

**Design review regulations** are another form of aesthetic control wherein new development is reviewed to ensure architectural compatibility with the unique characteristics of a neighborhood. Mobile homes or tract subdivisions can be regulated in this manner, requiring that they be a certain width, have a specific type of roof design, and be placed on permanent foundations.

**Other Implementation Tools**

Ndubisi lists several techniques under the category of "other implementation tools," such as moratoriums and enforcement of restrictive covenants which were also included in previous categories.

**Annexation** is another technique whereby land adjacent to an incorporated municipality is annexed into that municipality in order to provide services such as sewage treatment.

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47. Eric Kelly and Gary Raso, Sign Regulation (Chicago: American Planning Association, 1989) 6, and Ndubisi 72.

**Interim development controls** are similar to moratoria in that they are imposed for a limited time period. They allow for some development until a plan is adopted or implemented, but usually restrict the intensity of that development. In Montana's Missoula and Lake counties, for example, interim sign regulations were just recently passed in response to the development of several 1200 square foot signs that sprang up along U.S. Highway 93 within the past several months. These regulations limit signs in non-commercial areas to 32 square feet in size. The Confederated Salish and Kootenai Tribes, whose reservation intersects both of these counties and who regulate signage through a revocable permit system, elected last spring to withhold all sign permits until a study on signage development is completed.

Other techniques include local, state and federal technical assistance programs, such as county extension agencies, conservation districts and Environmental Protection Agency handbooks for local governments and consumers.

## Chapter 4 -- Developing a Strategy

> **.... When you build a thing you cannot merely build that thing in isoloation, but must also repair the world around it, and within it, so that the larger world at that one place becomes more coherent, and more whole; and the thing which you make takes its place in the web of nature, as you make it.**
>
> --A Pattern Language[48]

In order to successfully implement any of the previously described techniques, it is important to remember that comprehensive planning provides the umbrella. It is the identification and analysis of resource uses and the establishment of goals and objectives by the community for managing resource sustainability.

Implementation of the comprehensive plan must consider the most effective methods for protecting all community resources, whether physical, economic, social or cultural; and maintain working

48. Christopher Alexander, Sara Ishikawa, Murray Silverstein, Max Jacobson, Ingrid Fiskdahl-King, and Shlomo Angel, A Pattern Language (New York: Oxford University Press, 1977) xiii.

No planning implementation tool can accomplish resource use management in and of itself; a combination of compatible local techniques and regional resource management is necessary for providing flexible, comprehensive guidance. The courts specify that these controls cannot be arbitrary or capricious and must follow due process of law. Given the population growth and resource depletion and degradation rates of our planet, they must also be more comprehensive in nature than ever before.

Communities can look to each other to find tools that are working well, as did Lake County, Montana, when adopting interim sign regulations modelled after those of Missoula County. Cooperative working relationships can be established to protect resources that cross political boundaries, such as the Upper Flathead System Fisheries Management Plan 1989-1994 which was developed by the Confederated Salish and Kootenai Tribes and the Montana Department of Fish, Wildlife and Parks to manage the fisheries of Flathead Lake and its tributaries.

Out-dated and weak comprehensive plans, unable to address present growth rates, can be updated through community fund-raising

Out-dated and weak comprehensive plans, unable to address present growth rates, can be updated through community fund-raising efforts, as is currently the case in Montana's Flathead County. Volunteers can also unite to develop plans where none currently exist, such as in the City of Ronan, Montana, where a base plan is being developed from the use of existing documents and resources. Grants can be obtained to fund carrying capacity studies of critical resources such as sole source aquifers and endangered species, as is the case in Missoula County.

Aboriginal people can continue to share their heritage and model value systems from which all could learn to live more lightly on the land. Theirs is simply an approach by which we can sustain all of our rights to clean air and water, to food and shelter, to our habitat.

# Appendix A

(An illustrated version of performance zoning, as distributed at the Twelfth Annual Zoning Institute in Orlando, Florida, in 1992.)

American Institute of Certified Planners
Planners Training Service
1313 East 60th Street
Chicago, Illinois 60637

# Twelfth Annual Zoning Institute
October 21 - 23, 1992

## *"A Land Use Toolbox for the 1990s"*
*Thursday, October 22, 1992*
*9:30 a.m. - 12:00 noon*

ATTACHMENT

Thomas J. Peterson, AICP, Fort Collins, Colorado
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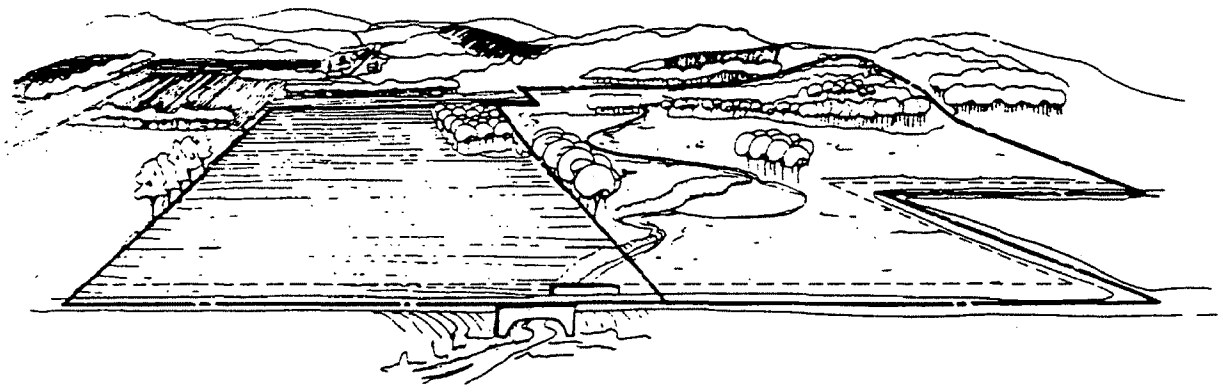
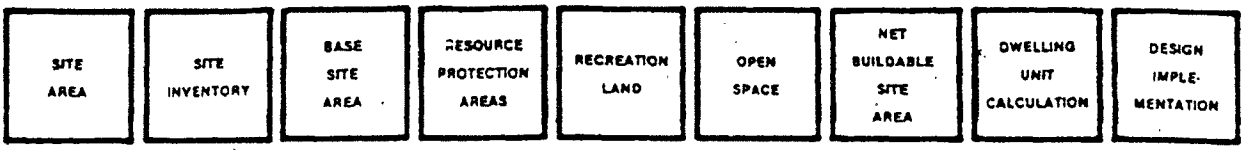
# PERFORMANCE ZONING

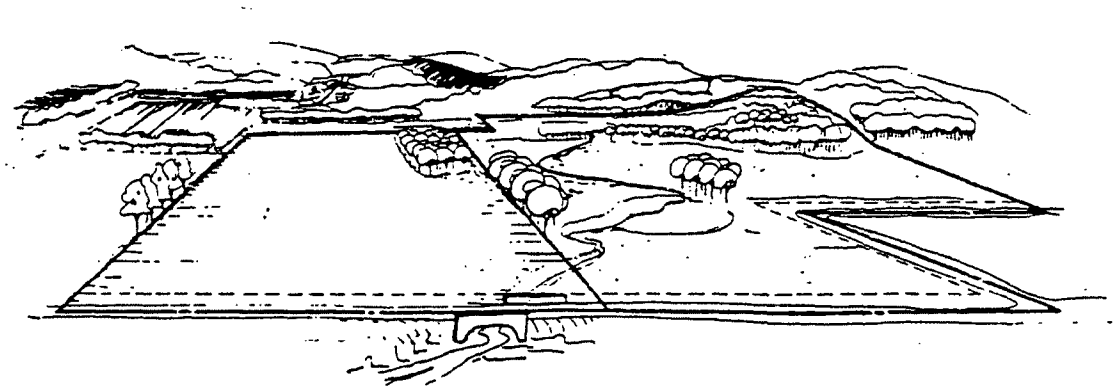


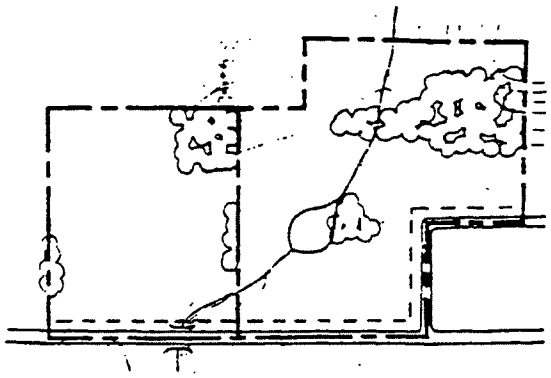
## site capacity calculation

Bucks County Planning Commission 1978




Performance Zoning Standards for natural resource protection have been developed by the Bucks County Planning Commission to provide guidelines for the site specific evaluation of the land's natural features. This evaluation will help the developer to determine how much acreage on his property is suitable for development and natural resource areas which are to be protected. This assessment is called the Site Capacity Calculation.

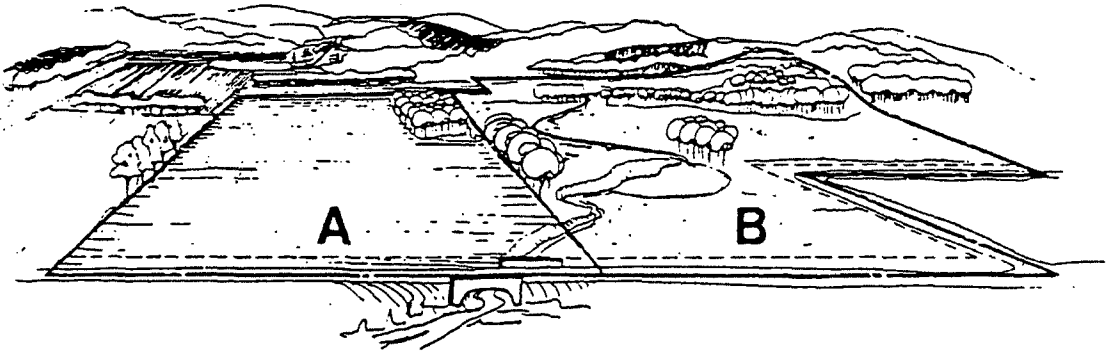


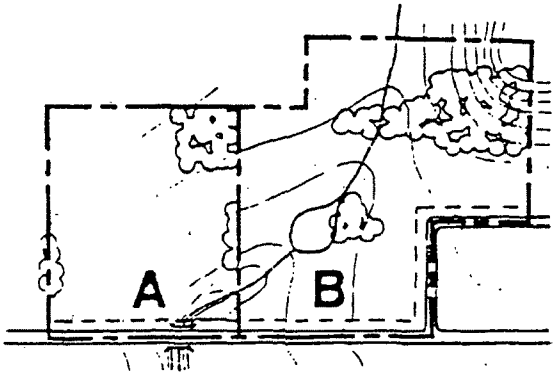


This worksheet will illustrate the Performance Zoning technique of site evaluation in a step-by-step procedure. Two imaginary sites for residential development are used. The developer will assess his land to determine the number of dwelling units he can build.


Site A is 10 acres. It is relatively flat with a small wooded area.

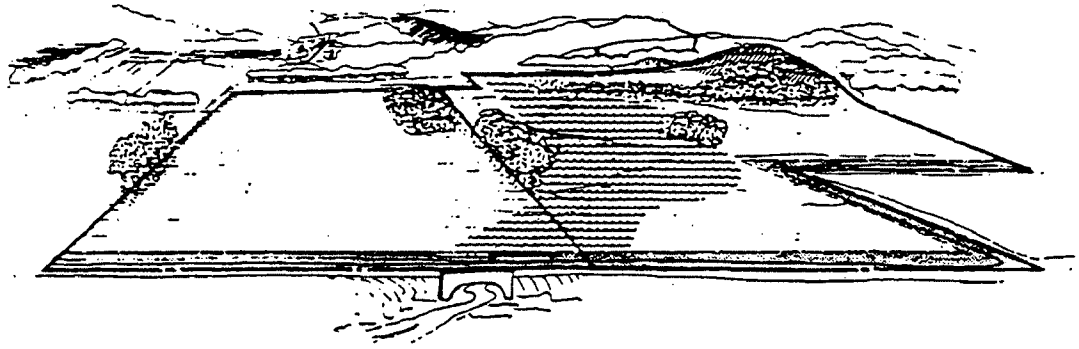
Site B, 15 acres, is an irregular shape with frontage on two roads. A large part of the forest cover extends over a steeply sloping hill that rises on the site. A stream with a small pond flows through both properties.

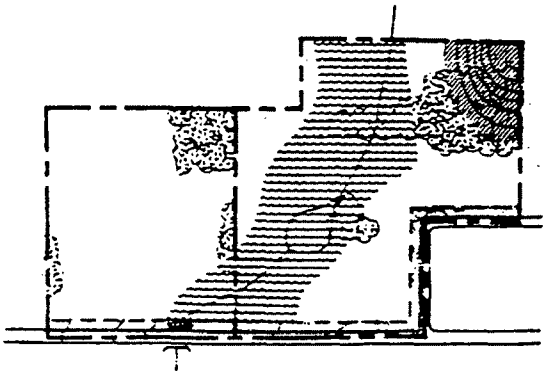


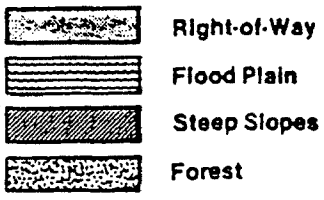




Site A = 10 acres
Site B = 15 acres


The site evaluation method begins with an initial Site Inventory that identifies those elements that exist on the site.



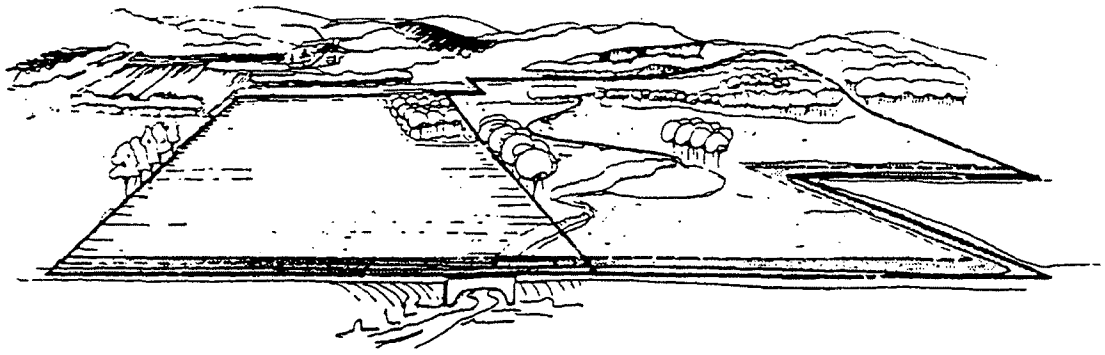


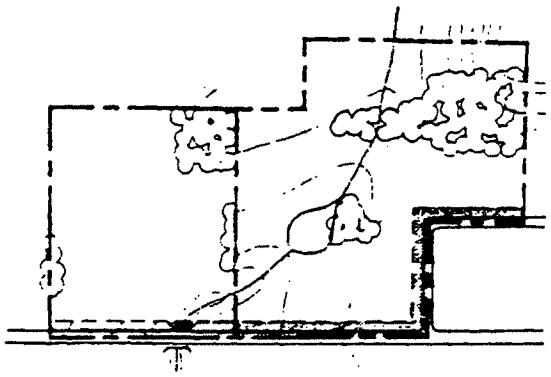



The initial calculation is the determination of the Base Site Area. In our example, both properties contain land within the ultimate right-of-way of the roads bordering the site

By subtracting this non-usable land from the total site acreage, the Base Site Area is determined.

Other lands that would be subtracted are land within utility right-of-ways, land with development restrictions, and land zoned for another use.





| | Site A | Site B |
|---|---|---|
| Site Area | 10.00 | 15.00 |
| Right-of-Way | - 0.25 | - 1.20 |
| | 9.75 Acres | 13.80 Acres |

Right-of-Way

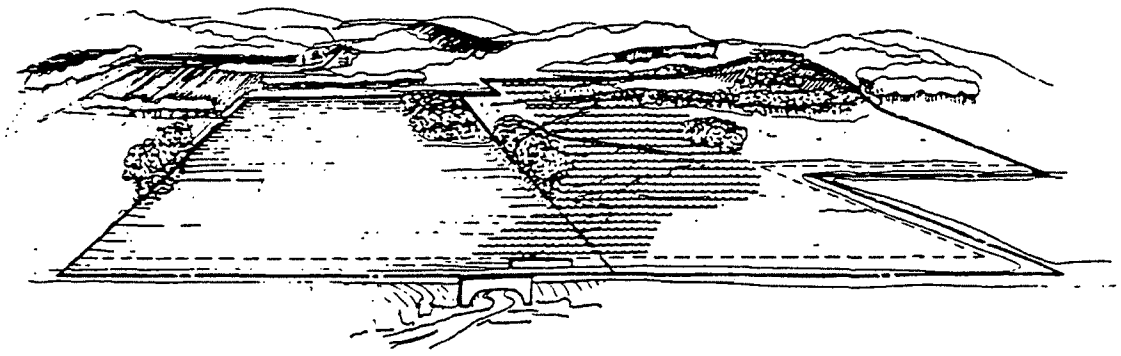

With the Base Site Area identified, a total of the natural resource acreage on the site is generated. The land containing 100% of all resource acreage is the Total Land with Resource Restrictions.

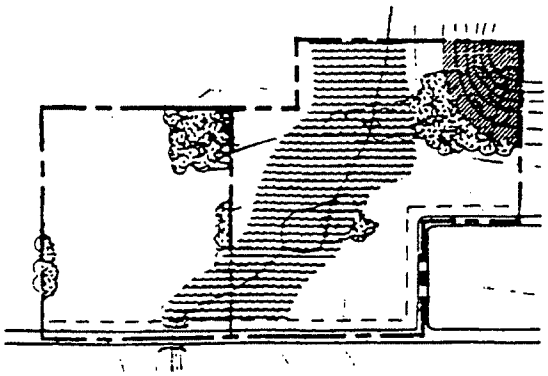
Some environmental resources can tolerate varying degrees of intrusion or disturbance. The resource protection standards reflect this.

Floodplains, floodplain soils, lakes, ponds, and wetlands require 100% protection.

Slopes require varying degrees of protection (60-85%), the degree of protection increasing with the increase in severity of slope.

As defined by acreage covered or size, and concentration of individual mature trees, forests require 80% protection.





Total Land with Resource Restrictions

| | Site A | Site B |
|---|---|---|
| Floodplain | 0.7 | 3.6 |
| Steep Slopes | 0.0 | 1.5 |
| Forest | 1.0 | 1.3 |
| | 1.7 Acres | 6.4 Acres |

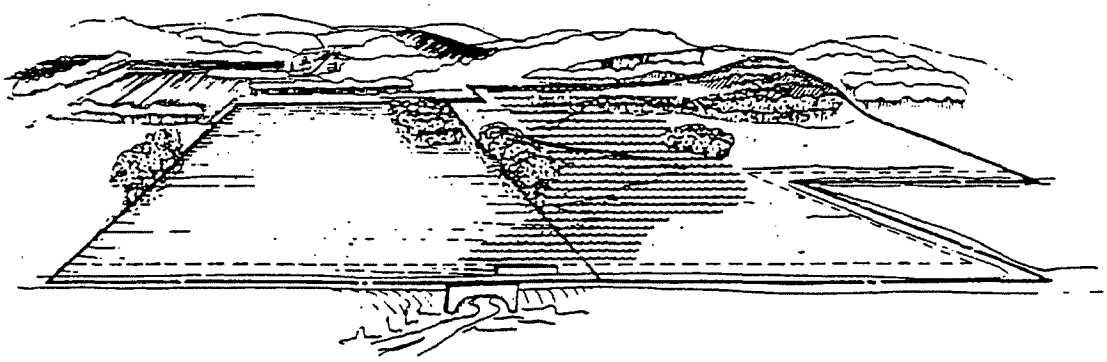

The resource protection standards are applied to both sites to determine the amount of land that must be protected to insure the future quality of the natural features.

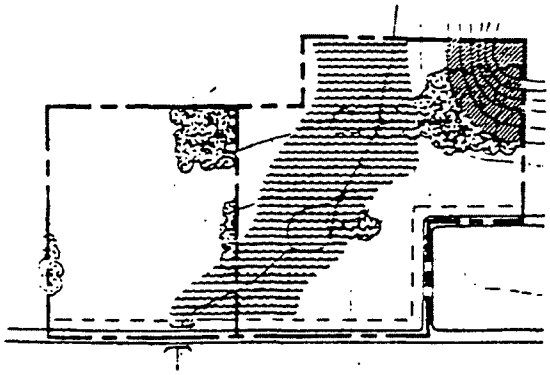
Flood plain soils, a stream, and a pond are found on both sites. 100% of this acreage is to be protected.

Steep slopes are found only on Site B. The severity of the slopes puts this area within the 85% protection class. The acreage that must remain undisturbed is identified.

Forested areas are found on both sites. 80% of this acreage must remain undisturbed.

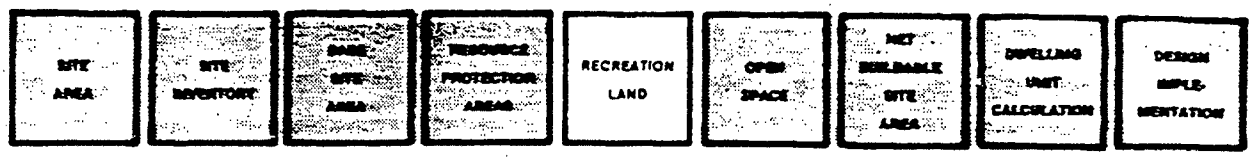
The Total Resource Protection Land is calculated for each site. This is a sum of acres to be protected after encroachment allowances have been identified for each natural resource on the site.





Total Resource Protection Land

| | Site A | Site B |
|---|---|---|
| Floodplain | 0.7 | 3.60 |
| Steep Slopes | 0.0 | 1.275 |
| Forest | 0.8 | 1.00 |
| | 1.5 Acres | 5.975 Acres |



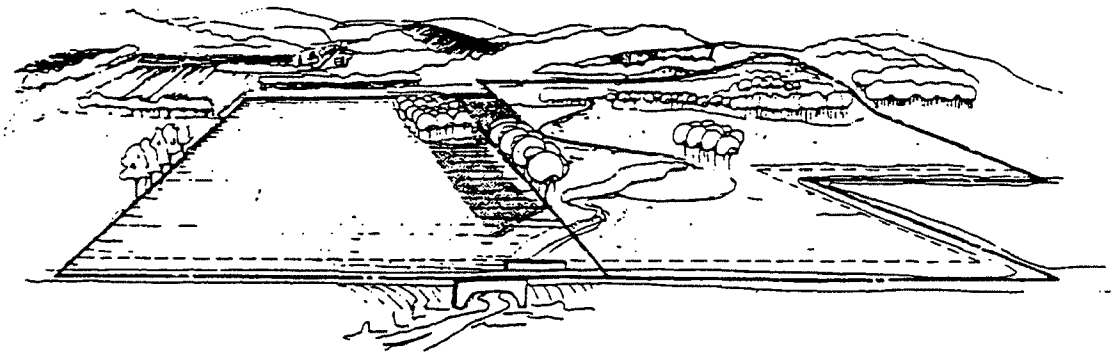

While open space is required for environmental protection, these lands are often unsuitable for developed recreational activities. A minimum percentage, 20%, of a development site is required for Recreation Land.

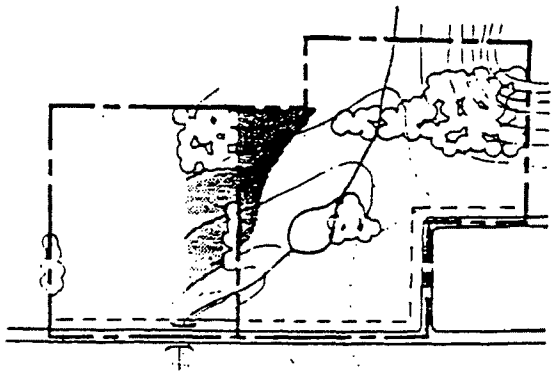
The Total Land with Resource Restrictions is subtracted from the Base Site Area to identify the Total Unrestricted Land. The Total Unrestricted Land is the acreage with no environmental limitations and is best suited for development activity.

Total Unrestricted Land

| | Site A | Site B |
|---|---|---|
| Base Site Area | 9.75 | 13.80 |
| Total Land with Resource Restrictions | 1.70 | 6.40 |
| | 8.05 Acres | 7.40 Acres |

By multiplying the Total Unrestricted Land by the minimum recreation land requirement, the acreage allotment is calculated for the Recreation Land for each site.





Recreation Land

| | Site A | Site B |
|---|---|---|
| Total Unrestricted Land | 8.05 | 7.40 |
| | x 20% | x 20% |
| | 1.61 Acres | 1.48 Acres |

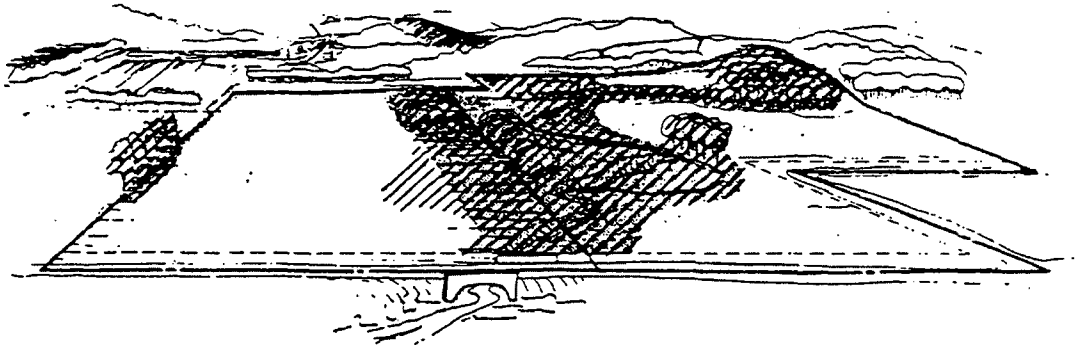

A performance subdivision provides open space which is not contained in private lots and is in common ownership. Minimum Open Space requirements must be met for each site.

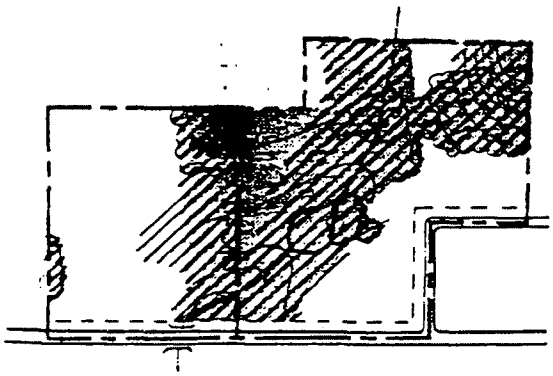
The land allotment for resource protection and recreation is compared with the minimum Open Space requirement for the Zoning district in which the site is located. The larger amount must be provided.

The sites are within a Suburban District which requires at least 40% open space. If the open space total is greater then that acreage figure is applied as in Site A. If the resource protection-recreation land acreage is greater as in Site B, then that acreage figure is applied.

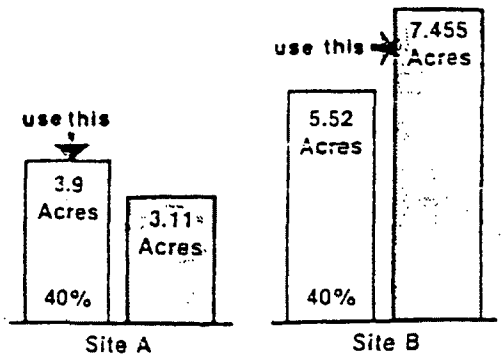
Open Space

| | Site A | Site B |
|---|---|---|
| Base Site Area | 9.75 | 13.80 |
| | x 40% | x 40% |
| | 3.9 Acres | 5.52 Acres |

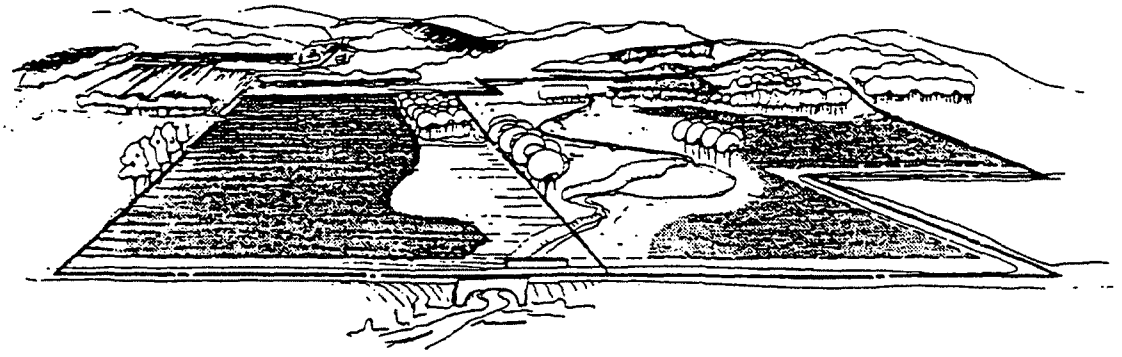


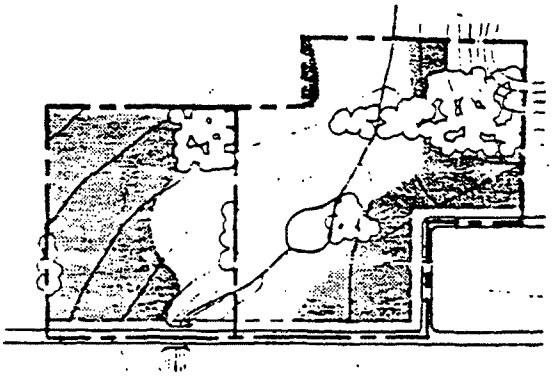


| | Site A | Site B |
|---|---|---|
| Resource Protection plus Recreation Land | 3.11 Acres | 7.455 Acres |
| Open Space | 3.9 Acres | 5.52 Acres |




The Base Site Area minus the maximum Open Space requirement calculates the Net Buildable Site Area. It is the Net Buildable Site Area that will be used to determine the area on each site which may be lotted for dwelling units. Although Site B is 5 acres larger than Site A, resource protection requirements restrict the buildable area to a size approximately equal with Site A.





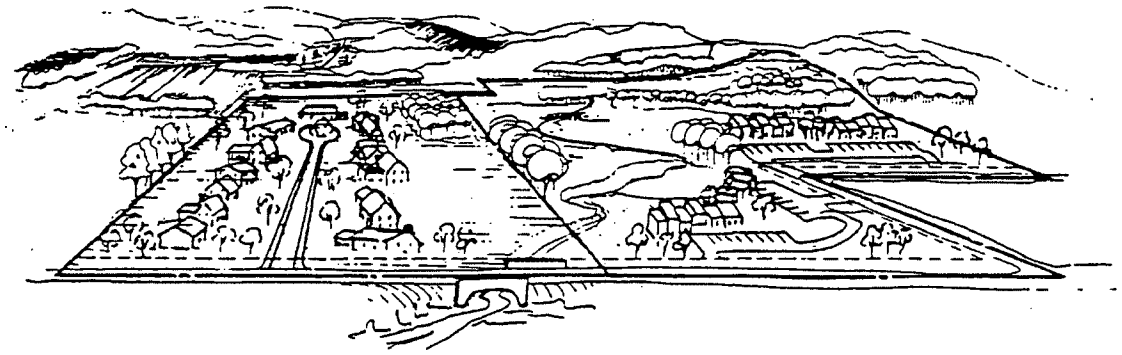
**Net Buildable Site Area**

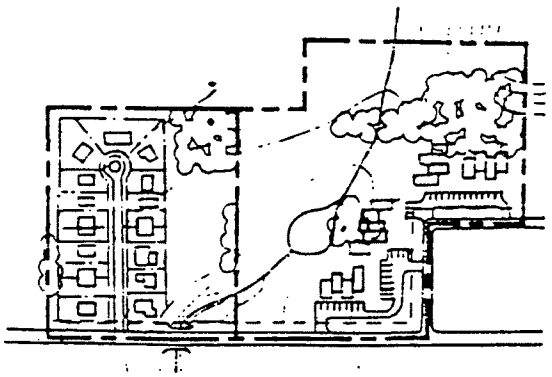
| | Site A | Site B |
|---|---|---|
| Base Site Area | 9.75 | 13.800 |
| Max. Open Space | -3.90 | -7.455 |
| | 5.85 Acres | 6.345 Acres |


The final stage of the Site Capacity Calculation is to determine the number of dwelling units that can be built. Rather than applying the density calculation to the entire site, the maximum number of dwelling units is determined by multiplying the Net Buildable Site Area by the density set by the zoning district in which the site is located.

Resource protection lands as well as recreation areas are provided for within the subdivision plan. The natural resources will determine the location of the building. On Site A, a mix of single-family and twin dwellings could be designed to achieve optimum use of the land. Due to the site constraints of the irregularly shaped Site B, a development of townhouses could be constructed.

For each zoning district buffer yards and impervious surface cover are also regulated.





**Dwelling Unit Calculation**

| | Site A | Site B |
|---|---|---|
| Net Buildable Site Area density | 5.85 | 6.345 |
| | x 3.3 | x 3.3 |
| | 19 D.U. | 20 D.U. |

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