Chapter 9

Wilderness and Natural Area Preservation

INTRODUCTION

Much of the impact for aesthetic control and management of landscape comes from early preservation efforts in the United States, so some historical review is in order. Much of the rationale for preservation of the wilderness and protection of wild and scenic rivers and national trails is aesthetic, so some examination of key programs and implementation issues is pertinent. Also, significant litigation over some of these programs (such as wilderness designation) has raised such critical legal issues as which individuals or groups have “standing” to stop or review specifications and their impact on the landscape.

Preservation became conservation for all intents and purposes in 1864, when George Perkins Marsh published Man and Nature. “Conservation” is a Utilitarian concept and antithetical to the Romantic view. As Gifford Pinchot put it at the turn of the century in connection with the conservation of forests, “the greatest good for the greatest number for the longest time.”

Natural landscape appreciation can also be seen in the works of the geographers of the nineteenth and early twentieth century. Many of our early American geomorphologists were keen perceivers of landscape attributes. Cornish (1934) wrote on the aesthetic quality of landscapes in England and developed the phrase “scenic amenity.” It was a long time before it became popular and was accepted as common jargon. In the United States, concern for landscape preservation, or “aesthetic conservation,” can be traced to the development of the state and national park systems, starting with Yosemite Valley (Figure 9.1) in 1864 (Zube 1973) and the preservation of Niagara Falls (Figure 9.2) in 1862 (Runte 1972). The cession of Yosemite Valley to the state of California by the Congress in 1864 for use as a state park is one of the earliest recognitions of scenery as a natural resource. Yosemite was also the first individual land area to be managed through the promulgation of public policy and enactment of federal legislation. Shortly thereafter (1872) Yellowstone was recognized as a scenic natural resource by the creation of Yellowstone National Park.

The development of American aesthetic conservation involved people such as Muir, Mather, and Udall (Strong 1970). These men, along with certain events, help to explain the strong “naturalness” and “wilderness” concepts that developed into a unique American landscape preservation aesthetic (McCloskey 1966).

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WILDERNESS AND NATURAL AREAS

The first landscape architect hired by the U.S. Forest Service, Arthur Carhart, was instrumental in the move to preserve “roadless areas.” During his time of service (1919-1923), he argued that the best development plan for the Trappers Lake, Colorado, area in the Rocky Mountains was one that protected the natural beauty of the shoreline, although he did allow for some summer home and camping facilities development (which never occurred), set well back from the lake. Trappers Lake is now part of the Flat Tops Wilderness Area. Carhart’s feelings were similar with respect to recreational development of the U.S.-Canada border lakes area now known as the Boundary Waters Canoe Area in Minnesota (Figure 9.3). His 1921 recreation plan for the area called for its preservation as a “watertrail wilderness.” Later, in 1926, Carhart (then a private citizen) and other conservationists were successful in helping to get the area administratively designated by the Forest Service as the Superior Area, with the express written support of the Secretary of Agriculture William Lurline.4

In a memorandum written in 1919, Carhart listed types of areas that should be free of summer home development. They were: “the superlative area, the unsuited high ridge of a mountain range, the area that should be for the group rather than the individual, such as lakeshore, stream bank, and the area of greatest use for preservation owned by the federal government” (Frome 1974, p. 119). It is not clear, however, that he had in mind the vast expanses we now think of as wilderness areas.

Aldo Leopold, a Forest Service colleague of Carhart’s, developed his own wilderness philosophy. He proposed a new guide for the preparation of management plans for the national forests. The richest and most accessible forest regions, capable of high-quality timber production, would be reserved for logging, while the remaining regions would be kept for recreation, game management, and wilderness uses. He developed a concept of wild areas for the Southwest based on four objectives: “(1) prevent annihilation of rare plants and animals, like the grizzly; (2) guard against biotic disruption of areas still wild; (3) secure recognition, as wilderness, of low-altitude desert generally regarded as valueless for recreation because it offered no pines, lakes, or other conventional scenery; and (4) induce

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Mexico to cooperate in wilderness protection.” (Frome 1974, p. 120). Leopold specifically sought to establish a wild area within the Gila National Forest in New Mexico. The designation was approved in 1924 by the district forester (now called regional forester).

Chief of the Forest Service in the mid-1920s, William B. Greeley, cautious at first and mindful of timber demands, later became a proponent of the Gila designation and encouraged other district foresters to do the same with comparable areas, especially to safeguard potential “wilderness” areas.6

Undoubtedly, one of the most controversial pieces of natural resource legislation of national stature dealing with aesthetic values in the natural environment is the so-called “Wilderness Act”6 of 1964. Although there have been relatively few court cases7 testing the merits of the Wilderness Act, there continue to be battles between commodity- (to take resources from the landscape, e.g., timber and mining) and noncommodity-oriented (to take experiences only) interest groups over each study and designation of proposed wilderness areas.

This section discusses briefly the legal and aesthetic issues related to the Wilderness Act, the Eastern Wilderness Act,8 and various “natural area” programs and legislation implemented by federal and state agencies.

Section 2(c) of the Wilderness Act defines the wilderness resource as follows:

A Wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammled by man, where man himself is a visitor who does not remain. An area of Wilderness is further defined to mean in this act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value.9

The lands included (Figure 9.4) in the National Wilderness Preservation System are to be managed in such a manner as to leave them unimpaired for future use and enjoyment as wilderness. They are to be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

Protection is ensured by the specific provision of the act that states:

Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, education, conservation and historical use.10 (Emphasis provided.)

What values were enhanced in the creation of an act calling for preservation of wilderness? McCloskey (1966) in his authoritative article on the act lists eleven (two more are added by other writers) different values associated with wilderness, both early and contemporary. Early valuations are:

1. Wilderness, as a challenging historical setting for triumphing over adversity and self-discovery.
2. As an aid to religion and as a setting for religious experience.
3. As a setting of political reform.
4. As a refuge or sanctuary.
5. As a need to protect wild country from threats to nature.

Contemporary valuations are:

6. Wilderness, as a cultural heritage and a setting for an aesthetic experience.
7. As a setting for scientific research in the biological sciences.
8. Maintenance of, as an ethical obligation for a “land ethic” or biocentric view.
9. As an opportunity for an educational experience.
10. As a setting for therapeutic experiences to relieve urban stress.

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6 Memo to each of the western District Foresters, December 30, 1926.
11. As an optimum setting for many highly individualized and stylized sport forms which require low-impact equipment and a self-restraining code of technique.


13. As a setting conducive to fostering self-actualization and the occurrence of peak outdoor experiences (Scott, 1974).

An interesting observation is made by the book’s authors as to what characterizes “ideal” wilderness. The literature of key people instrumental in the beginnings of the wilderness movement\(^\text{11}\) as well as the visual concept reinforced by the major agency\(^\text{12}\) involved in wilderness management decisions thus far maintain that a pristine alpine or subalpine mountainous wilderness is “ideal.” We hear relatively little about other physical landscape typologies of wilderness. In an interesting paper (see Watson and Smith 1971), it has been argued that caves constitute an underground wilderness of sorts. It is also held that “real” wilderness can only be found in the Western states (McCabe 1971), and that highest regarded wilderness areas in the U.S. would probably be in Alaska. It is interesting how such stereotypes and preconceptions have limited the dimensionality of the wilderness concept. Perhaps we should re-examine what constitutes wilderness as perceived through our regional and cultural biases.

Some key definitions in relation to terms often used in relation to the Wilderness Act are given by Haight (1974, p. 276):

1) wilderness (without capitalization or quotation marks) is used as the equivalent of what conservationists refer to as de facto wilderness; i.e., the kind of area the ordinary person would think of if he were asked to

\(^{11}\)Such as Aldo Leopold, John Muir, and others.

\(^{12}\)The U.S. Forest Service was the most active agency in wilderness studies, and most of its lands are upland forest areas.
describe wilderness—an area naturally wild, pretty much unaffected by man or man’s works.

2) “wilderness”: certain naturally wild areas designated by executive agencies prior to passage of the Wilderness Act, regulated and managed with preservation of their wild character as the primary objective. It is therefore an administrative, as opposed to statutory, designation. “Wild area” is a similar official but administrative designation, having the same meaning as “wilderness” but applied to areas smaller in size than “wilderness” areas.

3) Wilderness, or Wilderness Area: an area designated by Congress under the terms of the Wilderness Act as a component of the National Wilderness Preservation System (NWPS).

4) “roadless area” is another administrative designation pretty much equivalent to “wilderness.” The most important difference between the two is simply that “wilderness” is administered by the Forest Service of the Agriculture Department, while “roadless areas” are administered by components of the Interior Department.

The federal agencies presently involved with administering wilderness areas, and which also administered “wilderness areas” in the past, are the Forest Service of the Department of Agriculture, and the National Park Service and Fish and Wildlife Service of the Interior Department. The Bureau of Land Management is now involved with wilderness surveys under the jurisdiction of their new “Organic Act” within the U.S. Department of Interior.13

McCloskey (1966) has written extensively on the history and meaning of the Wilderness Act and Haight (1974) wrote an evaluation of the status of the act ten years after its passage. There have been other commentators (Foote 1973; Foster 1976; Wolcott 1973; Sokol 1976; Henning 1971; and McCabe 1971) who have described and criticized implementation on the Act by specific agencies.

McCloskey and Haight describe three major problem areas in relation to the interpretation and implementation of the act. These areas are: (1) the apparent exclusiveness of rules of entrance to the system, (2) the so-called “Purist’s Controversy” about what constitutes a wilderness for entrance purposes, and (3) the “compatibility of use” question regarding what is allowed after an area becomes wilderness.

Exclusiveness

Conservationists got a congressionally created National Wilderness Preservation System (NWPS), safeguarded from potential erosion by administrative agencies and with specified prohibited activities. However, an area can only be added to or removed from the NWPS by congressional act and not by administrative action. Furthermore, the act appeared to restrict the mechanism so as to exclude de facto wilderness consideration (see definition, p. 128). If narrowly construed, Section 3 of the act,14 pertaining to study and review procedure, was applicable only to (1) the Forest Service areas already designated as primitive, and (2) the “roadless areas” of 5,000 contiguous acres or more in the National Park System (under the National Park Service) and wildlife refuges and game ranges (administered by the Fish and Wildlife Service). There was no mention of the Bureau of Land Management lands or other large federal land-holding agencies such as the Department of Defense. Section 7 of the act15 provided that the Agriculture and Interior secretaries could make recommendations when they submitted their annual reports on implementation of the act to Congress.

The upshot, as reported by Haight (1974, p. 286), is that Congress does make the final determination on entrance to the NWPS. However, Congress has also decided that it can make its own determination to create a Wilderness area as its own initiative (the so-called “short-cut” method). It should be noted that congressionally initiated wilderness area legislation “may be lengthy and intricate, and may involve legislative purposes not directly achievable within the structured procedures of the Wilderness Act” (Haight 1974, p. 280). This is in contrast to congressional reaction to an administrative recommendation which is usually a brief, almost identical piece of legislation differing only in the name of the area.

The difference in the author’s mind is extremely significant because the legislation, custom made when Congress initiates a wilderness area designation, gives the area much more protection. First, it describes in more detail the unique or contextual qualities of the area that may be utilized at a later point for instance, to determine whether to classify an area as Class I for nondegradation air quality standards (See Chapter 10 Air Quality, p. 163). Second, it provides more protection than the Wilderness Act can from incompatible uses. Third, it provides a truer preference of congressional management policy through the political process.

The act creating the Sawtooth Wilderness Area in Idaho16 is a good case in point. The legislation for the area provides limited condemnation authority17 to the Secretary of Agriculture, and withdrawal of private

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15 Id., s. 1132(d) (1988).
17 Id. ss. 460aa-2(c), (e), (f), (h) (1988).
needs acquired from mineral rights and development. It was intended to be a multiple-purpose act (1) to establish a wilderness area with even stricter preservation features than those found in the Wilderness Act; (2) to establish a general-purpose national recreation area surrounding the wilderness area; and (3) to require the Interior Department to study the recreation area for the possible creation of a national park. Quick action was needed to protect the area from increasingly rapid commercial and residential development. Congress also recognized the need to regulate already existing molybdenum mining activity to "ensure that this activity will not impair the visual grandeur of the area, adversely affect fish and wildlife resources, and cause pollution of downstream waters." 

A second development in relation to the "exclusive-ness issue" is administrative in nature. Only the Department of Interior was required to review its "roadless areas" under the Wilderness Act. The Forest Service was not required to review its roadless areas under the Wilderness Act but opted to under its Roadless Area Review and Evaluation (RARE) Program. This program has been criticized both by conservationists (Haight 1974, p. 287) and by those critical of the review criteria and methodology used (see Burke and Twiss 1976). The Forest Service did not consider itself legally confined with the procedures of the act any more than Congress does. However, it is ironic that the Forest Service should suffer bad press while the National Park Service falls ever behind the schedule laid down by the act because specific wilderness studies have been subordinated to its master planning program, which is contended by some to be unconstitutional (see Williams 1975).

The third development in relation to the exclusiveness issue comes from the case Sierra Club v. Hardin. The plaintiffs used the Wilderness Act as partial grounds for its suit regarding an area in the Tongass National Forest in Alaska. The court rejected outright the plaintiff’s claim that the act imposed study and recommendation requirements, as there were no designated "primitive" areas in the whole state of Alaska. There could then obviously be no duty to conduct wilderness studies of such areas contiguous to them. Thus, a blatant loophole in the act was the failure to require, rather than merely permit, studies to be done on de facto wilderness areas.

The Purist’s Controversy

The first Roadless Area Review and Evaluation (RARE I) brought out into the open the dispute be-

tween the Forest Service philosophy and that of conservationists (see Costley 1972; Foote 1973) as to exactly what constitutes wilderness. More exactly, the issue is whether an area can qualify for wilderness status if it had been seriously affected by human activity in the past but is now restored or is restorable to a natural-appearing condition. The Forest Service stresses such words as "untrammeled" and "retaining its primeval character" to construe the statutory definition narrowly and restrict potential wilderness status to areas that have never been significantly affected by human activity. Certain members of Congress and wilderness advocates interpret the act more loosely in this regard. The dispute has not been resolved.

The "purists controversy," which was initiated with the Forest Service, has caused problems for incorporation of certain Bureau of Land Management (BLM) visual resource management concepts into their wilderness review (Curran 1978). Conservationists objected to the use of the term "intrusion," which was defined by the BLM as a feature or change influenced or made by people, land, water, vegetation, or structure, which is in contrast with the natural characteristics of the existing landscape. Conservationists would like the BLM to stay with the original language of the act, which specified that an area suitable for wilderness "generally appears to have been affected primarily by the forces of nature, with the imprint of man substantially unnoticeable." Conservationists are also urging the BLM to abandon the "sights and sounds" doctrine, under which potential wilderness areas have been disqualified in the past because they possess a view of a nearby city or disturbed area. Thus, the tactical maneuvers of wilderness advocates are to discourage inventive techniques that would surface any problems with a potential de facto wilderness area so as to sustain the overall strategy of preservation of the area under the conditions of the Wilderness Act.

The Compatibility Issue

The act hedges in its prohibition of incompatible activities in several ways. Prohibition is subject to exceptions for existing rights and practices (see the discussion of mining, Chapter 12). Thus Congress avoided the issue of giving priority to wilderness use versus extractive uses that are incompatible with wilderness use. A second part of the issue is the degree of incompatibility with wilderness values that would be acceptable in the nonwilderness activities allowed by the act.

Two court cases affecting use of the Boundary Waters Canoe Area (BWCA) in northeastern Minne-

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18Id., s. 450aa-2(e) and s. 450aa-9 (1988).
sota deal directly with the issue of compatibility of use of wilderness areas. The first case, *Isaac Walton League v. St. Clair*,21 (Butz I) deals with mineral prospecting on lands in which the mineral rights were privately acquired within the BWCA. The second case, *Minnesota Public Interest Research Group v. Butz*,22 (Butz II) was a suit brought by environmental interests to stop logging that had gone on for many years. In both cases the judges found that the contemplated activities were in fact incompatible with wilderness use of the BWCA. Haight (1974, p. 299) argues that the reasoning in the two cases hold true for all wilderness areas, although he admits that mineral claim-staking was prohibited on federal lands in Minnesota,23 and that mining laws enacted after 187324 that proclaim the awareness of public domain lands to mineral exploration have never been applied to Minnesota or a fortiori to the BWCA. Thus, any extension of the *Isaac Walton League* decision beyond BWCA would indeed be risky.

Extension of these decisions beyond BWCA, as Haight (1974, p. 300) points out, raises another problem. Strict interpretations regarding compatibility of certain uses on existing wilderness areas may pose problems for admission of future wilderness areas if we use the same standard. Thus, a contextual interpretation of what is suitable for admission and management of wilderness is needed. This avoids some of the problem we have just covered.

Another critical court case affecting wilderness decision-making was *Parker v. U.S.*,25 which determined the extent of the Forest Service's discretion in drawing boundaries between areas to be preserved and areas to be open to commercial exploitation. The case emphasized that certain decisions regarding classification and boundary delineation "must remain open through the Presidential level" and that "contiguous lands which seem to have significant wilderness resources will be studied."26

Another controversy involved legal challenges to Forest Service measures to control Southern pine beetle infestations in wilderness areas in the Southeast. The Southern pine beetle controversy involved a dispute over tree cutting within wilderness boundaries. Plaintiffs in *Sierra Club v. Black*,27 and *Sierra Club v. Lyng*,28 challenged an extensive Forest Service tree-cutting program aimed at halting the spread of Southern pine beetle infestations in four federal wilderness areas in Arkansas, Louisiana, and Mississippi. The courts interpreted Section 4(d) (1), of the wilderness act which does not refer to "minimum tool" management in the control of fire, insects, and diseases. The *Lyng* court essentially adopted similar reasoning to that used in the *Butz II* decision in the BWCA: When the Wilderness Act authorized managers to take action within wilderness areas "necessary" to accomplish the purposes of the Wilderness Act, but inconsistent with the preservation of wilderness character, managers may employ only those methods that have the least adverse affect on wilderness character.

If special uses threaten wilderness character, those uses should be limited by the "minimum tool" approach embodied in Section 4(c) of the Wilderness Act.29 The "minimum tool" approach permits actions that adversely affect wilderness character only when those actions are specifically authorized in the Wilderness Act and are the least intrusive means necessary to accomplish the task. Rohlf and Honnold (1988) argue that future controversy and litigation will revolve around such management questions. (Other significant issues affecting wilderness management and environmental quality, such as air quality and the amount of free-flowing water rights, will be covered in Chapter 10.)

Thus, we have reviewed some of the most controversial issues in relation to the implementation of the Wilderness Act. The act includes aesthetic values in its definition section, and many of the critical issues discussed relate to the aesthetic attributes of what wilderness is and how it should be maintained. Much research has been done on wilderness users and their preferences, and some of it includes their aesthetic preferences. Much work needs to be done on aesthetic judgments of land use compatibility in wilderness areas and on aesthetic appraisals of nonalpine wilderness envi-
environments, which may include deserts, arctic areas, underwater areas, and underground wilderness.

Other Federal and State Programs

Other natural area preservation programs of federal and state agencies will be briefly reviewed here. Many seem to be closely related to the National Wilderness Preservation System and have been instrumental in protecting scenic natural wonders.

At the federal level the 1906 Antiquities Act\(^\text{30}\) authorizes the president to declare historic landmarks, historic or prehistoric structures, and other objects of historic or scientific interest to be national monuments, provided such monuments are on lands that are federally owned or controlled. Examples of areas designated national monuments by presidential proclamation are: the Grand Canyon (1908), Dinosaur National Monument (1915), and the Katmai National Monument (1918). Congress may respond to these actions by later altering and redefining the areas proclaimed.

The National Park Service Organic Act of 1916\(^\text{31}\) provides management protection of these lands and resources in the act’s purpose, which “to conserve the scenery and the natural historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”\(^\text{32}\)

This statement has been attributed to landscape architect Frederick Olmstead, Jr., in William C. Everharts, *The National Park Service* (1972, p. 21).

The National Natural Landmarks Program was created by administrative approval of the Secretary of Interior on May 18, 1962. This is an interagency administrative program operated by the National Park Service through cooperative memoranda with the Fish and Wildlife Service, Bureau of Land Management, and the Forest Service. A national natural landmark is an area considered to have national significance; possessing exceptional value or quality in illustrating or interpreting the natural heritage of the nation; and presenting a true, accurate, and essentially unspoiled example of natural history. These areas can be disestablished by an administrative process, and thus receive no additional protection beyond that afforded by their designation. However, they must be taken into account in environmental impact statements required by NEPA before any plan by federal agencies to manipulate land or water is carried out.

A similar program was proposed by President Carter in his environmental protection message to Congress on May 23, 1977, where he took special note of the need to “preserve those places of natural, historic, cultural, and scientific value that give this nation continuity.” In response, a new National Heritage Program was proposed in order to pull together and expand existing federal cultural and natural heritage preservation efforts. Part of the National Heritage Program effort shepherded by the Heritage Conservation and Recreation Service (HCRS, formerly Bureau of Outdoor Recreation) was to develop a different classification and identification system for natural heritage resources that could be used at the national and state levels. One of the classification panels was the Scenic Heritage Classification System Panel, whose report was submitted to HCRS by Chairman E. H. Zube on April 5, 1978.

The Bureau of Land Management administers a program of Outstanding Natural Areas, which are established to “preserve scenic values and areas of natural wonder. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas and public use facilities are normally located at the periphery of the area. The public is encouraged to walk into the area for recreation purposes whenever feasible.”\(^\text{33}\)

The Forest Service administratively recognizes various areas of scenic, historical, geological, botanical, zoological, paleontological, and other values worthy of special classification. These are collectively called special-interest areas. There are currently 136 such areas in 29 states, totaling 989,744 acres. The authority for special-interest areas is the Organic Administration Act of June 4, 1897, which authorizes the Secretary of Agriculture to regulate occupancy and use of the national forests. Classification of special-interest areas that should be managed for recreation use substantially in their natural condition is authorized under 36 CFR 294.1a. Areas that are of a nature or significance to justify or require more intensive management, protection, or use are authorized under 36 CFR 294.1b.\(^\text{34}\)

The objectives of the administratively classified special-interest areas are:

To protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. To classify areas that possess unusual
recreation and scientific values so that these special values are available for public study, use, or enjoyment.\(^{35}\) (Emphasis added.)

Definition for a type of scenic special-interest area is as follows:

Scenic Areas. Scenic areas are places of outstanding or matchless beauty which require special management to preserve these qualities. They may be established under 36 CFR 294.1 whenever lands possessing outstanding or unique natural beauty warrant this classification.\(^{36}\)

The Forest Service Manual has a specific section on the protection of national natural landmarks:

Protection. Continuing integrity is essential to National Landmark values. Natural Landmarks should be managed in such a way as to pose no threat to the perpetuation of the feature or species designated. Other uses of the site or area which do not interfere with the purpose of the landmark designation or the integrity of the natural values represented are acceptable.” (Forest Service Manual 2362.41).

The Natural Landmarks Program does not have the protection features of Section 106 of the National Historic Preservation Act of 1966. Thus, designation of a national natural landmark presently constitutes only an agreement with the owner to preserve, insofar as possible, the significant natural values of the site or area. Administration and preservation of national natural landmarks is solely the owner’s responsibility. The agreement may be terminated by either party upon notification of the other.

It is expected that in the future Congress will provide additional protection for natural landmarks. In the meantime, regional foresters will follow the general protective features of Section 106 of the National Historic Preservation Act in managing national natural landmarks. They must determine in advance, through the preparation of environmental impact statements and consultation with professionals, whether any contemplated action involving a natural landmark will have adverse effect. If so, they must “(1) Seek alternative actions to alleviate the effect or if this is not practical or possible; (2) Plan to minimize the effect and delay action until a request in writing for the National Park Service to remove the site or area from the Registry has been acted upon.”\(^{37}\)

Besides these federal acts and programs, which are designed to preserve qualities of natural areas, there are a number of state programs that are well worth mentioning. Most of the state natural area preservation programs are meant to preserve areas primarily on ecological grounds (Juday 1975; Vogelman 1969), but some natural area programs have specific provisions for protection of scenic areas via easements as the Tennessee\(^{38}\) and Arkansas\(^{39}\) programs do in their state legislation. Other states have provisions for state or local preservation of critical areas, including aesthetic wilderness values.\(^{40}\)

WILD AND SCENIC RIVERS

Beside preserving scenic highways, preserving wild and scenic rivers has been one of the areas of greatest activity regarding management of visual resources in the country. The National Wild and Scenic Rivers Act (NW&SRA)\(^{41}\) provides for acquisition and management of wild, scenic, and recreation portions of rivers (Figure 9.5) at different levels of intensity, use, and access.\(^{42}\) The key agencies involved are the National Park Service, which sometimes performs the initial surveys for proposed wild and scenic rivers, the Forest Service, the Bureau of Land Management, and the Fish and Wildlife Service, all of which manage portions of wild and scenic rivers in their jurisdictions. The declaration of policy in the act states:

It is hereby declared to be the policy of the United States that certain selected rivers of the Nation, which in their immediate environments, possess outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.\(^{43}\) (Emphasis added.)

\(^{35}\)Id., F.S.M. 2360.2.
\(^{36}\)Id., F.S.M. 2362.41.
\(^{37}\)Id., F.S.M. 2363.37.
Similar statements of policy can be found in any number of state acts whose purpose it is to preserve or protect wild and scenic rivers (Turner 1974).

There has been some legal commentary on wild and scenic river activity at the international level (Compton 1975) level, federal level (Tarlock 1967; Tarlock and Tippy 1976; Utter and Schultz 1976; Turner 1974 and USDIBOR), and state level (Turner 1974; Coggins and Phillips 1977). This section will include a short review of activity under the National Wild and Scenic Rivers Act (NW & SRA) with some mention of state activity.

Even more important than the stated purpose of the act is the original impetus for its enactment in 1968. The act itself states:

The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented
by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition.\textsuperscript{44}

This legislation was in reaction in part to the controversy created by water development agencies such as the Army Corps of Engineers, the Federal Power Commission, and the Bureau of Reclamation (Tippy 1968; Poland, 1969). The conflict between preservationists and river development advocates led to many court cases where the aesthetic free-flowing values of rivers were primary. These cases include \textit{High Mountain Sheep,}\textsuperscript{45} \textit{Namekagon Hydro Corp. v. FPC,}\textsuperscript{46} and \textit{Scenic Hudson Preservation Conference v. FPC,}\textsuperscript{47} all with the Federal Power Commission, and \textit{Friends of the Earth v. Armstrong,}\textsuperscript{48} with the Bureau of Reclamation. Section 1278(a) of the NW&SRA prohibits federal licensing of the construction of any “dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act” on or directly affecting any protected river.\textsuperscript{49} This section also prohibits federal assistance, “by loan, grant, license, or otherwise,” of any water project that affects a protected river’s values directly and adversely.\textsuperscript{50}

The Ozark National Scenic Riverway\textsuperscript{61} was created in 1964 in reaction to some unpopular Corps of Engineers dam proposals. The earliest congressional recognition of the aesthetic free flow of rivers was the Act of 1906,\textsuperscript{62} which gave the Secretary of the Army the power to issue revocable permits for the diversion of water from the Niagara River as long as it did not interfere with the navigability of the river or with the scenic grandeur of Niagara Falls.

After many years of conflict over river basin development, the National Wild and Scenic Rivers Act protects the free-flowing aesthetic attributes of rivers. The act of 1968 does three things to protect the natural environment of rivers:

First, it protects both the water and area adjacent to the river by creating an elongated corridor, a quarter of a mile wide (on the average), and extending the length of the selected segment. As part of this first mode of protection, certain types of water resource projects, mining activities, and forestry practices are restricted from designated wild and scenic rivers or those under study. These restrictions, however, are subject to certain procedural requirements and provisions; that is, projects already existing are allowed and those in planning stages are subject to the National Environmental Policy Act,\textsuperscript{63} which calls for consideration of aesthetic factors when evaluating the impacts and alternatives of major federal projects and actions.

Second, the Wild and Scenic Rivers Act creates a classification system for these areas, designed to limit incompatible development and use of the land, and to limit recreational use in a manner that will prevent the deterioration of the natural qualities of the area surrounding the river. The classification system, designed to restrict the degree and intensity of shoreline development, divides wild and scenic rivers into \textit{wild} river areas, \textit{scenic} river areas, and \textit{recreational} river areas. The allowable intensity of development is determined by the classification of the river stretch. For example, almost no construction is allowed in a wild river area, and mining activity is prohibited.

Third, the act outlines broad, general guides for the benefit of agencies, and spells out allowable levels of development within wild, scenic, and recreational river areas. The act suggests that shorelines remain “largely undeveloped” in scenic river areas and “somewhat developed” in recreational river areas. This, of course, leaves wide latitude for the managing agency—whether the Forest Service, Bureau of Land Management, National Park Service, or Fish and Wildlife Service.

Recreational use is also limited by the classification of the river stretch. Recreational use in a wild river area is limited to hiking, boat floating, and hunting and fishing, with limitations placed on the number of users. Increased levels of recreational use and types of use are allowed in scenic and recreational river areas consistent with the goal of maintaining present environmental quality.

More detailed management guidelines have been issued by the Department of Interior and by the Forest Service as well as by specific management plans for each designated wild and scenic river. For instance, in 1988 Congress passed the Omnibus Oregon Wild and Scenic Rivers Act,\textsuperscript{64} which added 1,429 miles to those

\textsuperscript{44}Id.
\textsuperscript{45}Pacific Northwest Power Co. 31 F.P.C. 247 (1964).
\textsuperscript{46}216 F.2d 509 (7th Cir. 1954).
\textsuperscript{47}354 F.2d 608 (2d Cir. 1965).
\textsuperscript{48}485 F.2d 1 (10th Cir. 1973).
\textsuperscript{49}16 U.S.C. s. 1278(a) (1988).
\textsuperscript{50}Id.
\textsuperscript{51}16 U.S.C. ss. 460 mm-7 (1988).
\textsuperscript{52}Act of June 29, 1906, Ch. 3621, s. 2, 34 Stat. 626.
\textsuperscript{54}S. 2148, 100th Cong. 2nd Sess. 134 Cong. Rec. 1-10, 108 (Oct. 12, 1988).
sections already protected by the Oregon Wild and Scenic Rivers Act.

Legal Issues

The National Wild and Scenic Rivers Act has survived at least one takings challenge. Under the NW&SRA, private land may be included within the system, and activities on it that "substantially interfere with public use and enjoyment" of the values protected in the act may be prohibited. In *Schultz v. United States* the U.S. court of claims rejected a landowner's takings challenge to federal agency conduct pursuant to the NW&SRA, but other cases suggest takings potential in the future.

Generally, state laws include similar types of measures to protect their own designated wild or scenic river systems. State programs and acts vary tremendously in the amount of protection afforded to their wild and scenic rivers, whether it is the amount of control over land use or water quality, or on many other aspects. (Turner 1974). The states of California, Georgia, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia all have wild and/or scenic river acts. According to Kusler (1980), there are twenty-four states with legislation for the protection of wild, recreational, and scenic rivers.

Rivers classified under the NW&SRA have two levels of protection against incompatible development: (1) federal prohibitions against water resource projects; and (2) federal acquisition authority over lands within the river corridor. There is also the issue of whether state scenic river programs provide equivalent protection or act as a deterrent to federal water resource projects. In *California v. United States* the California Water Resource Control Board approved a federally funded project, the New Melans Dam, with twenty-five conditions attached. The United States sought a declaratory judgment to permit it to ignore the state-imposed conditions. The Court held that Section 8 of the Reclamation Act permits a state to impose conditions on "control, appropriation, use and distribution of water" as long as the conditions are not inconsistent with congressional directives respecting the project. This is termed "cooperative Federalism" (Reynolds 1989). As Reynolds points out, the Federal Power Act now functions in a legal matrix that includes the National Environmental Policy Act, the Northwest Power Act, the Fish and Wildlife Coordination Act, and the Federal Power Act amendments—the Energy Security Act of 1980 and the Electrical Consumer Protection Act of 1986.

There is a wealth of research work dealing with aesthetic attributes of scenic rivers. Most applicable work done to date attempts to assess the visual attributes of riverscapes and waterscapes. The work can be categorized into four types, including: (1) work involving waterscape/water recreation perception studies; (2) work involving biological-physical models for evaluating riverscape quality; (3) economic methods for measuring aesthetic values of waterscapes; and (4) work involving professional judgment techniques for describing, rating, and ranking water-related landscapes (LSU 1977; USDA, FS 1977). (Much of the previously cited work overlaps with that being done to assess the recreational quality and psychological-social carrying capacities (crowding) of riverscapes.) There also have been two major proceedings (LSU 1977; USDA, FS 1977a) dealing with wild and scenic river management.

Despite this large volume of work, little has been done on assessing the perceived compatibility or suitability of types and intensities of development on wild, scenic, and recreational river areas. Comparatively more has been done on perceived assessment of crowding relating to river recreation experiences. The author has proposed a research strategy for dealing with visual impact on wild and scenic rivers (Smardon, 1977).

Some of the most sophisticated work applied to management of wild and scenic rivers has begun to address the question of cumulative visual impact on sce-
nic rivers. Steinitz et al. (1978) developed fairly sophisticated models for simulating visual impacts from alternative policies used to preserve the North River under the Massachusetts Scenic and Recreational Rivers Act. Another sophisticated study was done by EDAW (1978) for the Forest Service for the Hells Canyon National Recreation Area. Part of this study dealt with the visual absorption capacity of the area to degrees of visual impact. These types of studies are on the “cutting edge” of visual analysis, which is also tied closely to legal mandates that serve to protect the visual quality of specific areas.

**SCENIC TRAILS**

The National Trails System Act, like the wilderness and scenic rivers acts, establishes a national precedent for establishing and maintaining a linear-preserved visual corridor, and it encourages states to establish their own programs. The National Trails System Act of October 2, 1968 (16 U.S.C. 1241–1249) sets the following policy for a national system of trails:

In order to provide for the ever-increasing outdoor recreation needs of an expanding population and in order to promote public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas of the Nation, trails should be established (i) primarily near the urban areas of the Nation, and (ii) secondarily, within established scenic areas more remotely located. The purpose of this Act is to provide the means for attaining these objectives by instituting a national system for recreation and scenic trails, by designating the Appalachian Trail and the Pacific Crest Trail as the initial components of that system, and by prescribing the methods by which and standards according to which, additional components may be added to the system.

The National Trails System Act (NTSA) created three types of trails: national recreation trails; national scenic trails; and connecting, or side, trails. National recreation trails provide for a variety of outdoor recreation uses in or near urban areas. They may be designated by the Secretary of the Interior or by the Secretary of Agriculture where lands administered by that department are involved. National scenic trails are long-distance trails that provide for maximum outdoor recreation potential, and for the conservation and enjoyment of nationally significant scenic, historic, natural, or cultural qualities of the area. They may be so designated only by Congress. Connecting, or side, trails provide access to or connect national recreation or scenic trails and may become part of the trails to which they are joined (USDI, BOR 1973).

The National Trails System Act directed the Interior and Agriculture secretaries to encourage states and local governments, as well as private interests, to establish national recreation trails on lands in or near urban areas; and the Secretary of Housing and Urban Development to encourage the planning of recreation trails on lands in or near urban areas, and in connection with urban recreation and transportation.

Where lands included in the right-of-way of a trail are not federally held, such land or interests in such land may be acquired by written cooperative agreement, donation, purchase with donated or appropriate funds, or exchange, provided that not more than twenty-five acres in any one mile is acquired by condemnation. According to National Trail System Act guidelines (USDI, BOR and USDA, FS 1975)

(a) The Secretary of the Interior, or the Secretary of Agriculture where lands administered by him are involved, may establish and designate national recreation trails, with the consent of the Federal agency, State, or political subdivision having jurisdiction over the lands involved, upon finding that—
   (i) such trails are reasonably accessible to urban areas, and, or
   (ii) such trails meet the criteria established in this chapter and such supplementary criteria he may prescribe.

(b) As provided in this section, trails within park, forest, and other recreation areas administered by the Secretary of the Interior or the Secretary of Agriculture or other federally administered areas may be established and designated as “National Recreation Trails” by the appropriate Secretary and, when no Federal land acquisition is involved—
   (i) trails in or reasonably accessible to urban areas may be designated as “National Recreation Trails” by the Secretary of the Interior with the consent of the States, their political subdivision, other appropriate administering agencies, and
   (ii) trails within park, forest, and other recreation areas owned or administered by States may be designated as “National Recreation Trails” by the Secretary of the Interior with the consent of the State.

National scenic trails are authorized and designated only by acts of Congress. These trails

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63Mass. G.L. Ch. 21, s. 17B.
by their very nature must be worthy of such
designation. Their scenic, historical, natural, or
cultural qualities must be superior to those of
other trails in the country. Because of their
special characteristics, national scenic trails
should be capable of promoting interest and
attracting visitors from throughout the United
States.

Half the states have passed comprehensive trails
system legislation, and federal agencies have desig-
nated hundreds of national recreation trails. Congress
has established eight national scenic and five national
historic trails.65 Most important the National Park
Service has nearly succeeded in acquiring a permanent
right-of-way for the Appalachian National Scenic Trail
(Figure 9.6), the patriarch of American hiking trails, a
2,100-mile footpath stretching from Maine to Geor-
gia.66 As Davis (1986) points out though, trail mileage
has decreased by about one-third since 1945, and pri-
ivate development threatens to destroy the scenic, cul-
tural, and biological qualities of the areas through
which national trails pass.

During its first decade, from 1968 to 1978, the NTSA
was not very effective or in active implementation
because:

1. The legislation relied on state governments to ac-
quire land for national scenic trails.
2. The act limited the extent of federal condemnation
authority to twenty-five acres in any one mile of
trail;
3. There were problems in interpretation of the act’s
trail-width provision due to limiting the amount of
land that could be acquired to twenty-five acres per
mile.

In 1976 Congress started addressing these problems
and in 1978 enacted amendments to the NTSA, in-
creasing federal amendments to the NTSA, increasing
federal condemnation authority from 25 to an average

66Id., s. 1244 (a) (1) (1988).
of 125 acres per mile of trail, and authorizing an additional $80 million over three years for acquisition of Appalachian Trail land.67

President Carter became an outspoken advocate of the National Trails System and between 1973 and 1980, nearly 19,000 miles of recreation, scenic, and historic trails were added to the system, a fourfold increase. Congress amended the NTSA four times in 1979 and 1980 and gave it an extensive overhaul in 1983. Aside from the Appalachian Trail, most of the remaining eight scenic trails will be incomplete for many years because Congress has refused to fund acquisitions of trail land outside the boundaries of federally administered areas.

Section 1246(1) of NTSA permits trail protection regulation. First, the act envisions scenic trails in part as means of conserving the natural qualities of the areas through which they pass. Scenic trails are not solely recreational facilities; they are intended to preserve valuable environmental resources. Second, the act encourages multiple uses of trails and adjacent land. Third, NTSA favors alternatives to property acquisition, especially by condemnation, for trail creation and protection. While the power of condemnation is strictly circumscribed, the potential use of other forms of acquisition, such as zoning and cooperative agreements, is possible. Fourth, the act endorses the right of federal agencies to regulate the conduct of private landowners on adjacent land. Fifth, the act implicitly approves the use of zoning to protect trails.

National scenic trails are designed for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails. (For other aspects of management and legal aspects of the National Trails System Act, see the Nature Conservancy 1976.)

Legal Issues

The Fifth Amendment presents potentially the most formidable legal obstacle to trail protection regulations since such regulations would significantly diminish the rights of some private landowners adjacent to trails. Determining whether a particular regulatory scheme as applied to a specific parcel of property is a “taking” requiring just compensation is difficult and unpredictable. “Open space” zoning techniques, like those employed in trail protection regulations, are particularly vulnerable to takings challenges because that may reduce land values far more than conventional zoning (as we saw in Chapter 8). This issue is very similar to that of the Wild and Scenic Rivers Act.

State Legislation and Scenic Trails

It was the original intent that the NTSA would encourage enactment of state trails legislation. A 1976 survey found that seventeen states had enacted trails legislation, twenty-five operated trails, fifteen reported local government trails, and eighteen had created state trail councils. As of 1986 twenty-five states had comprehensive trails system statutes, including: Alaska,68 Arkansas,69 California,70 Colorado,71 Connecticut,72 Florida,73 Georgia,74 Idaho,75 Kentucky,76 Maine,77 Massachusetts,78 Michigan,79 Minnesota,80 New Hampshire,81 New Jersey,82 New Mexico,83 New York,84 North Carolina,85 Ohio,86 Oklahoma,87 Oregon,88 Tennessee,89 Texas,90 and Washington,91

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74 Ga. Code ss. 12-3-110 to 117 (1982).
75 Idaho Code ss. 67-4232 to 4256 (1980).
83 N.Y. Parks & Rec. Law ss. 3.09 (7-a) (McKinney 1984).
Most state acts are far weaker than the NTSA. In some states, trail officials have no authority to acquire land or interests in land for new trails. In others, trail officials may acquire land, but not through the use of eminent domain. In three of the few states that do permit the use of eminent domain for trails, acquisitions are limited to twenty-five acres per mile, the equivalent of a trail corridor 200 feet wide.

There has been some behavioral research work done on recreational trail users, but little research (Palmer 1978) assesses how people usually use and evaluate scenic trails. There has also been one national symposium of note on trails (Open Lands Project 1971).

**SPECIFIC LAND AREAS**

Specific land areas managed by the Forest Service, Bureau of Land Management, the National Park Service, and the Fish and Wildlife Service often have specific statutes that contain language relating to aesthetic considerations.

Some specific federally owned land areas such as the Whiskeytown-Shasta-Trinity National Recreation Areas\(^2\) and the King Range National Conservation Area in California\(^3\) and the Spruce Knob–Seneca Rocks National Recreation Area\(^4\) in West Virginia have specific language pertaining to aesthetics in the statutes that created and guide administration of these areas. The same is true for many of the national parks and wilderness areas.

The Bureau of Land Management’s Organic Act\(^5\) even has specific provisions that call for study, identification, and protection of visual resources of a specific area, the California Desert Conservation Area (Figure 9.7), in the following passages:

Sec. 601. (a) The Congress finds that—

1. the California desert contains historical, scenic, archeological, environmental, biological, cultural, scientific, educational, recreational, and economic resources that are uniquely located adjacent to an area of large population;
2. the California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed;
3. the California desert environment and its resources, including certain rare and endangered species of wildlife, plants, and fishes, and numerous archeological land historic sites, are seriously threatened by air pollution, inadequate Federal management authority, and pressures of increased use, particularly recreational use, which are certain to intensify because of the rapidly growing population of southern California;
4. the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles;
5. the Secretary has initiated a comprehensive planning process and established an interim management program for the public lands in the California desert; and
6. to insure further study of the relationship of man and the California desert environment, preserve the unique and irreplaceable resources, including archeological values, and conserve the use of the economic resources of the California desert, the public must be provided more opportunity to participate in such planning and management, and additional management authority must be provided to the Secretary to facilitate effective implementation of such planning and management.

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\(^1\) 18 U.S.C. s. 480q-3 (1988).
of this section. Any patent issued on any such mining claim shall recite this limitation and continue to be subject to such regulations. Such regulations shall provide for such measures as may be reasonable to protect the scenic, scientific and environmental values of the public lands of the California Desert Conservation Area against undue impairment, and to assure against pollution of the streams and waters within the California Desert Conservation Area.98 (Emphasis added added.)

As mentioned in previous sections, that specific statutes such as these identify and provide direct consideration of, or protection of, visual resources within these specific areas is the best legal protection available. It should leave no doubt in any court’s mind about the intent of Congress concerning these areas, and that the intent constitutes a social norm or obligation of protection.

**Bi-State and Regional Scenic Areas**

Conservationists believed a precedent had been set when a regional commission was unable to manage a complex, bi-state natural area; Lake Tahoe. Remarkably similar to the Columbia Gorge, Lake Tahoe forms the boundary between California and Nevada. The two states have disagreed over how or whether to protect the lake. Lake Tahoe also contains scenic, natural, cultural, and recreational values of national significance.

The commission created to manage Lake Tahoe, the Tahoe Regional Planning Agency (TRPA), achieved national recognition as a failure. In the ten years from its creation in 1969, TRPA approved 96 percent of all development proposals put before it, resulting in the swift and steady deterioration of the lake’s scenic and natural values. On June 15, 1984, U.S. District Judge Edward Garcia delivered a legal opinion of TRPA’s effectiveness when he enjoined it from approving any development project in the Lake Tahoe Basin until the states adopted a management plan that did not violate the federal California-Nevada Bi-state compact.97

In contrast, the 1987 Columbia River Gorge National Scenic Area Act98 is one of the most comprehensive acts for management of a special scenic area including parts of two states. For a detailed account of the legislative history of the act and a detailed critique of its many provisions, see the article by Blair (1987). The purposes of the act are:

1. to establish a national scenic area to protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge; and
2. to protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with paragraph (1).99

Although the act’s basic purpose is clear, its implementation mechanisms are complex. The Gorge Scenic Area is divided into three separate land classifications: Special Management Areas (SMA’s), General Management Areas (GMA’s) and Urban Areas (UA’s). Each area is administered by a different management entity and is subject to disparate land use standards. The boundaries for these designated areas are set on maps incorporated into the act and can be altered only in a limited fashion subject to strict criteria.

The composition of the Columbia Scenic Gorge Commission is similar to that of the 1969 Lake Tahoe Bi-State Compact (particularly that a majority, eight of twelve, of the commissioners must reside within the local counties), but the differences are more pronounced. The primary distinctions between the Gorge Commission and the TRPA are (1) that an equal number of appointments are made by authorities outside the Gorge scenic area as those made by authorities within, and (2) that elected and appointed officials—those who, theoretically, would be more likely to sacrifice long-term protection for short-term economic development—are barred from serving on the commission. The Gorge Act also differs from the Tahoe Compact, by greatly restricting commission authority through complex voting procedures, and by incorporating mandatory and specific land use standards into the act itself.

Thirteen cities and towns, or 10 percent of the scenic area, are exempt from the act’s purview, and the rest of the land use activities within the Gorge scenic area must be consistent with the act’s comprehensive management plan. The act also places rigorous standards upon certain land use activities. The strictest standard is an outright prohibition on “major development actions” within the SMA’s. The act also prohibits commercial (except certain recreational facilities), industrial, and multi-family residential development within the SMA’s as well as mining exploration, development, and production, with two limited exceptions.
All residential development within the Gorge scenic area (excluding the designated UA) — and even development on SMA parcels larger than 40 acres — is prohibited if it would “adversely affect” the scenic, cultural, recreational, and natural resources of the area. “Adversely affect” is defined in the act as:

A reasonable likelihood of more than moderate adverse consequences for the scenic, cultural, recreation or natural resources of the Scenic Area, the determination of which is based on

1. the context of a proposed action;
2. the intensity of a proposed action; including the magnitude and duration of an impact and the likelihood of its occurrence;
3. the relationship between a proposed action and other similar actions which are individually insignificant but which may have cumulatively significant impacts; and
4. proven mitigation measures which the proponent of the action will implement as part of the proposed action to reduce otherwise significant affects to an insignificant level.\(^{100}\)

The Gorge Act also contains strong standards for industrial and commercial development, and production of mineral resources. Three years after the commission has been created by law, it must adopt a management plan for the scenic area. Note the Gorge Scenic Act is a Federal law, but there are provisions to create state laws to replace or take over Federal functions with state activity.

Private property regulation by the Forest Service and other federal agencies within federally designated areas certainly is not a novel approach. Two prominent examples, the Sawtooth National Recreation Area and Hells Canyon National Recreation Area, are in the Northwest. Both use a regulatory method derived from the Cape Cod National Seashore, popularized as the “Cape Cod formula.” The Cape Cod formula, as used in the Gorge Act, requires local governments to enact zoning ordinances (and variances) that are consistent with standards promulgated and subject to approval by the Secretary of the Interior. The secretary is authorized to enforce the interim guidelines through injunctive and condemnation authority until the commission has approved zoning ordinances for the GMA’s and the secretary has concurred with SMA ordinances.

The scenic area's major tributaries are protected through state-designated wild, scenic, or recreation river standards or under the National Wild and Scenic Rivers Act. The act also authorizes appropriations for preparing a program for restoring and reconstructing Oregon's scenic highway adjacent to the Columbia River Gorge.

It is too early to judge how successful the approach taken by the Gorge Act will be, but the structure of the commission is an improvement over the Tahoe Compacts. Standards for development — such as a forty-acre minimum lot size for the scenic area's most significant lands, and a requirement throughout the area that new residential development not “adversely affect” the gorge's scenic, natural, cultural, and recreational values — ensure a minimum level of protection.

The Adirondack Park Agency Act\(^{101}\) is an example of a state statute aimed at the “threat of unregulated development” within a six-million-acre landscape (Figure 9.8) in northern New York State that includes private and state lands (Note 1975; Davis 1976; Booth 1975). The statute is unusual in its degree of specificity of review criteria for proposed land uses that fall within the park agency's authority.

The first criterion is that the proposed use “be compatible with the character description and purposes, policies and objectives of the land use wherein it is proposed to be located.”\(^{102}\) The aim of this first criterion, which applies to 87 percent of the park’s private land area, is “to prevent strip development along major travel corridors in order to enhance the aesthetic and economic benefit derived from a park atmosphere along these corridors.”\(^{103}\)

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\(^{100}\) Id.

\(^{101}\) Adirondack Park Agency Act, N.Y. Exec. Laws ss. 800 et seq. (McKinney 1972).

\(^{102}\) Id., s. 809.10b.

\(^{103}\) Id., ss. 805.3.f(z), 805.3g(x).
The second criterion is that the proposed use "be consistent with the overall intensity guideline for the land use area included."\textsuperscript{104} The intent of these guidelines for six different types of zone areas appears to be to control vacation home development by channeling it into areas where it would least detract from those scenic and environmental qualities the vacation home buyers are themselves seeking." (Note 1975)

The third criterion is that the proposed use must "comply with the shoreline restrictions if applicable."\textsuperscript{106} These restrictions regulate shoreline building densities, building setback, and the maintenance of vegetation along the shores of all lakes and ponds and certain rivers and streams.\textsuperscript{106}

The fourth criterion is that the proposed use "not have an undue adverse impact upon the natural, scenic, aesthetic, ecological, wildlife, historic, recreational or open space resource of the (Adirondack) park or upon the ability of the public to provide supporting facilities and services made necessary."\textsuperscript{107} This last criterion gives the park agency a good deal of discretionary control, but its function is to prevent the park's "unique scenic, aesthetic and recreational resources"\textsuperscript{108} from becoming victims of their own attractiveness.

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**Case Study: Alpine Lakes Wilderness Appraisal\textsuperscript{109}**

**Introduction**

The impetus for the research presented in this case study was a congressional act, the Alpine Lakes Management Act (ALMA) of July 12, 1976, that mandated the establishment of the Alpine Lakes Wilderness Area.\textsuperscript{110} ALMA specified that all private lands within the designated wilderness boundaries would be purchased at fair-market value. At the time of the act, the Pack River Management Company (PRMC) owned more than 22,000 acres of land within the boundary. The Forest Service offered PRMC $13 million for the property based on its timber value. While the value of the timber was not in dispute, an offering price based on timber value seemed inconsistent with the physical setting (Figure 9.9) of the land.\textsuperscript{111}

At this juncture an interdisciplinary team of scientists from the University of Wisconsin (Madison) was engaged to appraise the property. The team was headed by the late Professor James A. Grasskamp of the University of Wisconsin, who had developed an approach to valuation based on contemporary real estate appraisal theory. Other members included Bill Gates (a computer scientist), Ralph Kiefer (a remote-sensing expert), Mike Robbins, and a landscape architecture team of Bernard Niemann and Richard Chenoweth. The marriage of contemporary real estate appraisal theory with wilderness assessment, in the context of a spatial data base utilizing remotely sensed data, formed the basis of the appraisal.

**Real Estate Valuation Methodology**

Establishing the most probable use of the subject property is a pivotal step in the contemporary valuation process. In this process (Figure 9.10), the analysis moves inductively from what is known about the property to be appraised toward identification of alternative uses. The alternatives uses are

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\textsuperscript{104}Id. s. 809.10.c.
\textsuperscript{105}Id., s. 809.10.d.
\textsuperscript{106}Id., s. 809.1.
\textsuperscript{107}Id., s. 809.10.c.
\textsuperscript{108}This phrase is a legislative “finding” concerning the park.
\textsuperscript{109}Parts of this case study were taken from an unpublished paper by Michael L. Robbins and Sean C. Ahern, "The Price of Wilderness and Scenic Beauty: A Methodology for the Inventory and Appraisal of Wilderness and Scenic Land," undated. Used with permission of the authors.
\textsuperscript{111}It was the hope of Congress and the intent of ALMA that compensation agreements could be negotiated that included exchange of other federally owned property or donations. Timber trades for national forest lands were considered probable. However, when PRMC sold its sawmill operations in the Wenatchee, Washington, area of the intended wilderness, the Forest Service found it expedient to withdraw trade offers from PRMC.
then ranked in terms of economic benefit, physical suitability, political suitability, effective demand, and financial viability at a particular point in time. The resulting matrix of choices suggests scenarios of possible use for the parcel. The determination of most possible use, in turn, suggests the nature of the most probable buyer.

To estimate what the most probable buyer would pay in terms of market value, or most probable price, the appraiser must either find direct case equivalent sales of comparable property between fully informed parties or, in the absence of current market information, simulate the economic logic and pricing calculus of the most probable buyer, given political constraints and available market alternatives.

After determination of wilderness as the most probable use for the subject property, this case study illustrated how transactions between informed buyers and sellers were structured so that the sales comparison approach (market inference) could be employed to price the subject property.

The contemporary appraisal process (Figure 9.10) is generally divided into eleven steps; however, the principal focus of this study will be Step 7, Choice and Application of Appraisal Method, and the inclusion of nontraditional aesthetic analysis as part of this step. Steps 1 through 6 are described briefly to provide context.

The Valuation Process

Step 1: The Appraisal Issue

The issue for which fair-market value was required stemmed from the Alpine Lakes Management Act of 1976, Section 4 (Land Acquisition and Exchange), which authorized and directed the Secretary of Agriculture to acquire more than 41,000 acres of nonfederal lands in the Alpine Lakes Wilderness and the “intended wilderness.”

One of the unique features of ALMA was that it gave the owners within the intended wilderness special rights that modify the appraisal rules affecting condemnation. For example, since ALMA provided three years for negotiated purchase, the Forest Service saw one of their alternatives to be no action at all in order to prompt landowners to force a purchase by court action (USDA FS 1978, p. iv).

While ALMA used the term “just compensation,” there was no condemnation action at the time of appraisal. The actions of attorneys for the property owners were not adverse condemnation actions, but rather suits to proceed with negotiation of purchase in which the court would set the price should negotiations stalemate.

Step 2: Preliminary Survey

An initial survey of the unique physical attributes of the subject property suggested to the appraisal team that the most probable use could be wilderness, with a significant component for scenic quality conservation. The initial survey also suggested that this traditional public use concept (wilderness conservation) could be identified as a private market phenomenon in which there was an organized market acquiring land without right of eminent domain for the specific purpose of wilderness and scenic preservation.

Step 3: Data Program

To be sensitive to the attributes affecting economic value, the economic land unit is analyzed by collecting relevant data according to five categories:

1. **Physical attributes** such as size, shape, soils, geology, slope, water, flora, and fauna.
2. **Legal and political attributes** affecting use and degree of decision-making within the private sector, including federal, state, county, and private land use control relevant to the parcel.
3. **Linkage attributes** that tie the site to infrastructure sys-

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tems such as roads and sewer, or to peripheral activities and establishments that may generate demand for the parcel.

4. **Dynamic attributes** related to how people perceive a site — for instance, as prestigious, dangerous, attractive, enjoyable, beautiful.

5. **Environmental attributes** related to off-site effects of the subject property, for example, storm water runoff or destruction of a viewshed.

**Step 4: Alternative Use Determination**

The detailed property analysis resulted in two sets of uses being identified for PRMC: (1) lands for logging, intensive recreation, and recreation lot development; and (2) lands for wilderness and recreation. These are conflicting uses in that logging or development precludes the use of the land as wilderness. Appraisal theory suggests that the most probable use of the land will be that which yields the highest present value within the practical constraints of public policy, market demand, physical resource base, and financial viability when sold on the open market, in a negotiated purchase, by a knowledgeable buyer and seller, neither acting under duress and given a reasonable time for sale (ILAC 1973, 25–23). While the economic ranking of PRMC land had been established for its timber value, the economic ranking for its use as wilderness and recreation had to be established in order to determine the most probable use.

**Step 5: Most Probable Use Determination**

While the appreciation and preservation of wilderness and scenic lands have been well accepted, the market valuation of such lands has received little attention (Robbins 1983, pp. 3–7). Wilderness and scenic lands are bought and sold every day, but the valuation process has yet to recognize the attributes associated with wilderness lands as economic commodities. When valuing a single-family house, the appraiser is able to assign adjustments to differences between attributes of the house (number of bathrooms, square footage, etc.) and a comparable value because the motivation and behavior of buyers indicate that such attributes have economic importance to them. Wilderness and scenic beauty attributes had been considered intangibles that could not be priced in the marketplace, in part, because the tie between buyer motivation and the physical attributes had not been established. The underlying principle of this research is that the market (both buyers and sellers) recognize that wilderness consists (at least in part) of tangible attributes that are capable of interacting with people in a way as to make them desirable and in demand.

**Step 6: Most Probable Buyer Determination**

The selection of the most probable use of the subject property by the appraiser leads to identification of the most probable buyer. Most probable buyer identification then enables the appraiser to begin the search for sales with a most probable use similar to that of the subject property. Wilderness land purchases, or comparables, could then be used to determine the fair-market value of the subject property based on the application of the sales comparison approach to value (Grasskamp 1985: pp. 7–8).

After careful matching of the attributes making up the subject property with previous buyer history along similar attributes, it was determined that the most probable use of the subject property was for wilderness and the most probable buyers would be those motivated to protect the unique condition of the subject property.

The appraiser has determined in his opinion that highest and best use of each cluster shall be allocated between, certain acres appropriate as trailhead and public corridor to the back country, and the most probable acres shall be allocated as wilderness for public purposes as these uses have only immediate and higher present value than alternatives, but are in addition most compatible with community environment and development goals. *These uses are the probable buyer or buyers motivated to preserve high priority wilderness tracts and representing collective private citizen financing.* (Grasskamp and Robbins, 1982, p. III-21) (emphasis added).

**Step 7: Choice and Application of Appraisal Method**

**Choice of Appraisal Method**

Once the most probable use has been determined, the best approach to valuation is to estimate value from what the most probable buyers have done in prior transactions of similar properties (inference). This method of determining most probable price involves inferring future market behavior from recently completed market transactions. The method implies that a prudent person will not pay more for a property than a comparable substitute property would cost.

Land appraisal depends primarily on the sales comparison approach as opposed to an income capitalization or cost approach to valuation (Grasskamp 1985, p. 9). The goal of the research was to establish a methodology enabling the sales comparison approach to be applied in the pricing of the subject property. The PRMC appraisal is unique because one of the potential uses was wilderness, a use that had not previously been appraised as a market commodity and whose attributes had been poorly defined.

The sales comparison approach preferred to compare the subject property in terms of specific, physically ascertained attributes to broadly similar properties that had been sold to a class of buyers with similar motivation. Therefore, it is necessary to describe the physical attributes of the subject property that may be significantly related to alternative uses for the selection of the best use. In the case of the Alpine Lakes Wilderness, where the subject property was owned in a checkerboard pattern adjoining both government and privately owned properties, it was also necessary to place the subject property within the context of a regional pattern and subenvironmental systems (Figure 5.11). Comparison of scale, physical diversity, ruggedness, and quality of the property in question created a data problem of unusual proportions (Table 9.1). Nevertheless, the distinctions between subject property and comparables had to be retained if pricing inferences were to be equitable.

The dual objectives of needing to maintain consistency in the application of pricing methodology while remaining sensitive to the diversity within and among the comparables and the subject property led the appraisal team to determine that a geographic information system (GIS) would be necessary to manage the data. In addition, it was determined that the automated data management function of the GIS would need to
be tied directly to the automated pricing process so that individual components of the subject could be priced with selected units from comparable properties.

The automated selection and pricing process of this research fits the basic strategy of the sales comparison approach, which is to search for properties that might have served the same uses as the indicated most probable use for the subject property, on the principle that buyers' top price will be only as much as they would pay for reasonable substitutes.

In general, there are three major conditions for executing the sales comparison approach (even for wilderness lands) (Robbins 1987, p. 232):

1. There is an orderly market for parcels of wilderness and scenic attributes in which arm's length transactions occurred without recourse to eminent domain.

2. Adequate information is available to adjust sales prices of transactions meeting the first condition for external factors such as; time of sale, financial terms, and unusual sales conditions. The appraiser must have enough information to make reasonable adjustments for differences in location, or for imbalances in the market, to the degree that these differences are unique to only some of the comparables.

3. The subject property and the comparables need to have some common denominator with respect to both size and quality or suitability, for the presumed use, for comparison of the subject property and the comparables.

Determination of comparability based on a most probable use of wilderness was a fundamental challenge of this research. Two problems were encountered: (1) wilderness is a condition that is not defined by a single set of attributes but one that is a result of the synergy among various combinations of attributes; and (2) there was no established methodology to inventory the wilderness attributes once they were defined.

Establishing Comparative Wilderness Scores

Following the preliminary survey (Step 2) indicating wilderness as a potential most probable use, an assessment of the attributes associated with wilderness (Step 3) as a most probable use is the next step based on physical, dynamic, and environmental attributes. Of the three, definition of the dynamic attributes for wilderness posed the most difficult problem. As discussed above, the two problems confronted were how to identify wilderness attributes and once identified how to inventory them. The more general issue, however, was how to develop a scoring system for wilderness attributes that provided for a relevant unit for comparison—a unit that measures the kinds of utility buyers think they are purchasing when they buy wilderness lands.

In the search for wilderness and scenic attributes that

<table>
<thead>
<tr>
<th>Table 9.1 Alternative Use Considerations</th>
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<tbody>
<tr>
<td>Damage Potential to Other Alpine Areas Views and Ecosystems</td>
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<tr>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Public Benefits</strong></td>
</tr>
<tr>
<td>*Cluster 1</td>
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<td>*Cluster 2</td>
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<td>*Cluster 3</td>
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<td>*Cluster 4</td>
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</tbody>
</table>

Total Subject Property Acres

3,588 | 18,869 | 22,457

*As part of a strategic play by the appraised team (in anticipation of possible court rulings) the subject property was organized into four separate clusters.

could be used for the valuation of the PRMC lands, two systems were identified that attempted to categorize lands based on their wilderness and scenic beauty quality: the Wilderness Attribute Rating System (WARS) (USDA, FS 1977, p. 1) and the Variety Class Assessment System (VCAS) (USDA, FS 1974). Both systems were developed by the U.S. Forest Service to rank lands for their wilderness and scenic quality by identifying the attributes that described these phenomena. These two systems provided a point of departure for the geographically based information system developed for the appraisal described in this case study.

The Wilderness Evaluation System (WES)

The term given the combination of GIS-based wilderness evaluation with automated sales-comparison-price estimating was the Wilderness Evaluation System (WES). WES was designed to extract the best aspects of WARS and VCAS for use in a spatial approach to wilderness evaluation (Table 9.2). WES augments the systems discussed above by using the additional tools provided in a spatial data base and the information gleaned from visitor employed photography (Chenoweth and Neimann 1982). WES was designed to provide a mechanism for a site-specific comparison of the subject property’s wilderness/scenic attributes with comparable properties’ attributes in accordance with the sales comparison approach to value.

WES has several features that distinguish it from other approaches to wilderness evaluation: (1) evaluation is done on a site-specific basis; (2) it provides an understanding of the spatial relationships and attribute variability within a wilderness area; (3) it uses a standardized unit of evaluation, enabling retesting and comparative analysis to be performed; and (4) it is a programmatic approach that is specific in application.

System Structure

WES contains the four major components of wilderness: (1) natural integrity/apparent naturalness, (2) opportunity for solitude, (3) opportunity for primitive recreation experience, and (4) scenic beauty (Scenic Quality System).

Natural integrity was defined as the extent to which physical development has affected long-term ecological processes. The ratings were based on the same physical impacts used in WARS but geared toward impacts on the natural processes as perceived by the nonexpert typical user. Rating was done on individual cells (spatial unit of analysis) starting with 10 points. The value of any physical impacts contained within the cell’s boundary was added. Values ranged from 10 (paved road) to 0 (no impact). A weighting factor was applied to each cell to account for the physical impact from surrounding cells. Therefore, the final natural integrity score for each cell reflected both internal and external physical development.

Opportunity for solitude was rated for each cell using four attributes: (1) distance perimeter to core, (2) view-from the cell, (3) view-to the cell (both from the same selected viewing platforms), and (4) vegetative screening. The first attribute was generated using a simple distance function in the GIS, and the second and third attributes were generated using viewshed algorithms (Travis et al. 1975). The last attribute was derived from the density information collected in the landscape attribute inventory. A rating system was devised that combined the four components into a single solitude score.

Opportunity for primitive recreation experience was made up of three attributes: (1) challenge, (2) diversity of terrain, and (3) diversity of landscape. Challenge was scored on the basis of several environmental attributes, such as the presence of various types of rock forms and density of vegetation. Diversity of terrain used the percent slope as a measure of challenge (more elaborate measures could be made, e.g., fractal dimension). Diversity of landscape was measured by the number of different landscape features contained within a single cell (physiography, vegetative, rockform, waterform). Each cell was scored with respect to this component.

Scenic quality system (SQS) was based on many of the attributes described in the VCAS utilized by the Forest Service, which translates to a variety of rockforms, landforms, water, and vegetation per unit of area. The primary difference is that SQS used an inventory procedure based on individual cells using aerial color photographs for the inventory procedure and a visual interpretative key for each of the environmental attributes (Ahern 1982). In addition, SQS relied on the visitor employed photography study (Neimann and Chenoweth 1982) to augment those environmental attributes identified by users that were not delineated by wilderness and scenic

<table>
<thead>
<tr>
<th>TABLE 9.2</th>
<th>The Scenic Quality Criteria*</th>
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<tbody>
<tr>
<td>I. Physiography</td>
<td>1. Sharp dissected uneven slopes</td>
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<td></td>
<td>2. Moderately dissected slopes</td>
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<td></td>
<td>3. Irregular landscape</td>
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<td>4. Ridged landscape</td>
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<td>5. Peak</td>
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<tr>
<td>II. Rockform</td>
<td>1. Avalanche chute (rock)</td>
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<tr>
<td></td>
<td>2. Avalanche chute (snow)</td>
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<tr>
<td></td>
<td>3. Talus slope or boulder field</td>
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<td></td>
<td>4. Rock outcrop &lt; 2 acres</td>
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<td></td>
<td>5. Rock outcrop 2–5 acres</td>
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<td></td>
<td>6. Rock outcrop 5+ acres</td>
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<td></td>
<td>7. Cliff</td>
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<td></td>
<td>8. Pinnacle</td>
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<td></td>
<td>9. Cirque</td>
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<td></td>
<td>10. Permanent snow field</td>
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<td></td>
<td>11. Glacier</td>
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<td></td>
<td>12. Rock dome</td>
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<tr>
<td>III. Vegetation</td>
<td>1. Stocking 10 to 39%</td>
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<td></td>
<td>2. Stocking 49 to 68%</td>
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<td></td>
<td>3. Stocking 70%+</td>
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<td></td>
<td>4. Large old growth timber</td>
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<td></td>
<td>5. West meadow</td>
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<tr>
<td>IV. Waterform</td>
<td>1. Unusual shoreline configuration (lakes)</td>
</tr>
<tr>
<td></td>
<td>2. Falls</td>
</tr>
<tr>
<td></td>
<td>3. Rapids</td>
</tr>
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<td></td>
<td>4. Meander</td>
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</tbody>
</table>

*These factors reflect elements of diversity revealed by the visual study to be prominent in scenic quality ratings of people who make the effort to enter the area on foot and selected for the fact that data could be gathered from air photos.

experts. Scoring of each cell was done using the number of landscape attributes found in each cell (diversity) and the exposure of the cell to viewing platforms (as determined by watershed analysis).

The diversity measure was derived by correlating the scenic score that users gave to scenes they photographed with an inventory of the WES landscape attributes that occurred in each picture. Correlations had an \( r^2 \) of 94 percent using 800+ samples. The rationale behind using view-from as the other component of the scenic score is that a scenically beautiful region is even more valuable if it is visible from a variety of vantage points.

As stated previously, a complicating factor in the assessment of wilderness lands is that no one set of environmental attributes (those relating to the physical characteristics of the land) constitutes wilderness. WES addresses this problem (as does WARS) by defining four components of the system whose subattributes can be applied regardless of the region of the landscape on which the analysis is performed. The identification and interpretation of the environmental attributes used to score those components will vary from region to region. For example, the attribute challenge in a mountainous region with steep slopes may have a high score (indicating a significant challenge) because of the difficulty of traversing such terrain, whereas in a relatively flat terrain with no visible mountains, the score may be high due to orientation problems. This consistency of the wilderness components and their attributes in WES allows for comparison of wilderness areas regardless of their geographic region or characteristics. Site-specific information for each new study area is obtained from the environmental attributes for each set of components and interpreted on a case-by-case basis.

The other key feature of WES is its spatial approach to wilderness evaluation. Wilderness scores are calculated for each of the four components in a defined spatial unit (for the PMRC appraisal a ten-acre cell was used). This unit forms the basis for comparison of the subject and comparable properties. This unit is, however, not evaluated in isolation. The viewshed analysis in the GIS permits including off-site effects that influence the wilderness score of a cell. This spatial approach to wilderness evaluation has the advantages of site specificity, repeatability, context (visual exposure), and comparability (with other wilderness areas).

Data Sources

The WES component attributes were scored using environmental attributes obtained from map and photographic data and spatial operations of a GIS. The map data (7.5 minute US Geological Survey quadrangles) yielded information on physical development, human impact (roads and buildings), topography, and surface water. The photographic data (1:11,000 color aerial photographs) were used to derive the landscape attributes defined in WES. Derived data sets were generated using the spatial operations of the GIS and the Forest Service’s VIEWIT Program (Travis et al. 1975). The derived data set included view-from and view-to each cell (from the same selected viewing platforms), distance perimeter to core, and slope for each cell.

Attribute Weighting

WES consists of ten attributes scored on an ordinal basis, each attribute having a minimum possible score of 10. The ten attributes were grouped into the four components of wilderness. It was decided that the most defensible weighting scheme, from a legal standpoint, would be one in which each attribute would be weighted equally, relative to the component in which it is assigned. This type of weight distribution is consistent with contemporary valuation theory in that it attempts to remove any biases. The Wilderness Act of 1964 identified three primary wilderness components—wilderness quality, solitude, and primitive recreation experience. It also permitted use of any of four supplemental attributes, including scenic quality, if present to a significant degree. For a detailed description of the application of the appraisal method see Robbins (1983 and 1987).

Significance and Results

This case study shows that spatial data base concepts can be used to value individual appraisal units, explicitly recognizing the unique combinations of ascertainable facts present in each appraisal unit. Rather than assigning average values for only limited amounts of the total site (e.g., by valuing the site for timber or recreational lot development by either the aggregate or multiple regression methods), the techniques utilized in this project allowed valuing each individual appraisal unit making up the subject property.

The development of the WES enabled the use of physical attributes and user attitudes in establishing proxies for recognized wilderness characteristics. Having established the wilderness proxies, the wilderness scores were evaluated and processed using an attribute-matching methodology, which was not dependent on inferential statistical reliability for accuracy. In addition, the attribute-matching pricing methodology provided for testing of alternate pricing models, allowing internal consistency and appraisal goals to be evaluated and maintained. Finally, the derived price estimate was provided in a format that was easy to follow and explain, thus greatly enhancing the defensibility of the price estimate.

This research demonstrated that there is an active and informed market for a natural landscape that contains significant concentrations of attributes associated with wilderness. By bringing together acceptable market transactions between knowledgeable buyers and sellers, where wilderness was recognized as a significant component of the transaction, with a systematic and detailed inventory of the subject and comparable properties, market inference could be employed to estimate the value of the subject under a wilderness use scenario.

The research concluded that:

1. The highest and best use of the Pack River lands in the Alpine Lakes Management Area was wilderness.
2. The complex issue of wilderness evaluation could be addressed by building a foundation of knowledge and guidelines as laid out by the U.S. Forest Service in the years since the Wilderness Act of 1964.
3. A comprehensive WES necessitated modification of the U.S. Forest Service’s systems of wilderness and scenic beauty evaluation, for inclusion into a GIS, to provide an effective data structure for site-specific analysis.
4. A Fair-market evaluation ($37 million) of the Pack River property in the ALMA could be attained by building on well-established wilderness evaluation and real estate appraisal techniques.
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Poland, S. P. 1969. Development of recreational and related resources at hydroelectric projects licensed by the Federal


