Chapter 12

Surface Mining

INTRODUCTION

A number of specific land and resource uses have caused either a great deal of controversy or an extreme aesthetic disruption of the landscape throughout the country. One such activity is surface mining in all its various forms (Figure 12.1). Much of the discussion in this chapter will relate to these activities as practiced on federal lands or through federal permits (such as those given by the Bureau of Land Management), but the basic principles will also apply to private lands as regulated by federal and state statutes.

Rarely is there a more blatant conflict between economic and aesthetic values in the landscape than with surface mining. It is generally agreed that surface-mined land is considered “unaesthetic” (P.L.L.R.C. 1970, p. 122), “aesthetically undesirable” (Bosselman 1969) and “downright wicked” (Graham 1948), but it also may be the most economic use of the land. As Bosselman (1969, p. 143) aptly states the case: “Perhaps the most serious but least tangible effect of surface mining is in the amorphous area of aesthetics.”

The problem is to determine how aesthetic values should be considered in siting and location questions concerning various forms of surface mining, and the weight these values should be given in the decision process. There is ample legal literature on surface mining: (See Dietrich 1971; Larson 1972; Mintz 1976; Binder 1977; Haggard 1975; Kidd 1974; Renkey 1969; and Brooks 1966.) However, few journal articles consider aesthetics per se for any serious treatment. (See ASLA 1983; Bosselman 1969; Hubbard 1969; Clyde. 1976; Down; and Stocks 1977; McCloskey 1968; and Kidd 1974.)

TYPES OF SURFACE MINING

The term “surface mining” refers to processes by which minerals are uncovered from the surface of the earth and then extracted. It is distinguished from “deep mining” in which a shaft is constructed to the mineral vein and the mineral is extracted through the shaft. The best-known type of surface mining is variously referred to as strip mining, surface mining, or open-cut mining; it currently accounts for about 50 percent of the coal mined. Although surface mining is used to remove many types of minerals, its most common use, and the one that has created the greatest problems, is the mining of coal, sand, gravel, and stone.

There are at least five distinct types and subdivisions of surface mineral mining: generally taken from the U.S. Forest Service (1977) “Anatomy of a Mine.”

1. In the hydraulic method, high-pressure water jets are used to wash the land from its original location over ridges or some other mechanism where the mineral is trapped, as in gold mining in some of the Western states.

2. Strip mining consists of mining a relatively shallow deposit by removing one parallel strip of “overburden” after another; the overburden is then placed on the adjacent strip from which the mineral has been removed. It is useful to distinguish between three broad types of strip mining: contour mining, which takes place in hilly terrain; area mining, which is performed on relatively flat land; and auger mining, which may occur in both types of terrain.

   a. In contour mining (Figure 12.2) earth-moving machinery cuts a section out of a hillside to ex-
pose the coal seam and, as the name implies, follows the contour of the seam along the hill. What is left is a long vertical "highwall," sometimes over a hundred feet high, at the point of furthest penetration into the hill, and a horizontal "bench" from which the coal has been removed. In the simplest technique of contour mining, the removed overburden, now "spoil," is placed downslope of the bench as mining proceeds. With "contour stripping," used in mountainous areas, the strips resemble looped shoestrings as they follow the sinuous outcrop of a coal seam, leaving a gash of one hundred feet or so in the hillside. The resulting cut can be viewed as a triangle cut out of a hill. From a distance the cut looks like a road (or series of parallel roads if successive cuts have been made) running around the side of a hill.

b. In area mining (Figure 12.3) coal is uncovered by digging what is essentially a huge trench. After the overburden and coal are removed, another cut is made next to the first, and the spoil from the new one is placed in the previous trench. The process creates a series of high ridges and furrows —
resembling "a gigantic washboard" — with an exposed trench, often a hundred or more feet deep, marking the last cut. In both contour and area mining explosives are commonly used to fracture and loosen the overburden prior to removal.

c. **Auger mining** is a relatively new technique in which the augurs are used to get any remaining coal that contour mining cannot economically reach. Drills as large as seven feet in diameter bore into a seam (often into a highwall left by stripping) from the surface, leaving a perforated series of holes from which the coal has been removed. Any of these methods may cause extensive pollution and erosion damage downslope and downstream of the mine site unless the mine is carefully managed.

3. **Open-pit mining** (Figure 12.4) is used to mine ore bodies that may be large masses or bodies of irregular wandering configuration. It generally requires the removal of large amounts of material from an ever-expanding pit and the deposit of waste in separate dump areas near the pit. This type of mining is more common with metaliferous ores, such as iron or copper.

4. **Dredge mining** is generally done by a machine floating (Figure 12.5) in a pool of water and is used to mine shallow mineral-bearing gravels. Tailings from the dredge are placed behind it in piles as it moves.

5. **Underground mining** may leave spoil piles on the surface of the land even though the actual mining activity is not seen.

Any of these methods of mining may result in changes to the surface. Dumps of waste material and tailings from underground mines are generally deposited on the surface, and if the block-caving method of underground mining is used, there may be large-scale subsidence of the surface. The results to the surface from the other mining methods are obvious. Much of the visual impact may be due to ancillary facilities and equipment such as roads, processing centers, and large excavating equipment.

This is a brief sketch of mineral mining methods and some of their visual impacts, but accurate delineation of the activity is needed to assess the types of visual or aesthetic impacts involved (see U.S.D.A. FS 1977; Law 1984; ASLA 1978). It is evident from law journal and popular articles that there is much confusion and misconception about the actual mining techniques used and their effects on the environment.

**VISUAL IMPACTS AND PROBLEMS FROM SURFACE MINING**

There is still very little literature relating to the visual impacts due to surface mining activities. This is ironic, given the wide geographical scope of activity and the amount of public concern. One study on methodology for visual reclamation of surface mining is based primarily on eastern Appalachian conditions (Cole et al. 1976), while the only other in-depth studies are descriptive approaches for assessing northern Great Plains (Litton et al. 1979) and northeastern British Columbia (Tetlow and Sheppard 1977) landscapes. Some good summary material of mining impacts and approaches has been released (ASLA 1978; Adams 1983), and the Oak Ridge National Laboratory has been looking at surface mine reclamation and post-use possibilities as well (Seddon and Petrich 1983a and 1983b).

Visual management problems from surface mining break down into three basic types: First is the cumulative visual impact of unreclaimed surface mining activity on the unexceptional everyday landscape. Second is...
the direct conflict over surface mining activity for rare locatable, (valuable minerals located at specific deposits or sites) minerals that affects landscapes of high visual quality or social significance (Figure 12.6) — for example, national parks, wilderness areas, or monuments. Examples of the last category include phosphate mining in Caribou National Forest in Idaho (Figure 12.7) and borax mining in the Death Valley National Monument in California and Nevada. The third problem is the visual impact of surface mining adjacent to or within viewing distance from a highly scenic area.

The next step is to see how these visual or aesthetic concerns are addressed at the state and federal levels. The third problem is well illustrated by the Miners Ridge case in the Northern Cascades where Kennecott Copper Corporation proposed to develop an open-pit mine within Washington’s Glacier Peak Wilderness. McCloskey (1968, p. 82) describes the situation quite graphically:

The Miners Ridge case is a flagrant example of conflicting values. The mine site is the center of the wilderness on broad high meadows which look out on breathtaking alpine panoramas. Treasured Image Lake, mirroring Glacier Peak, is but a short distance away. Digging a 2,000 foot-wide hole in these meadows is like punching out the eyes of the Mona Lisa. The damaged area may be small, but the damage changes the importance of everything in sight for miles around. It is no longer a glorious, remote, and untouchable area. In a psychological as well as visual sense, the open pit will rob the area of the meaning it now has as wilderness.

The first type of visual problem is found throughout the U.S.: Appalachia, the northern Midwest, the northern Great Plains, the Southeast, Southwest, and so on. The second and third types of visual problems have become increasingly common in publicly owned environments in which protection is significant and also have valid mining claims. These values conflict directly and indicate many of the wilderness/mineral resource development conflicts that have never been amicably resolved. These conflicts may be expected to increase to some degree as certain rare (in location) minerals are found in publicly protected areas, and as the scale and physical intensity of mining (large scale, more impact) technology increases and more publicly owned areas are designated for protection—for instance, wilderness, roadless, primitive, or scenic area.

STATE SURFACE MINING CONTROL STATUTES

There are a number of state surface mining control statutes that specifically provide for consideration of aesthetic values. In the Wyoming Environmental Quality Act,\(^1\) which was drafted to regulate surface

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\(^1\)Wyo. Laws, Ch. 250, ss. 35-487.1 et seq. (1973).
mining specifically, an operating permit for mining exploration or production on unique quality lands can be denied under certain conditions. The criteria for classification is whether "the proposed mining operation would irreparably, harm, destroy, or materially impair any area that has therefore been designated by the council to be of a unique and irreplaceable historical, archeological, scenic or natural value." (Emphasis added.) The act also provides that the agency created by the act should inventory sites deemed as unique and irreplaceable, and of archeological, historical, scenic, or natural value. The intent of the provision was stated by Governor Hathaway before a U.S. Senate committee:

With our vast energy fuel resources Wyoming wishes to do its part to help alleviate the nation's energy crisis. But in the development and use of these resources we desire, indeed, we insist, that we have appropriate and adequate protection for our clean air and water and for our scenic and inspirational landscapes. . . . The number of visitors to our two great national parks in Wyoming, Yellowstone and Grand Teton, and to our lakes and streams, our big game areas and to our historical and geological attractions is each year more than 30 times the resident population of Wyoming.3

The concern voiced here is for a balance, including conservation of the Wyoming landscape, which contributes to Wyoming's third most profitable industry—tourism.

Montana also has a surface mining act, entitled the Montana Reclamation of Mining Lands Act,4 which mentions that priorities should be given to "the aesthetics of our landscape, waters and ground cover." 5 Other state acts may not mention aesthetic values per se, but may still imply maintenance of aesthetic values through reclamation provisions.6 For example, a North Dakota act requires that before the commission gives a permit, they must consider, among other things, whether the mining activity will result in "the permanent destruction of consequential aesthetic values."7

The West Virginia Strip Mine Control Act8 provides that the director of their department of natural resources can refuse altogether to issue a permit to a strip mine if the activity will unreasonably and irreparably interfere with the property rights of others. Included among such property rights is the aesthetic value of potentially damaged property. Broughton (1972, p. 498) comments that the professional training and value system of the head administrator of the act is key to the success to protection of environmental values. According to Broughton, one permit was refused on the grounds of damage to aesthetic values, where the action contemplated was to physically sever the top of a ridge immediately adjacent to Grandview State Park.9

The following states have active surface mining statutes, permit programs, and some form of enforcement: Alabama,10 Arkansas,11 California,12 Colorado,13 Florida,14 Georgia,15 Idaho,16 Illinois,17 Indiana,18 Iowa,19 Kentucky,20 Maryland,21 Michigan,22 Minnesota,23 Mississippi,24 Missouri,25 Montana,26 New Hampshire,27 New York,28 North Carolina,29 North Dakota,30 Ohio,31 Oklahoma,32 Oregon,33 Pennsylvania,34 South Carolina,35 South Dakota,36 Tennessee,37 Texas,38 Utah,39 Virginia,40 Washington,41 and West Virginia.42
Eight states do not have a statewide regulatory program applicable specifically to surface mining. These states include four Eastern states where little surface mining occurs, except for sand and gravel: Connecticut, Delaware, New Jersey, and Rhode Island; three Western states with substantial mining activity and large amounts of public lands: Alaska, Arizona, and Nevada; and Nebraska. Hawaii’s statute is inactive and is not being used.

Even among states with permitting statutes, there are differences. For example, California’s permits are granted by local governments within the context of state policy. In Maine and Vermont permits are granted within the context of the statutes regulating the location of all developments having major impact on land resources. (For a more detailed discussion of state surface mining statutes and programs the reader is referred to Bloom 1980.)

**FEDERAL SURFACE MINING STATUTES AND PROGRAMS**

The most wide-ranging federal legislation passed on this type of mining is the Surface Mining Control and Reclamation Act (SMCRA) of 1977. This act is the result of many previously proposed pieces of legislation that failed in Congress (Mintz 1976). The findings section of the act states that “many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and public welfare... by impairing natural beauty,” among other things. Aesthetics is not heavily emphasized elsewhere in the act, whose other major intent seems to be to provide a very detailed program for states to develop their own “ecologically sound” surface mining programs and to provide federal resources to promote surface mine land reclamation to restore the ecological functions of the landscape. Several aspects of the act will be emphasized here as they relate to aesthetics.

Environmental protection performance standards contained in the act that are to be utilized by approved state and federal programs include provisions for restoring the “approximate original contour” of the land. This phrase is defined as:

Approximate original contour means that surface configuration achieved by backfilling and grading of the mined area so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls and spoil piles eliminated; water impoundments may be permitted where the regulatory authority determines that they are in compliance with section 515(b)8 of this Act.

The implied criterion is that the land be restored to a “natural” or prior landform configuration. This leaves little room for alternative landform treatment as some have proposed, although there may be some provision for experimental aesthetic landform treatments of reclaimed surface mine sites under the section of the act dealing with experimental practices.

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22Mont. Code Ann. Title 82, Ch. 4.
26N.D. Cent. Code Title 38, Ch. 16.
27Ohio Rev. Code Ch. 1514.
29Or. Re. Stats. ss. 750–900.
32Surface Mining Land Reclamation Act of 1971, S.D. Cons. Laws s. 25–6A.
34Uranium Surface Mining and Reclamation Act, Texas Nat. Res. Code Ch. 131.
35Mined Land Reclamation Act 1975, Utah Code Ann. Title 40, Ch. 8.
36Code of Virginia Ch. 16, Title 45.1.
37Rev. Code of Wash. Ch. 78.44.
38W. Va. Code, Ch. 20, Art. 6D.
42Id., s. 1201(c).
43Id., s. 1265.
44Id., s. 1291 (2).
45Id., s. 1301.
The environmental protection performance standards relating to revegetation also imply a strong return to a natural situation. The operation should:

establish on the regraded areas, and all other lands affected, a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area; except, that introduced species may be used in the revegetation process where desirable and necessary to achieve the post-mining land use plan. 50

The act exceeds most previous ones in the specificity of its procedures and duration pertaining to performance and monitoring of reclamation measures. There are even separate standards for steep-slope surface coal mining. 51

There are some procedural deterrents to the bringing of many potential environmental cases: (1) the case must be "brought only in the judicial district in which the surface coal mining operation complained of is located," 52 that is, no change of venue strategies allowed; and (2) the plaintiff may be liable for court costs of the litigation or may be required to file a bond or equivalent security if a temporary restraining order or preliminary injunction is sought. 53 These two provisions may act to discourage most environmental groups from litigation under the act.

The act also prohibits future mining activities on certain federal lands:

After the enactment of this Act and subject to valid existing rights no surface coal mining operations except those which exist on the date of enactment of this Act shall be permitted—

(1) on any lands within the boundaries of units of the National Park System, the National Wildlife Refuge System, the National System of Trails, the National Wilderness Preservation System, and Wild and Scenic Rivers system, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act and National Recreation Areas designated by Act of Congress:

(2) on any Federal lands within the boundaries of any national forest: Provided however, That surface coal mining operations may be permitted on such lands if the Secretary finds that there are no significant recreational, timber, economic or other values which may be incompatible with such surface mining operations and—

(A) surface operations and impacts are incident to an underground coal mine; or

(B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those national forests west of the 100th meridian, that surface mining is in compliance with the Multi-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1975, the National Forest Management Act of 1976, and the provisions of this Act; And provided further, That no surface coal mining operations be permitted within the boundaries of the Custer National Forest;

(3) which will adversely affect any publicly owned park or places included in the National Register of Historic Sites unless approved jointly by the regulatory authority and the Federal, State, or local agency with jurisdiction over park or historic site. 54 (Emphasis added.)

The act also allows states to designate lands that have values that would be incompatible with surface mining. One of the criterion used is that surface mining not

(B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems. 55 (Emphasis added.)

LEGAL AND CONSTITUTIONAL ISSUES

SMCRA’s legislative history reflects congressional thinking (see Eichbaum and Buente 1980; Kite 1978; and Waters 1979). Congress observed that surface mining seriously impaired the post-mining usefulness of the land, then concluded that this important problem required a federal solution. Finally, it found that a relatively detailed regulatory scheme governing post-mining land use was necessary.

SMCRA requires that all land disturbed by surface coal mining operations be restored to a condition capable of supporting the potential uses of the land prior to any mining, or to higher or better uses if certain conditions are met. This standard is imposed in both the initial and permanent phases of the SMCRA regulatory

50Id., s. 1265 (b)(19).
51Id., s. 1265(d).
52Id., s. 1270 (c).
53Id., s. 1270(d).
54Id., s. 1272(e).
55Id., s. 1272 (a)(3)(B).
program. During the initial program, the Office of Surface Mining directly enforces the standard on individual mine operators under Section 515 (b)(2) and the implementing regulations. During the permanent program, the standard may be enforced directly by the states if they qualify for delegation by the Secretary of the Interior. A permanent program must institute federal procedural mechanisms, principally permitting and performance bonding, to ensure compliance by the industry. Section 515(b)(2) and the implementing regulations form a land use regulatory scheme that is national, uniform, and mandatory.

There was much hostility and resentment from states that were already implementing stringent surface mining regulation programs, from states that needed to mesh federal standards with already existing standards, and from other states, where the requirements were so different. Some saw procedural hardship deriving from the specificity of the regulations.

Two constitutional amendments could potentially limit the federal government's power to enact and enforce SMCRA's land capability requirements. First, land use regulation under Section 515(b)(2) may constitute a "taking" under the Fifth Amendment, entitling affected persons to just compensation. Second, these requirements may violate the Tenth Amendment because they inappropriately interfere with state land use regulation. However, in Hodel v. Virginia Surface Mining and Reclamation Association, Inc.65 and Hodel v. Indiana,66 the U.S. Supreme Court reversed the decisions of the two separate federal district courts, in Virginia and Indiana, that had found several provisions of SMCRA unconstitutional and had permanently enjoined their enforcement.

The Virginia district court found that the acts' reclamation requirements for steep-slope mining interfere with traditional state government functions and thus violate the Tenth Amendment. The Indiana district court enjoined SMCRA's prime farmland provisions, finding that they regulate activities having no substantial impact on interstate commerce and so are beyond the power of Congress under the commerce clause. The Indiana court also held that the prime farmland provisions violate the Tenth Amendment by usurping state functions, and that both they and the steep-slope "approximate original contour" provisions violate the substantive due process and equal protection guarantees of the Fifth Amendment. Both district courts held that the provisions for issuing cessation orders and imposing civil penalties for their violation transgress the procedural due process of the Fifth Amendment.

The lower courts also found that several provisions of SMCRA are impossible to comply with and are economically prohibitive, thus taking from the mine operators all use of their land in violation of the just compensation clause of the Fifth Amendment. In reversing, the Supreme Court held that SMCRA is a legitimate exercise of commerce clause power and that it does not violate the Tenth Amendment. The Court also rejected appellant's equal protection argument. The Court held, however, that the due process and just compensation questions were not ripe for decision, leaving mine operators free to litigate these issues later if SMCRA's provisions adversely affect specific property interests. (For more detailed discussion of the Supreme Court cases and lower court cases leading up to these decisions, see Conner 1982; Eichbaum and Buente 1980; and Wadsworth 1980.)

EARLIER FEDERAL ACTS

There were other, earlier federal statutes, prior to the Surface Mining and Reclamation Control Act of 1977, that also have a potential impact on visual resources. The General Mining Law of 187267 is the statutory authority used by the mining industry and the federal land management agencies to provide the industry with a right to mine on public lands. Hard-rock mining on public lands as authorized by the 1872 mining law refers primarily to mining metals such as gold, silver, copper, molybdenum, lead, zinc, and uranium. It does not include mining for coal, oil shale, sodium, and phosphate or common varieties of certain building materials. Most of the nation's nonferrous metal deposits are located in the vast public lands in twelve Western states, especially in desert and mountainous areas, managed mostly by the U.S. Forest Service and the Bureau of Land Management.

Although the 1872 mining law states that mines on the public lands must comply with regulations prescribed by law, it does not explicitly vest the Forest Service or BLM with authority to regulate mining activities. However, organic acts of the Forest Service and BLM give these agencies specific authority to regulate mining. The Forest Service Organic Act of 189768 requires that miners in national forests comply with rules and regulations issued by the Secretary of Agriculture.
Section 302(b) of the Federal Land Policy and Management Act (FLPMA) grants BLM a sweeping mandate to prevent undue degradation of the public lands "by regulation or otherwise."64 BLM’s mandate is strengthened by the fact that, although hard-rock mining is not governed by most FLPMA provisions due to a savings clause preserving the miners rights under the 1872 law, Section 302(b) is explicitly exempted from this savings clause.

These provisions provide the Forest Service and BLM with sufficient authority to impose environmental regulations on hard-rock mining. BLM and the Forest Service do have regulations in force. In addition to requiring compliance with the Clean Air Act, the Clean Water Act, and Resource Conservation and Recovery Act RCRA,65 the Forest Service imposes requirements designed to harmonize operations with scenic values "to the extent practicable."66 The emphasis on "practicable" means the Forest Service regulations do not eliminate environmental degradation from the mines in the national forests, but require only those measures the miner can afford.

To block mining activity, the land agencies have resorted to reserve public lands and thus remove them from the purposes of mineral exploration. In 1910 Congress passed the Pickett Act granting to the president the power to "temporarily" withdraw public lands and reserve them for public purposes specified in the withdrawal orders, such withdrawals to remain in force until revoked by the president or act of Congress.67 In 1914 the Supreme Court, in the case of United States v. Midwest Oil Company,68 declared that, for the eighty years prior to the passage of the Pickett Act, the president had had an implied grant of power to make withdrawals without express statutory authority. By Executive Order No. 10355 of May 1952, the president’s powers of withdrawal were delegated to the Secretary of the Interior.

All units in the National Park System and the National Wildlife Refuge System that contained wilderness areas were closed to mining before any of their lands were designated as wilderness. The mining exception thus has no application to these areas. Eastern national forests and their wilderness area are not subject to the mining laws.

The mining exception was incorporated into most Western forest wilderness areas as they were added to the system, but there were some exceptions. The Sawtooth and Hells Canyon wilderness areas and their surrounding national recreation areas were withdrawn from operation of the mining laws on the date they were established. The Boundary Waters Canoe Area in northern Minnesota was withdrawn from mining in 1978. The Misty Fjords and Admiralty Island national monuments of Alaska and their wilderness areas, administered by the Forest Service were established on December 2, 1980, and withdrawn from mining the same day.

In two Idaho wilderness areas, the mining exception went to the advantage of the mining industry. In the Gospel Hump Wilderness, created by the Endangered American Wilderness Act of 1978, withdrawal was not until January 1, 1988. The River of No Return Wilderness was created with a "special management zone" within which there will be no withdrawal from mining with respect to cobalt and associated minerals.

For the most part, mineral exploration in wilderness areas ceased on January 1, 1984. The withdrawal (from mined utilization) is "subject to valid rights then existing," however. In 1976 Congress responded to political opposition to withdrawals by enacting the Federal Land and Management Act, which limits BLM’s traditional authority to withdraw land from mineral entry.69 It requires notification to Congress of withdrawals over 5,000 acres, and such withdrawals are subject to a one-house congressional veto which would prevent withdrawal from mineral utilization. The act also limited the duration of withdrawals and mandated review of existing withdrawals before 1991.

If land is not withdrawn from mining law application, it is still subject to the mining law of 1872 as well as to Forest Service and BLM review. The critics (see Noble 1980; Toffenetti 1985) charge that current Forest Service and BLM practices that are intended to regulate and control hard-rock mining activities on public lands are too timid or too brutal. On the one hand, regulations to protect surface resources do not sufficiently protect public lands from degradation, while on the other, withdrawal power is too blunt and sweeping. Other options include denying the existence of a valuable deposit, denial of other necessary permits, or proposals for new procedures addressing more stringent environmental regulation. The last is espoused most often; for a more detailed treatment of the mining law of 1872 and its impacts on public lands, see Noble (1980) and Toffenetti (1985).

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64Id. 1732(b).
66Id., s. 252.2(d).
68236 U.S. 459 (1935).
Many of the minerals located in the public domain are controlled by the Mineral Leasing Acts (MLA's), which cover mining and exploration activities for minerals that are not hard rock—such as phosphorus, sodium, oil shale, oil and gas, and coal as well as geothermal development. The MLA's delineate the broad terms of a lease, the qualifications of applicants, and the acreage that may be leased. A tremendous amount of discretion is given to the Secretary of the Interior under the MLA's, including rule-making authority, which must consider other environmental statutes, and the general directive to manage public lands in the public interest.

Under these acts the federal government is able to insert clauses into a mining lease that will provide for the preservation of aesthetic values and will require restoration of the surface. Also, many of the leasing statutes provide for the renegotiation of the terms of the lease at stated intervals. The federal government is inserting clauses in its lease renewals requiring restoration of the surface. In the Montana Power Company case, where the federal government owned mineral rights but not the surface, the Secretary of the Interior inserted such a clause on December 3, 1965. The surface rights were held by the Northern Pacific Railway, which was the assignee of the coal lease. According to the appellants, Northern Pacific had waived restoration of the surface rights. Nevertheless, the BLM required restoration, and this was one of the main grounds for the appeal. The decision states, in upholding the insertion of the restoration clause:

The appellant stresses that the Northern Pacific Railway has no interest in the restoration of the surface. It contends that the restoration provision should be limited in acreage, the surface of which is owned by the United States. Although it is true that the United States has a greater interest in its own lands, it also has a substantial concern with the lands of others in which it has reserved the minerals. Furthermore, by the end of the twenty-year lease terms, the ownership of the surface of the land may well have changed, and the new owners may have a different attitude from the railroad’s.

Administration of the forest reserves was transferred from the Secretary of Interior to the Secretary of Agriculture in 1905, but responsibility of all mineral entries within the national forests remain with the Department of Interior. The Forest Service has the authority to manage only the surface resources of national forests. The BLM exercises authority for the secretary of interior for all oil and gas leasing as well as for other minerals that call for leasing of public lands under the MLA’s. But, the relevant land management agency, often the Forest Service, prepares the environmental assessment for the proposed leasing activity.

The final authority over the granting of oil and gas leases and locatable minerals leases resides with the Secretary of the Interior through the Department of the Interior Board of Appeals (IBLA). In a critical case, Duncan Miller, the IBLA abandoned the departmental policy of accepting the recommendations of the land management agency—in this case, the Forest Service. The IBLA rejected the agency’s stipulations or recommendations because they would have made all oil and gas exploration and development so difficult as to render the leases nugatory. The new departmental policy is that Forest Service leasing recommendations are considered but are not conclusive. This is a major issue and has been at the center of more recent disputes, such as phosphate mining in the Osceola National Forest (see Pell 1984) and offshore leasing for gas and oil (see Martin 1982). The only counterweight that the land management agency has is their assessment as to whether surface environmental impacts from mineral exploration and development are significant and whether remediation is possible.

Both the mining act of 1872 and the Mineral Leasing Acts have caused extensive litigation, much of which focuses on the relationship with environmental legislation as stated in the Wilderness Act and the National Environmental Policy Act, among others.

WILDERNESS AND MINING

In 1929 the Secretary of Agriculture and the chief of the Forest Service, by administrative action, set aside within the national forests eighty-eight wilderness-type areas. These areas were divided into “primitive,” “wilderness,” “wild,” and “canoe” categories. In 1964 the Wilderness Act took the last three categories and designated them as “wilderness” areas (see Chapter 9). The most important provisions of the Wilderness Act relating to mining activities are found in Subsections 4(b) and 4(d). The last sentence of Subsection 4(d) sets forth the general rule:

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80Id.
Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.77 (Emphasis added.)

Subsection 4(d)78 sets forth the exceptions to this general rule. The most important exception is in Subsection 4(d)(3):79

Notwithstanding any other provisions of this Act, until midnight December 31st, 1983, the United States mining laws and all laws pertaining to mineral leasing shall, to the same extent as applicable prior to the effective date of this Act, extend to those national forest lands designated by this Act as “wilderness areas.”80

Thus, mineral claims could be located in wilderness areas until 1984, and all further exploration for mineral development ceased in 1984. However, any claim validly located by that date could be worked indefinitely thereafter (Comment 1968 and Toffenetti 1985). As pointed out by Toffenetti (1985), viable mineral claims established before 1984 will have to pass several economic tests, and actual logistical working operations may prove impossible in many wilderness locations.

It should be noted, however, that in the interval between the effective date of the act and 1984, certain restrictions were placed upon mining and mineral leasing activities. First, patents issued on claims located in the interval conveyed title only to mineral deposits within that claim. The only timber and surface rights acquired were those reasonably required for conducting mining and prospecting activities. Second, the Secretary of Agriculture could prescribe reasonable regulations governing ingress to and egress from mining operations.81 Third, the Secretary of Agriculture could promulgate regulations governing the use of motorized equipment in connection with exploration, drilling, and production of mineral deposits. Fourth, the Secretary could require that upon termination of mining operations, the surface of the land disturbed by those operations be restored as nearly as is practicable to its condition prior to mining activities.

The greater limitations upon leases for mineral exploration are a consequence of the differences between the mineral leasing acts and the federal mining location laws. Under the latter, citizens are free to explore as a matter of right, while under the leasing laws they must apply for the “privilege,” as one case puts it.77 Citizens have no vested interest until the privilege is granted through the issuance of a permit. However, no application for a lease or permit covering lands within a wilderness area can be denied solely because the lands are within a wilderness area. Such a decision would appear to abuse discretion, which would emasculate the express provisions of the Wilderness Act allowing such activity.

The other major “exception” to the general plan of the Wilderness Act is found in Subsection 4(d)(1).82 This provision states that where the use of aircraft or motorboats within a wilderness area has already been established, that use “may be permitted to continue,” subject to any restrictions that the Secretary of Agriculture may promulgate. This does not mean, however, that if these modes of transportation were used prior to the Wilderness Act permission to continue such use was automatically established. On the contrary, in United States v. Gregg,79 the court held that after the act’s passage the Secretary of Agriculture had to give express permission to continue flights into wilderness areas even where such use had already been established. The court pointed out that the Wilderness Act provides “that the landing of aircraft may, not shall, be permitted where such use has become established.”83 (emphasis added).

The court then looked to Subsection 4(d)(4),84 which states that “the grazing of livestock . . . shall be permitted to continue,”85 and concluded that that language “clearly shows that Congress knew how to write an exception if they had intended one.”86 The court also held to be criminal acts any violations of valid regulations promulgated by the Secretary of Agriculture under the authority contained in the Wilderness Act.87

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77Id.
78Id.
79Id., s. 1133(d)(3).
80Id.
81Id.
82Id.
83Wilber v. United States ex rel Barton, 46 F.2d 217, 221 (D.C. Cir. 1930), aff'd. 283 U.S. 414 (1931).
86Id. at 707.
88Id.
89Id. 290 F. Supp. 706, 708 (W.D. Wash. 1968).
90Id.; 16 U.S.C. s. 551 (1988) provides: “[A]ny violation of . . . rules and regulations (promulgated by the Secretary of Agriculture to protect national forests) shall be punished by a fine of not more than $500 or imprisonment for not more than 6 months or both.”
Confusion abounds as to when certain mining activities are allowed in national forests, wilderness areas, primitive areas, and roadless areas, and also what degree of regulation is deemed appropriate by the agency. In this area of openly conflicting laws, court opinions, and agency regulations, there are very few clear guidelines. The Surface Mining and Control Act of 1977 eliminates some of these questions, but it does not clarify questions relating to previous or existing mineral rights. The cessation of mineral exploration in wilderness areas after 1984 also clears up other questions. However, there are still viable mineral claims in national forests, national monuments, wilderness areas, and even national parks, with little guidance as to what are allowable mining extraction activities and landscape impacts, or whether mining operations have to calculate environmental mitigation as part of their feasibility costs are lacking.

MINING AND THE NATIONAL ENVIRONMENTAL POLICY ACT

Beside the Wilderness Act, the National Environmental Policy Act (NEPA) is the other far-reaching federal act affecting federal actions regarding surface mining. Although NEPA is abroad (see Chapter 11), some factors limit its application to mining activities on federal lands and in regard to certain Federal agency actions.

First, NEPA’s effect on existing mining laws is limited, depending on whether a restrictive or liberal view is adopted.

A conservative interpretation of NEPA proceeds as follows. Section 102 of NEPA provides, in part:

The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policy set forth in this act. (Emphasis added.)

The Senate-House Conference Committee added the words emphasized above and explained their purpose:

The purpose of the new language is to make clear that each agency of the Federal government shall comply with the directives set out in such Subparagraphs (A) through (H) unless the existing law applicable to such agency’s operations expressly prohibits or makes full compliance with one of the directives impossible. If such is found to be the case, then compliance with the particular directive is not immediately required.

NEPA provides further: “The policies and goals set forth in the Act are supplementary to those set forth in existing authorizations of Federal agencies.”

The conference committee explained this section to mean: “The effect of this section . . . is to give recognition to the fact that the bill does not repeal existing law.” (Emphasis added.)

Therefore, NEPA does not require the impossible, nor does it change any existing laws, including the mining law. These conclusions were applied in United States v. Kosanke in which the IBLA decided that the above provisions of NEPA exempted mineral patent application proceedings from NEPA environmental impact statement procedures. Kesanke holds that a federal agency decision that does not involve the exercise of discretion but requires only the application of fixed objective rules to the facts establishing statutory rights need not be preceded by an environmental study.

The question now arises as to what mining law activities other than mineral patent proceedings may be exempted from NEPA procedures. Additional language in Kosanke is useful in applying this exemption to such activities as mineral exploration and development under the existing Forest Service regulation system and the prospective BLM regulation system:

Moreover, to condition the full enjoyment of an existing right upon the filing of an informational statement by the executive branch of the federal government, the adequacy of which statement is subject to attack by third parties and ultimate determination by the courts, would seriously impair that right.

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43 12 IBLA 282 CFS (Min) 79 (1973).
45 The board came to this conclusion notwithstanding the fact that it also found that the secretary may consider costs added by environmental requirements in determining whether the claimant can satisfy the marketability test.
46 Another attempt was made to apply NEPA to mineral patent application proceedings in the United States v. Pittsburg Pacific Company, IBLA 74–271.
48 12 IBLA 282 CFS (Min) 79 (1973) at 297.
To the extent that mining laws give the individuals the right to enter the public domain, to locate claims thereon, to discover minerals therein, and to extract and remove those minerals therefrom, all without prior approval of the United States, the development of a mining claim cannot be tortured into "Federal action" major, minor or otherwise. 95

The result reached by the ILBA in Koseanke is supported by at least two circuit court decisions. The Court of Appeals for the Fifth Circuit has held that the qualifying words "fullest extent possible" Section 102 of NEPA mean that the act does not require a NEPA statement of its preparation would lead to the violation of a statutory duty of the agency concerned. 96 However, any such agency that decides that its statutory duties preclude application of NEPA procedures must make express findings of the exigencies and conflicts preventing compliance. 97 Under this interpretation, it may be concluded "that the NEPA procedures cannot be applied to any Mining Law activities, including mineral exploration, development or mining, if such application would interfere with existing rights under the Mining Law or with an agency's duty to provide for those rights" (Haggard 1975, p. 355) — in other words, ministerial functions of the secretary mandated by the mining law.

One court confirmed that NEPA does indeed permit the secretary to "establish lease terms that, to the fullest extent possible, assure protection of environmental quality." 98 The courts have consistently held that the secretary does not have discretion to reject preference right lease applications if the requisite showing has been made, and that NEPA does not operate to transform a previously ministerial task into a discretionary one. 99 Nevertheless, the courts have also determined that issuance of a lease in these cases is not a purely ministerial act, in light of NEPA; two statutory provisions afford a degree of discretion to the secretary.

First, one of the MLA's provides that "each lease shall contain provisions . . . for the protection of the interests of the United States." 100 This affords the secretary broad discretion in setting the terms and conditions of leases, including preference right leases. Second, the secretary has an obligation "to interpret and administer the Mineral Lands Leasing Act in accordance with NEPA 'to the fullest extent possible.'" 101 The result of construing the MLA and NEPA together is that the secretary has discretion to condition the terms of the lease for protection of environmental values.

The preference right lease cases confirm that NEPA's application is limited. It does not enable the secretary to abrogate vested rights. For example, invocation of NEPA as authority for conditioning a lease may subvert the purposes and terms of MLA. NEPA cannot be extended that far. NEPA expands the secretary's powers incrementally but does "not justify [their] gross extension" (Martin 1982). Much sorting out of the interrelationship of the Mineral Leasing Acts and the General Mining Law of 1872 in relation to environmental statutes remains to be done.

SPECIFIC STATUTES FOR SPECIFIC LANDS

All the aforementioned federal acts apply to a general purpose for a geographic area, but there are specific statutory or regulatory provisions for certain federal lands. Most of these provisions are related to National Park Service lands such as the Coronado National Monument, Arizona, 102 Death Valley National Monument, California—Nevada, 103 Glacier Bay National Monument, Alaska, 104 Mount McKinley National Park, Alaska, 105 and Organ Pipe Cactus National Monument, Arizona, 106 all of which provide that the Secretary of the Interior shall prescribe regulations for surface mining. The secretary appears to rely on the regulations of the National Park Service as to surface use in these areas. 107 Another statute placed the burden of reclamation on the mining claimant, but that is also of limited effect. The Mining Claims Rights Restoration Act of 1955 108 opened to mineral location public
lands withdrawn for power development or power sites. This law also provides that the secretary of the interior may prohibit placer mining, or may permit it only upon condition that the surface be restored.

There is also statutory authority to regulate mining law activity in U.S. Federal Wildlife Service areas in the Custer State Park Game Sanctuary in South Dakota.106 The Secretary of Agriculture is authorized to regulate mining operations and locations of claims. The Surface Mining Control and Reclamation Act of 1977 also states that no surface coal mining operations are permitted in the Custer National Forest.110

The prohibitions or restrictions in these individual areas are interesting because they often follow a pattern of events. In many of these areas, mining was allowed at one time to perpetuate the image of the single prospector with pick axe in hand. However, most of these areas have unique scenic values that conflict directly with large-scale high-technology mining allowed under the mine claims established prior to the protective statutes. The Death Valley National Monument cases are an illustration in point.

Plans to expand borate mining in Death Valley National Monument focused public attention in 1975 on mining in the national parks. Mining is generally prohibited, but in some parks preexisting rights under the 1872 mining law have been preserved; special legislation has opened other parks to mining. Congress enacted special legislation opening Death Valley to mining under the 1872 mining law four months after the area was proclaimed a national monument by President Roosevelt in 1933. At that time, no one contemplated large-scale surface mining within the monument. Today there are seven talc mines and two borate mines operating.

A case decided in March 1975 by the U.S. District Court for the Eastern District of California provides reason to forecast even more serious difficulties than those experienced in the past for conducting mining activities in the few available areas under National Park Service jurisdiction. In Kaysor v. Morton,111 the court upheld a denial by the superintendent of the Death Valley National Monument of an application by holders of unpatented mining claims to construct a road to their claims for mineral exploration and mining. The court found that Death Valley National Monument was open to mineral location pursuant to 16 U.S.C. s. 447 (1970) subject to regulations of the Secretary of the Interior as set forth in 36 C.F.R. 7.26, which requires road permits. The court expressed the following as a basis for its decision:

1. There was reason to doubt the validity of the mining claims.
2. The road would leave a permanent scar on the environment.
3. There are other means of access to the claims, for instance, foot trail, burro, and helicopter.112

This decision was quickly followed by a memorandum dated April 21, 1975, from the director of the National Park Service to the regional directors stating:

This order provides the legal authority for National Park Service management to refuse to grant permits concerning unpatented mining claims unless the claims are determined to be valid. You should request the Branch of Mining and Minerals of the Land Acquisition Division to investigate the validity of all unpatented mining claims before issuance of permits” (Haggard 1975, p. 384).

Haggard states that “the incorrectness of this order and the Court’s decision should be clearly demonstrable by precedents holding that a valid mining claim is not a prerequisite to conduct mineral exploration in areas open to Mining Law activities” (Haggard 1975, p. 384).

In another case, the Sierra Club filed against the Department of the Interior, listing the Death Valley National Monument itself as a plaintiff113 and stating that the secretary of the interior has a trust and a responsibility to protect the monument. The suit asked that this trust be fulfilled by such measures as the promulgation of regulations that would prohibit surface mining or require effective reclamation, prohibit the expansion of existing mines, and provide for the withdrawal of certain areas of the monument from the General Mining Law of 1872.114

One case that never went to trial resulted in a tempo-
rary restraining order awarded to the National Park Service against American Borate.116 The order restrained American Borate from doing exploratory work that would create a cumulative visual impact that would become visually significant when added to the previous mining activity in the area. The area would have straddled an interpretive drive that carried 25 percent of the monument’s total visitor traffic. In still another incident, concern was raised over potential strip mining near the Zabriskie Point viewing area, “considered a premier scenic wonder of Death Valley, where ribboned waves of sand, stone and rock stand in a fragile frieze”116 (see the case study below).

Incidents such as this one in the Death Valley National Monument, as well as others in the national parks mentioned before where mining was allowed, added impetus to passage of the Regulation of Park Mining Act of 1976 (PL. 94–429). The act imposes a moratorium on mining in Death Valley. The moratorium does not shut down ongoing mines, but permits no new land disturbance pending a study by the U.S. Department of the Interior to determine the validity of the existing rights to Death Valley National Monument, Mount McKinley National Park, and Organ Pipe Cactus National Monument, and to recommend to Congress whether any valid or patented claims should be acquired by the United States. The act also repeals the laws that permit the staking of new mineral claims in Coronado National Memorial, Crater Lake National Park, Death Valley National Monument, Glacier Bay National Monument, Mount McKinley National Park, and Organ Pipe Cactus National Monument.

The Forest Service also saw several forest areas promoted to the status of national issues by environmental groups. The first of these issues arose in early 1969 when a mining company applied for a permit to construct a road to explore and develop its mining claims in the White Clouds area of the Challis National Forest, Idaho. The issue was resolved by establishment of the Sawtooth National Recreation Area in 1972.117 Still other conflicts over mineral development activity arose in the Stillwater complex in the Custer and Gallatin National Forests of Montana (see Burns 1972).

These types of conflicts lead to one point: Despite all the general legislation and regulation, there still are exceptions, for which protection is being lobbied, that do not fit the normal classification. The contextual rule as discussed earlier rises again. The legal system does not itself seem capable of dealing with the idiosyncratic conflicts of aesthetics versus economic values found in mining situations. This is pointed out by a landscape architect’s testimony for the Surface Mining Control and Reclamation Act of 1977 (Franzman 1977) as to site-to-site differences affecting reclamation practices; and by Clyde (1967), when he stresses the need for flexibility in regard to slope practices, rainfall differences, and intensity of use or viewing differences. Another factor is the impact of future mining technologies and the need to limit the location of mining activities in the future. Examples are potential phosphate mining in the Caribou National Forest in Idaho, the Osceola National Forest in Florida, and the Los Padres National Forest in California, as well as vermiculite mining in the Green Springs Historic District, Virginia.

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**Case Study: Death Valley National Monument**

Background and Context

Death Valley National Monument was created February 1933 by presidential proclamation under the authority of the Antiquities Act of 1906. When President Roosevelt made the proclamation, special note was taken of the “unusual features of scenic, scientific, and educational interests therein contained,” and the monument was closed to mineral entry. However, four months after creation of the monument, Congress reopened Death Valley to mining.

Two primary types of claims for minerals can be located under the mining law of 1872: placer and lode claims. Placer claims are filed on alluvium, an ore carried away from its original source, usually by the action of water. Lode claims are filed upon rock-in-place; the intersection of the mineral vein with the surface, or apex, is discovered, and the claim is filed upon that apex.

Placer claims can be up to 20 acres if filed by an individual, and up to 160 acres if filed by an association of eight individuals. On a placer claim, the miner must continue working within the stated boundaries of the claim.

Lode claims can be up to 20.66 acres, and are filed upon the apex of the vein or lode. Though the exact claim dimensions

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116Phone interview with Larry May, USNPS Denver Service Center, August 1978.
are dependent upon site restrictions, the idealized lode claim is 600 by 1,500 feet. The claim need not be rectangular, but the 600-foot end lines must be parallel; these end lines in turn are to be located parallel to the vein and not in excess of 300 feet from the center line of the vein. In a lode claim, the miner may not cross the end lines of the claim, but may follow the vein outside the lateral lines of the claim so long as the vein is continuous and remains within the parallel projection of the end lines.

Tunnel site claims are similar to lode claims but do not require that ore show upon the surface of the ground. The claimant has the right to any veins or lodes discovered within 3,000 linear feet of the tunnel face. Upon discovery, the claimant must show the location of the tunnel line upon the surface to create the mining claim. In addition, the miner may claim up to 5 acres of nonmineralized land for use as a mill site. A valid or patented mill site entitles the owner to use of the surface, including such resources as water and timber, to support the mining or milling operations.

Death Valley has had a romantic history of prospecting and mining within its boundaries—images of the grizzled prospector moving across the desert with his faithful burro and the 20-mule-team borax wagon trains making the 250-mile trek across the Mojave Desert are an established part of Western lore. Early prospecting and mining operations were small-scale efforts; the mines themselves were underground. Despite continuing efforts to find untold mineral riches, the operations in Death Valley netted only about $2 million in the 60 years following the first flurry of prospecting activities in the 1880s. Small amounts of precious metals were discovered and mined out, but the most profitable commodities in the region proved to be borax and talc. Talc is a relatively common mineral, and it is mined in several parts of the country, but sizable amounts of borates in the U.S. are found only in southern California and Nevada. A few years after borates were discovered in Death Valley, much larger discoveries of sodium borates were made in the Searles Lake and Boron, California, area about 100 miles southwest of the monument (Cranston 1976). As a result, mining for borax in the monument was essentially shut down. As for talc, there was a brief rise in mining activity during World War II, but the operations since that time have been sporadic and small scale.

Increased demand for Colemanite and ulexite (the sodium-calcium borates ores found in Death Valley National Monument) in the early 1970s prompted Tenneco Company to enter the monument and to stake claims for borates directly below Zabriskie Point. Internationally famous, Zabriskie Point is one of the prime scenic viewpoints within the monument; it was the view from Zabriskie Point that, over one hundred years ago, prompted pioneer William Manly to write that he had “just seen all of God’s creation.” Upon completion of a claim location, Tenneco announced plans to reopen a strip mining operation for borates. To the shock of both the National Park Service and the general public, it was discovered that the company was within its rights under the General Mining Law of 1872, and that the monument could do little to prevent such an operation within its boundaries. The loophole left by Congress in authorizing mineral entry allowed not only a prospector with burro, pick, and shovel but large-scale strip mining as well. The resulting public outcry prompted Congress to take steps to prevent the desecration of Death Valley National Monument’s natural, cultural, and scenic resources.

On September 28, 1976, Congress signed the Regulation of Park Mining Act (P.L. 94–429) into law. It provided, among other things, that national park system lands be closed to future mineral entry under the mining laws of 1872; that existing mineral rights be examined for validity; and that, upon determination of the extent of valid claims and their environmental consequences, the Secretary of the Interior will make a recommendation to Congress on allowing mining to continue, acquiring valid claims, or excluding significant mineral deposits by boundary adjustment in order to reduce the cost of acquisition. In order to ensure that damage would not continue during the time allotted for studies, a moratorium on further surface disturbance for the purpose of mineral extraction was imposed; this moratorium applied to Death Valley. The Secretary of Interior was given until September 28, 1978, to perform the required studies and formulate recommendations to Congress (Figure 12.8).

Analysis and Study Approach

The National Park Service was given the responsibility for producing the studies required. As there was little time available in which to perform fieldwork and produce the studies, two facets of the project—validity determination and assessment of environmental effects—proceeded simultaneously. Originally, 863 unpatented claims were registered with the

**FIGURE 12.8** Map of area
superintendent (in compliance with P.L. 94–429); however, after completion of fieldwork by the mining engineers, only 19 were determined to be valid (workable) without contest. Within Death Valley, then, there are 118 patented claims and 19 valid unpatented claims. The valid and patented (registered) claims can be combined in various ways to offer a large number of alternatives for allowing mining on some claims, acquiring some claims, or excluding certain claims through adjustment. It was decided, in order to facilitate the choice of reasonable alternatives, the first step would be to study the environmental consequences of mineral extraction on all valid and patented claims.

As the proclamation creating the monument makes special note of the scenic resources of the monument, the impact on this was of major concern to the National Park Service. In analyzing this factor, the study team determined that ‘scenic quality’ within the monument was established when President Roosevelt signed the proclamation. The team specifically cited the unique scenic quality, which has been internationally recognized as a major scenic phenomenon. Most people visit Death Valley to view the spectacle of multicolored rock, magnificent desert vistas, stark salt pans, and majestic mountain ranges. Therefore, in assessing visual impact on visitors, there was no need to deal with subjective values attached to scenic quality. The study team’s task was simply to determine which existing or potential mining operations (Figure 12.9) would likely be visible from the most heavily used visitor-use areas in the monument, and thus to identify those that might alter the scenic quality of the monument.

In order to objectively analyze an area as large as Death Valley National Monument—over 2.1 million acres—a computer-assisted program was utilized. In consultation with the in-house Automatic Data Processing (ADP) unit, the study team decided to use a routine developed by Colorado State University that is designed to utilize the IMGRID cellular data system developed by Harvard University. The IMGRID system is a computer program designed to manipulate natural resource data that have been organized on the basis of a grid cell data structure. Visual Information System (VIS), the Colorado State University program, is a computer algorithm of IMGRID that analyzes the terrain visible from a single point or from multiple observer points. A search of 360 degrees is made from the observer point to delineate the viewshed for a given horizontal distance.

The IMGRID-VIS program was chosen so that the terrain information already digitized by the Defense Mapping Service (DMS) and now distributed by the National Cartographic Information Center (NCIC) could be utilized. These tapes contain topographic maps interpolated to produce a data point for approximately every 208 feet on the ground. These data are accurate within 100 feet vertically and ±400 feet horizontally. Using an existing routine, the DMS data were then integrated into the IMGRID format. Without the information available on these tapes, the team could not have carried out the analysis within the project’s time and budget constraints.

The study area boundary selected encompassed the entire monument; it contained 54,410 cells, each approximately 83 acres in size. The overall study area thus included approximately 7,100 square miles. An elevation point was selected for each cell from information from the NCIC tapes. To ensure that the analysis would be on the conservative side, the lowest point inside each data cell was used, rather than the average or the highest point. Mining claims were then grouped according to certain geographical and mineral resource characteristics. This facilitated the analysis by eliminating the need to make a run from each individual mining claim. Selection of claims for grouping was thus important, as single data points were required both to represent claim groups and to fit the level of refinement mandated by the 83-acre cell size.

Mining claim locations were incorporated into the program according to information furnished by the mining office in Death Valley. To reduce computer time and save money, all searches or visual scans originated from the group of mining claims and scanned an arc with a horizontal distance of 79 miles and a vertical distance of 82.5 miles. A factor of 5 feet was added to each cell searched to obtain an average height for an observer looking into a mining area; the origin point was left at ground elevation.

A tabular format was chosen for the report. Thus, the value printed for any particular cell indicated the number of mining claim groups in each run that could be seen along a direct sightline from the location in the monument. If none of the claim groups was visible from a location, the cell was left blank. The program did not identify which claims within a group were visible. As a result, some groups were later split and run again in order to better define the claims with the highest visibility from sensitive visitor-interest areas. Also, factors such as horizon silhouetting of above-ground structures, dust/smoke plumes, and relative contrast between mined areas and adjacent lands (talc, for instance, is starkly white, and offers a high degree of contrast with the natural colors of the surrounding rock, soil, and vegetation) were not included in the analysis. The visibility analysis was run to show which of the mining claims were as likely to be visible and thus intrude on the monument’s natural scenic resources. The analysis did not purport to include any information on the relative intrusiveness of different types of mining methods.

The data obtained from the computer model were plotted on monument-wide base maps (Figure 12.10) that delineated the areas within the monument from which one or more of a particular set of claims were visible. With the help of the monument staff, the most popular visitor-interest points were identified and plotted on base maps. To further assist the evaluation, a 25-mile radius was drawn from each claim group analyzed and the acreage affected totaled within the curve. After field checking, the team decided that the recognition factor would drop off dramatically from this point outward so that even if the area was visible from a great distance, the casual observer would not be able to identify a mining operation as such.

Results

The acreage within each viewshed was totaled both within the 25-mile-radius zone and for the entire monument; and the number of visitor-interest points that fell within the viewshed was identified. With this information, the team could estimate the number of visitors that annually might view the mining from those scenic spots in the monument and thus infer the mining impacts on visitation. In the exami-
VISIBILITY ANALYSIS
FURNACE CREEK WASH AREA CLAIM GROUPS
DEATH VALLEY NATIONAL MONUMENT, PUBLIC LAW 84-429 MINING STUDY

FIGURE 12.10 Area affected or potentially visible mining activity
The study for Death Valley National Monument was submitted to Congress in two parts; the first discussed the environmental consequences of mineral extraction, and the second presented alternatives to allowing mining, boundary adjustment, and acquisition of mining claims. Congress, in general, has restricted any future mining activities in the Central Parts, but has allowed mining in previous activity valid potential claims.


Martin, J. B. 1982. Comment: The interrelationship of the


