Protecting the Grand Canyon National Park from Glen Canyon Dam: Environmental Law at its Worst

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1903
"The ages have been at work on it and man can only mar it. What you can do is keep it for your children, your children's children, and for all who come after you..."\(^1\)

—President Theodore Roosevelt on visiting the Grand Canyon

1969
"Unregulated, the Colorado River wouldn't be worth a good god-damn to anybody."\(^2\)

—Floyd Dominy, former Bureau of Reclamation Commissioner

1981
"I've changed the operation of other dams when there is a reason to. I don't see any benefit in doing this at Glen Canyon.... What's so special about the Grand Canyon anyway?"\(^3\)

—Ken Wilson, Western Area Power Administrator

1992
"The destruction in the Grand Canyon below Glen Canyon Dam is a national disgrace."\(^4\)

—Roger Clark, Grand Canyon Trust, Director of Conservation Programs

I. INTRODUCTION

For millions of years the Grand Canyon stood as a pristine natural monument, relatively unmarred by human contact. But in 1963, an evolution began with the completion of Glen Canyon Dam a few miles upstream. Man's intervention in the form of this dam has brought signif-

\(^1\) Environmental Defense Fund, Conflict on the Colorado (1992) (back cover).
\(^3\) Id.
\(^4\) James Bishop, Jr. & Bennie Blake, Dam and Double Dam, Phoenix Mag., Jan. 1992, at 78.
icant degradation to the natural resources, habitat, and scenic wonder of the Canyon and the downstream Colorado River corridor.

In the beginning of this century, the government's approach, with President Theodore Roosevelt leading the charge, was to preserve the Grand Canyon's natural wonder for generations to come. In the 1960s, as the need for water storage projects gained importance, the focus shifted to consumptive use bordering on exploitation. Now we find ourselves on the losing end of a battle to mitigate the environmental damage to the Canyon by the construction of Glen Canyon Dam and its built-in hydroelectric power generation station. One of this country's greatest natural wonders is on the verge of destruction. The purpose of this Comment to help explain why.

Part II briefly discusses park conservation and the need for legal protection from external threats. This discussion includes an examination of the Grand Canyon's park resources that are at risk and the types of external threats that exist because of Glen Canyon Dam. Part III discusses the practical aspects of the operation of Glen Canyon Dam, including (1) the current impact of the dam on the Grand Canyon and downstream Colorado River corridor and (2) the interaction of government agencies, private interests, concerned environmental groups, and economic interests that factor in future policy decisions. Part IV focuses on conflicting legislative authority surrounding the management and protection of the Grand Canyon National Park. Specifically, the National Park Service's mandate to regulate the resources and land within Grand Canyon Park is incompatible with the development and reclamation of water resources called for by the Reclamation Act of 1902 and the Colorado River Storage Project Act of 1956. Part V argues that these two dimensions of legislative authority have proved inadequate in the management of the Grand Canyon's resources because of (1) judicial restraint in upholding current legislative authority to regulate activities on lands adjacent to the Canyon and (2) conflicting mandates of governmental agencies that preclude effective preservation of the resources,

5. The purpose of this analysis is not to historically document the Grand Canyon National Park. Instead, it is meant as a look at the current threat to its natural resources. Such an approach is limited, however. It is necessary to first understand the physical nature of the Canyon's domain before one can fully appreciate the scope and breadth of legislation, adjudication, and agency regulations that degrade, or alternatively, work to preserve the natural state of the entire Canyon system. Admittedly, this discussion looks at the Grand Canyon from a preservationist perspective. Economic gain, however large or small, arising from the irreversible destruction of the Canyon's environment can never be justified or condoned as long as even one viable alternative exists.
land, and aesthetic quality of the Grand Canyon. Central to this analysis will be an examination of the proposed Environmental Impact Statement due in 1994 and the recently released Interim Report on proposed revised dam operations. Finally, Part VI analyzes several proposals for reorganizing the federal administrative infrastructure as it relates to the management of energy and environmental concerns of Glen Canyon Dam and the Grand Canyon Park. An effective solution, as will be argued, reverses subordination of environmental concerns to those of power generation.

Ultimately, this analysis provides a starting point for understanding the current status of the Grand Canyon, the resources at risk, and the threats to those resources. The judicial, legislative, and administrative infrastructure responsible for the preservation and conservation of the Grand Canyon is allowing economic gain to overshadow the costs of environmental destruction. Primarily because of the large financial windfalls to be made with relatively cheap hydroelectric power, the law that says power generation is incident to Glen Canyon's operation as a storage facility is being subverted by federal management at the expense of the Grand Canyon environment. Only by restructuring the approach to resource management can the Grand Canyon be saved from environmental ruin.

II. BACKGROUND OF NATIONAL PARK PROTECTION

Our national parks are a commitment not only to future generations of Americans, but also to the world. They are a reminder of how pristine nature can be and how population growth and industrial development can infringe on nature's bounty. To be sure, industrialization and development are necessary components of economic expansion. Unfortunately, however, the preservation of national parks does not always coexist with economic development; quite often, in fact, each opposes the other.

This is not to say that national parks, such as the Grand Canyon, and economic development are mutually exclusive. On the contrary, the two can coexist, but not without facing many difficult problems in the process. While it is generally agreed that neither the Grand Canyon nor economic development can be completely subordinated to the other, the current administrative infrastructure is often incapable of eliminating the external threats to the Grand Canyon's resources.  

6. William J. Lockhart, External Park Threats and Interior's Limits: The Need for an Independent National Park Service, in Our Common Lands: Defending the National
The Grand Canyon has value to many differing interests, and it is axiomatic that many of these interests are in direct conflict. The government agencies involved with the Grand Canyon cannot agree how to best utilize the resources found near or within its boundaries while conserving the natural splendor for generations to come. It is, therefore, helpful in this overall analysis to first understand the basis for park protection.

A. The Importance of Providing Legal Protection for National Park Lands

David J. Simon, a leading author on environmental issues, admits that though national parks may be “the best idea we ever had,”\(^7\) encroaching development like that threatening the Arctic National Wildlife Refuge in Alaska would, if left unchecked, “sacrifice a majestic arctic ecosystem on the altar of America’s energy gluttony.”\(^8\) Although this is perhaps an oversimplification of the current status of national parks such as the Grand Canyon, Simon may not be far from the truth. It would be too simple, however, to lump all of the park threats into one category of unchecked development and unrestrained quest of natural resources as many environmentalists would suggest. The future of a park such as the Grand Canyon is in jeopardy primarily because its existence is in continuous conflict over values not easily stated and even more difficult to reconcile.

As a general starting point for an analysis on conflicting values, it must be understood that a cumulative effect of several factors, and not one by itself, has placed parks like the Grand Canyon at risk.\(^9\) One factor emanates from a practical standpoint: The entire Grand Canyon National Park, as large as it is, is not large enough, and its infrastructure not

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\(^7\) David J. Simon, Preface to Our Common Lands: Defending the National Parks, supra note 6, at xii. This oft-quoted phrase is attributed to Wallace Stegner and is frequently used in describing the national parks, especially the Grand Canyon, as America’s “crown jewels.”

\(^8\) Id. at xi. See generally Philip M. Hocker, Oil, Gas, and Parks, in Our Common Lands: Defending the National Parks, supra note 6, at 389 (discussing the Arctic National Wildlife Refuge in Alaska and the proposal for opening the Refuge for oil exploration).

\(^9\) Lockhart, supra note 6, at 7-8.
diverse enough, to be a self-contained ecosystem. Accordingly, influences from within and without its boundaries have an exaggerated effect on the park as an ecological system, wildlife sanctuary, and geological showcase. A second factor can be viewed as a historical reality: When the idea of a park system was first recognized as necessary to preserve its natural resources, habitats, and ecosystems, the Grand Canyon was, for the most part, protected by its very remoteness from degradation. With the vast increase in industrial growth and population shifts over the last century, this natural protection is no longer sufficient due to park accessibility and, to an even greater extent, development and utilization of public and private lands adjacent to park boundaries. A third factor is best expressed as an institutional failure: Federal management has proved inadequate in regulating activities outside of the Grand Canyon that threaten the resources located within its physical boundaries. As a result, the courts and government agencies have no set policies or guide-

10. See John C. Freemuth, Islands Under Siege at xi (1991). In describing the fragile nature of park wildlife, Freemuth states that the preponderance of unfavorable wildlife conditions is traceable to the “insufficiency of park areas as self-contained biological units.” Id. at 14. Consequently, no single park is large enough to provide year-round sanctuary for adequate populations of all resident species. See also Alfred Runte, The National Park Idea: Historical Misconceptions and Ecological Realities, in External Development Affecting the National Parks: Preserving “The Best Idea We Ever Had” 11 (Natural Resources Law Center, U. Colo. Law School ed., 1986) (using phrases such as “ecological interdependence” and “biological integrity” to explain how parks are just one piece of the ecological puzzle and not islands unto themselves). See generally George C. Coggins, Protecting the Wildlife Resources of National Parks from External Threats, 22 Land & Water L. Rev. 1 (1987) (describing how the aggregate impact of developmental activities on adjacent lands destroys wildlife habitat). It is important to remember, however, “that the concept of an ecosystem is a human artifact, and a very crude representation of what the real world is like.” Norman Myers, External Values of the Parks Movement and the Monday Morning World, in National Parks, Conservation, and Development 656, 658 (Jeffery A. McNeely & Kenton R. Miller eds., 1982).

11. David Mastbaum, A Simple Solution for the Thorny Problem of Park Protection: Focusing on Alternatives, in External Development Affecting the National Parks, supra note 10, app. A at 8. The National Park Service has found that “[t]wo-thirds of all the threats reported can be tied to sources located solely or partially outside the park, [and] hence [is] harder for the park to influence.” National Park Serv., National Resources Assessment and Action Program Report 36 (1988). Moreover, in more modern times, protected lands including national parks have become “integrially local” entities, even in once extremely isolated areas such as Third World regions of the tropics. Myers, supra note 10, at 658; see also Michael A. Mantell, Frontier Issues, in Managing National Park System Resources 235, 240 (Michael A. Mantell ed., 1990). The Grand Canyon has 31 identifiable threats and ranks 34th out of 261 parks with reported threats. Office of Science & Technology, U.S. Dept of the Interior, State of the Parks, 1980: A Report to the Congress (1980).

lines to follow when adjudicating disputes over the fate of the Grand Canyon’s natural environment.

External threats are not always easy to identify, and it is even harder to determine what resources are threatened and to what degree. Without a clear understanding of the practical aspects of resource degradation, tackling the problem of external threats becomes a very confusing task. Accordingly, before discussing the legal means of protecting the Grand Canyon’s natural state and resources, it is useful to first identify which park resources are at risk.

B. National Park Resources at Risk

A recent assessment of the National Park Service (NPS) found approximately 1750 threat sources affecting roughly 200 parks. Many of these threat sources are directly attributable to private and public energy development. In general, these threats include air pollution injury to vegetation, acidification of lakes and streams, visibility impairments, waste products from outside activities, deterioration of cultural resources, and other activities incompatible with the parks themselves.

Although most identifiable threats emanate from a variety of activities, they can nevertheless be grouped into two main categories. The first includes those activities that create airborne by-product emissions (air pollution), while a second category of activities includes those operations producing by-products and collateral effects that cause the di-

13. The NPS has defined “threat” as a “negative impact to park resources, values, and purposes; or to park management objectives; or to visitor experience.” NATIONAL PARK SERV., supra note 11, at 29. This negative impact has the potential to cause significant damage to park resources or to seriously degrade important park values or park experiences. OFFICE OF SCIENCE & TECHNOLOGY, supra note 11, at vii.

14. NATIONAL PARK SERV., supra note 11, at 29.

15. Other nonenergy related activities are also linked to these types of threats, but usually to a far lesser degree. See OFFICE OF SCIENCE & TECHNOLOGY, supra note 11, at 4-23.

16. See NATIONAL PARK SERV., supra note 11, at 19-36. Also included are other point sources such as coal-fired generating stations, industrial urban areas, and automobile exhaust. Many of these activities take place on public and private lands adjacent to the parks, but some are far removed from the parks. See Lockhart, supra note 6, at 9-10. Sulfate discharge is the major pollutant and is so prevalent that one government study has shown that man-made visibility impairments resulting from sulfate emissions “affect all park units in the lower 48 United States virtually all of the time.” Molly N. Ross, Legal Issues Associated with Protecting Park Resources: Air Quality and Related Values, in EXTERNAL DEVELOPMENT AFFECTING THE NATIONAL PARKS, supra note 10, at 2. Several authors suggest that “aesthetic threats” are the most serious threats to the parks because the “impressive vistas” and “feelings of grandeur” that the parks invoke are completely lost when visual resources are impaired. FREEMUTH, supra note 10, at 3 (quoting RONALD FORESTA, AMERICA’S NATIONAL PARKS AND THEIR KEEPERS 233 (1984)).
rect degradation of primary park resources such as water, vegetation, and wildlife.\textsuperscript{17} Such activities include mining and logging operations, road and utility corridor development, subdivision development, recreational activities, agricultural operations, and hydroelectric dams.\textsuperscript{18} In general, both categories of activities interfere with the aesthetic value of the park or the pristine nature of its resources.\textsuperscript{20} As will be shown, Glen Canyon Dam is responsible for interfering with both the aesthetic and physical environment of the Grand Canyon.

Identifying the exact degree of aesthetic and physical interference, however, is not easy. Data collected by the NPS on the location of threat sources suggest that the scientific data of the quality necessary to establish an unequivocal nexus between proposed and existing activities and resource damage is difficult to come by.\textsuperscript{21} Consequently, the NPS must not only prove existing activities are responsible for resource damage, but also that proposed activities will be detrimental.\textsuperscript{22}

When dealing with the Grand Canyon National Park, the problem is not identifying the external threat, but assessing exactly what damage that threat creates and its long-term impact. Few dispute that Glen Canyon Dam causes damage within the downstream Colorado River corri-

\begin{footnotesize}
\begin{enumerate}
\item[17.] National Park Serv., supra note 11, at 29-30; see also Office of Science & Technology, supra note 11, at 3.
\item[18.] Mastbaum, supra note 11, at 1; see also National Park Serv., supra note 11, at 29.
\item[19.] Activities listed in each category lead directly or indirectly to resource degradation: Land and water resources are subject to acidification resulting from sulfate absorption capacity of soil; cultural resources such as bronze, marble, limestone, and certain sandstone formations deteriorate faster when sulfur dioxide in the air creates acidity in precipitation. Ross, supra note 16, at 6. Air pollution has significantly reduced park visibility, especially in the eastern United States and in various parks in the Southwest. Id. Park vegetation also is affected, as evidenced by research showing elevated ozone concentrations already bringing about the reduction, if not elimination, of certain sensitive plant genotypes. Id. at 3.
\item[20.] Many seemingly innocuous activities have profound effects. For example, hydroelectric plants cause water fluctuations destroying habitat, land formations, and fish breeding grounds. See generally National Park Serv., supra note 11.
\item[21.] Id. at 29-30. "Lack of documented information, a chronic problem in formulating management plans within parks, is more serious by far when a case must be made for remedial steps outside." Conservation Found., National Parks for a New Generation: Visions, Realities, Prospects 142 (1985). "A surprising 75 percent of the reported threats to park resources have been classified by onsite park observers as inadequately documented by either private or government research." Office of Science & Technology, supra note 11, at viii.
\item[22.] National Park Serv., supra note 11, at 37-38. The NPS study found that external threat sources most often occur on private lands and that many of these sources involve some type of energy development. Id. at 36. Proving causation, given the vast scientific research involved, is one of the many factors hindering the NPS in identifying all possible threat sources.
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IV. THE GRAND CANYON COLORADO RIVER CORRIDOR AND OPERATIONS AT GLEN CANYON DAM

A. Resources Within the Grand Canyon and Colorado River Corridor

The Grand Canyon and downstream river corridor make up a complex and fragile ecosystem. Although sometimes difficult to see in the desert environment, the complex relation between the river and the overall Grand Canyon cultural and physical domain cannot be understated. For thousands of years, over 5000 species of plants and aquatic animals have existed within the Canyon.23 These species survive on the nutrients and food-stuffs found within the river basin.24 Each spring the river floods, leaving a fresh supply of phosphorus and nitrogen in the soil and sediment it deposits.25 For the river basin, the natural rise and fall of the river’s water level is essential to the yearly cycle of replenishing what is lost to the spring floods.

The Grand Canyon also has a unique cultural history. The approximately 250 miles of river corridor borders nearly 140 miles of Native American lands and has within its boundaries hundreds of cultural and historical sites.26 Many of these windows into the past date back over 1000 years and are representative of at least eight different Native American tribal cultures.27

Scientists and amateur geologists have found the Grand Canyon to be a valuable tool for studying the physical sciences. The entire length of the basin has long been considered a living laboratory for the study of geological formations, and the river provides valuable data on seasonal erosion, replenishment, and the natural evolution of a major river corridor.28

Current operations at Glen Canyon adversely affect each of these natural, physical, and cultural resources. Unfortunately, these same op-

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23. Bishop & Blake, supra note 4, at 84.
25. Id.
26. ENVIRONMENTAL DEFENSE FUND, supra note 1, at 5.
27. Id.; see also Jean Ann Mercer, Native American Perspectives on the Grand Canyon: The Ethnohistorical Component of GCES, NEWSLETTER (Colorado River Studies Office, Salt Lake City, Utah), Spring/Summer 1992, at 2.
28. See Randall, supra note 24, at 28.
erations also pose a definite long-term threat, the exact extent of which has yet to be fully determined.

B. Glen Canyon Dam: Cornerstone of Water Storage and Reclamation

In 1963, the federal government, primarily through the U.S. Bureau of Reclamation, finished work on Glen Canyon Dam, which is located several miles upstream from the beginning of the Grand Canyon.29 The dam is over 600 feet high and holds back nearly two years’ river flow in the lake formed behind the dam.30 The dam’s primary purpose at the time of construction was water storage and control of seasonal flood and run-off waters.31 A secondary purpose, one that has created the most controversy, was generating electric power with the immense hydroelectric plant built within the dam.32

Glen Canyon is the largest of the hydroelectric generating stations that form the federal Colorado River Storage Project (CRSP), providing water and power to the arid Southwest.33 Power from Glen Canyon and other dams under CRSP control is marketed by the Western Area Power Administration (WAPA), a federal agency within the Department of Energy.34 WAPA provides subsidized power generation at rates below open market prices to long-term customers such as public utilities, agricultural irrigation districts, and rural electrical cooperatives.35 In wet years, excess power is sold through short-term contracts and on the open market; in dry years, WAPA sells more power than it generates by purchasing supplemental electricity from local utilities and reselling it to its normal customers. The result is that the Bureau of Reclamation, which runs the power plant and maintains the generators, and WAPA, which manages the electrical system and the power lines, can market all their generating power to hungry municipal buyers.36 Glen Canyon "generates ten percent of [WAPA’s] total kilowatt-hours and more than seventy percent of all federal hydropower produced in the upper Colo-

29. ENVIRONMENTAL DEFENSE FUND, supra note 1, at 1.
31. Id.
32. Id.
33. ENVIRONMENTAL DEFENSE FUND, supra note 1, at 6.
34. Id.
35. Id.
36. Bishop & Blake, supra note 4, at 79.
rado River basin [and is able] to respond almost instantly" to consumer demands.\(^{37}\)

As a result of Glen Canyon’s enormous power output and generating flexibility, the primary concern of the agencies in charge of the dam’s operation is to maximize the amount of electricity generated. However, maintaining a high rate of power output has brought severe environmental damage to the downstream river corridor. Understanding exactly what environmental damage is occurring is a necessary step in identifying a workable solution.

C. Environmental Damage as a Result of Power Maximization

Prior to completion of Glen Canyon Dam, the late summer rains helped replenish the downstream beaches and shorelines, much in the way any river’s flood plain is replenished as silt is left behind by receding flood waters.\(^{38}\) Since completion of the dam, the water coming into Lake Powell still carries the sediment gathered by the mountain run-off, but now the water is slowed down and any sediment settles to the bottom of the lake. The water released through the dam is free of any sediment. This water can no longer replenish the Grand Canyon’s beaches and river corridor because it is “hungry,” or clear water, and quickly erodes the loose soil and sandstone it contacts below the dam.\(^{39}\)

Adding to the problems wrought by the dam is that the hydroelectric plant can vary its power production very quickly by manipulating the amount of water released through the dam, which in turn runs the turbine generators.\(^{40}\) Consequently, the electric power generated by the dam can be quickly increased during peak periods and decreased when demand subsides. The result of this ability is that releases of water through the dam create tremendous fluctuations in the water level of the Colorado River. During periods of peak demand the “ramping rate,” or rate of change, in the release of water causes the river to have high and low water lines that have been measured at thirteen feet in a single day.\(^{41}\) No natural conditions could ever duplicate this tremendous fluctuation in daily water levels.

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38. GRAND CANYON: THE PRICE OF POWER, supra note 2.
39. Id.
40. Coal and nuclear generating plants do not have the same ability to increase or decrease production due to spot demand. Bishop, supra note 37, at 10.
41. GRAND CANYON: THE PRICE OF POWER, supra note 2.
The ramping rate has, not unpredictably, brought detrimental effects to the physical resources of the downstream river corridor. Peak flows erode the main channel and beaches.\textsuperscript{42} Archeological sites close to the river, previously protected by sand and natural conditions, are damaged or destroyed by high water.\textsuperscript{43}

During peak power releases, the widely fluctuating daily surges of water released from the dam severely erode and damage the dependent organic resources of the river corridor.\textsuperscript{44} Studies by the government and private interest groups have all concluded that the fluctuation in water flow is seriously damaging plant and wildlife habitat,\textsuperscript{45} as well as fish breeding grounds.\textsuperscript{46} David Wegner, manager for the Glen Canyon Environmental Studies for the U.S. Department of Interior’s Bureau of Reclamation, concedes that two endangered species of fish, the bonytailed chub and the Colorado River squawfish, may already have been lost because of the elimination of spawning grounds and damaged year-round habitat caused by the unnatural fluctuations in the river levels.\textsuperscript{47} The native razorback sucker and roundtail chub are probably gone as well, and a fifth species, the endangered humpback chub, is threatened.\textsuperscript{48}

Even though the physical and organic damage suffered by the Grand Canyon can be reasonably measured, the issue of how to best apply legal redress to the adverse effects of Glen Canyon Dam is not clear. As will be shown, the lack of specific congressional authority handicaps the NPS’s ability to address incompatible activities, such as Glen Canyon, located on property not under the jurisdiction of the NPS. Additionally, the primary concern of the first legislative acts designed to initiate reclamation projects was water storage and reclamation. Today, this primary purpose is subordinate to energy concerns. To begin a discussion of why Glen Canyon Dam now threatens to cause serious environmental damage, a natural starting point is the original legislative authority mandating reclamation and preservation projects.

\textsuperscript{42} Randall, supra note 24, at 28-29.
\textsuperscript{43} Id.
\textsuperscript{44} ENVIRONMENTAL DEFENSE FUND, supra note 1, at 1.
\textsuperscript{45} GRAND CANYON: THE PRICE OF POWER, supra note 2.
\textsuperscript{46} Id.
\textsuperscript{47} Bishop & Blake, supra note 4, at 84.
\textsuperscript{48} Randall, supra note 24, at 26.
IV. LEGISLATIVE AUTHORITY AND THE PRESERVATION OF GRAND CANYON NATIONAL PARK

A. The Organic Act of National Park Environmental Conservation: The Creation of the National Park Service

Before 1916, fifteen national parks and twenty-two national monuments had already been established, but there was no single agency providing unified management.49 In 1916, Congress adopted the National Park Service Organic Act ("Organic Act")50 fully intending the newly created NPS to coordinate and rationalize America's national park development. Congress envisioned one agency administering existing and future park lands in accordance with a prevailing feeling that the parks had a necessary place in America's development.51 Congress stated:

There is created in the Department of the Interior a service to be called the National Park Service. . . . The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . as provided by law, by such means and measures as conform to the fundamental purpose of the said parks . . . which purpose is to conserve the scenery and the natural and historic objects and the wild life 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.52

Congress also enacted the enabling legislation53 of the Organic Act, which reads in part: "The Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary or proper for the use and management of the parks, monuments, and reservations

49. Gerald H. Suniville, The National Park Idea: A Perspective on Use and Preservation, 6 J. CONTEMP. L. 75 n.1 (1979). Before 1916, the Department of the Interior managed the national parks and several of the national monuments, whereas the War Department and the Forest Service (as part of the Department of Agriculture) administered the remaining monument sites and all of the historical sites. Id. This arrangement "de-centralized" control and tended to create conflicting rules and regulations. This conflict continues to exist because merely the names of the government agencies have changed and is responsible for the current destruction of the Grand Canyon's natural resources. See infra part V.


51. Russell E. Train, An Idea Whose Time Has Come: The World Heritage Trust, a World Need and a World Opportunity, in SECOND WORLD CONFERENCE ON NATIONAL PARKS 377, 378 (Sir Hugh Elliot ed., 1972). "The national park concept is based on the recognition that certain areas are of such national significance and value that they should receive national recognition as such, and the nation as a whole should take a responsibility to assist with their protection and maintenance." Id.; see also John Lemons & Dean Stout, A Reinterpretation of National Park Legislation, 15 ENVTL. L. 41, 50 (1984).


53. Id. § 3.
under the jurisdiction of the National Park Service." Read together, these legislative enactments in theory should provide for cohesive administration and management of park land in adherence to the stated congressional intent.

The statute did not, however, clearly define how the NPS was to regulate pursuant to the congressional mandate. Two questions were left unanswered: whether the authority under this statute extended to both public and private holdings within the park's physical domain and whether the authority extended outside of park boundaries to include the right to regulate private and public lands.

Judicial interpretation of the Property Clause of the U.S. Constitution has extended the statutory authority to public and private holdings. However, this authority includes only that power necessary to enact regulations that govern private in-holdings or public lands if those regulations are proper and realistically related to congressional intent. Although the first issue, that the NPS can regulate activities within park boundaries (both private and public) to further use and preservation mandates, is fairly well settled, it is not clear whether the NPS can regulate outside of park boundaries with the same authority.

In dealing with adjacent public and private lands, the NPS is battling other federal agencies for effective management policies to best coincide with park values. A difficult problem facing the NPS is how to fulfill its

54. Id. (emphasis added).
55. Sunville, supra note 49, at 75 n.1. The management and administration of all federal parklands was centralized in 1933 when the remaining 63 parks (national monuments, historical lands, and military sites) were transferred from the Forest Service and War Department to the NPS by executive order. Id.
56. Id. at 76. During the early periods of the Park Service's history, regulating the parks was not difficult since each park ran itself for the most part. This was because visitation was minimal and park resources were not yet caught in the "cross-current of conflicting proposals and expectations" that face the parks today. Id.; see also CONSERVATION FOUND., supra note 21, at 141-43.
57. U.S. CONST. art. IV, § 3, cl. 2.
58. See generally Michael Mantell, The National Park System and Development on Private Lands: Tools to Protect Park Resources, in EXTERNAL DEVELOPMENT AFFECTING THE NATIONAL PARKS, supra note 10, at 106. In Minnesota by Alexander v. Block, 660 F.2d 1240, 1249 (8th Cir. 1981), the court held that in the context of activities on private lands within authorized boundaries, under the Property Clause, "Congress' power must extend to regulation of conduct on or off the public land that would threaten the designated purpose of federal lands." That decision, which has received uniform treatment from the courts, has essentially assured that the NPS can regulate both public and private lands within park boundaries. See also Blake Shepard, The Scope of Congress' Constitutional Power Under the Property Clause: Regulating Non-Federal Property to Further the Purposes of National Parks and Wilderness Areas, 11 B.C. ENVTL. AFF. L. REV. 479, 489 (1984) (providing an extended analysis on the scope of the federal government's constitutional power to regulate federal property).
mandate to protect the Grand Canyon in light of other federal agencies with conflicting concerns. The original Organic Act does not address how the NPS is supposed to integrate its mandate with other agencies and no amendments have been adopted that resolve this issue. Without a clear congressional intent, the NPS cannot pursue an effective management policy because it is constrained by the language of its enabling statute.

Several possible explanations account for the lack of specific authority in the original national park legislation. One view is that because the Organic Act does not specifically create protective buffer zones around the parks (or similar measures), Congress did not intend to restrict outside activities beyond park boundaries, and the NPS is constricted by legislative omission. Another argument is that the lack of a specific manifested congressional intent to regulate on private lands is sufficient proof that none was intended. These views reflect a literal interpretation that does not seem warranted, especially given the myriad of external threats that could not have been foreseen when the Organic Act was passed in 1916.

The best argument, however, is that the statute itself creates the confusion. The vague wording of the legislation has resulted in the transboundary application of the Organic Act being open to many interpretations, not all of which are favorable to NPS objectives. Furthermore, as with the initial Organic Act, several amendments used
broad, sweeping language that, while giving a good description of the overall mandate of park protection, did not adequately describe how the Secretary was to fulfill that duty.\textsuperscript{63}

Consequently, specific authority for adequately addressing external threats is still lacking today, as evidenced by the often lamented environmental concern that "in practice the too-general commands in these laws do not provide sufficient muscle for a well-meaning, but weak and weary Park Service."\textsuperscript{64} The fact that Congress has not included detailed language in any park protection legislation illustrates the basic conflict over park values that, as mentioned previously, is not easily reconciled. Identifying the underlying basis of that conflict is the focus of the next section.

\section*{B. The Reclamation Act of 1902}

The Bureau of Reclamation, or the Reclamation Service as it was originally known, was created as part of the Reclamation Act of 1902.\textsuperscript{65} The language of the Reclamation Act of 1902 is important because it denotes a very different intent than is pursued today by the same agencies. The original Reclamation Act outlined a "comprehensive reclamation scheme . . . provid[ing] for the examination and survey of lands and for construction and maintenance of irrigation works for the storage, diversion, and development of water for the reclamation of arid and semi-arid lands" found primarily in the western states.\textsuperscript{66} Specifically, "the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right."\textsuperscript{67} Numerous court decisions made it clear that the primary intent of the legislation was a comprehen-
sive plan for long-term storage and management of water resources.\textsuperscript{68} This plan became essential in the states where irrigation and diversion made habitation of those states possible.

As the development of water resources became the nexus for continued economic expansion and growth in the western United States, the original Act was amended numerous times, and new legislation was passed to respond to the present and anticipated need for water.\textsuperscript{69} In 1956, the Colorado River Storage Project Act ("1956 Act") was passed to ensure the efficient development of water resources in the Upper Colorado River Basin. The 1956 Act reads in part:

In order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, . . . provide[] for the reclamation of arid and semi-arid land, for the control of floods, and for the generation of hydroelectric power, as an incident of the foregoing purposes, the Secretary of the Interior is hereby authorized . . . to construct, operate, and maintain . . . units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, transmission facilities and appurtenant works.\textsuperscript{70}

The intent of the original language was to create water storage facilities. The generation of hydroelectric power was anticipated, but only as an "incident of the foregoing purposes" of water storage and conservation.\textsuperscript{71}

Included within this same 1956 Act is language clearly showing congressional intent directing that the development of water resources was not to be done at the expense of, or degradation to, other resources. The last line of the 1956 Act states that "as part of the Glen Canyon Unit the Secretary of the Interior shall take adequate protective measures to pre-

\textsuperscript{68} E.g., Ickes v. Fox, 300 U.S. 82, 95 (1937) (acquiring right to use of water only by prior appropriation for beneficial use); Ide v. United States, 263 U.S. 497, 502-03 (1924) (allowing government to capture and utilize seepage from project irrigation); West Side Irrigation Co. v. United States, 246 F. 212, 217 (9th Cir. 1917) (determining that rights of the government in appropriation agreements have priority over individual and corporate appropriators); United States v. Conrad Inv. Co., 156 F. 123, 128 (C.C.D. Mont. 1907), aff'd, 161 F. 829 (1908) (holding that excess water from Indian Reservations is subject to appropriation by others pursuant to local laws and customs).


\textsuperscript{70} 43 U.S.C. § 620 (emphasis added).

\textsuperscript{71} \textit{Id.}
clude impairment of the Rainbow Bridge National Monument.”\(^\text{72}\) (When the 1956 Act was passed, Rainbow National Monument was the only protected resource in the area affected by Glen Canyon Dam). The language of the 1956 Act, therefore, sets forth two main purposes: First, the facilities necessary for the storage of water for beneficial consumptive use was envisioned, with the generation of hydroelectric power being incident to the initial purpose; and second, the development of water resources would be undertaken so as to preclude impairment of at least one national park that was obviously going to be impacted in some way by Glen Canyon Dam.

C. Reclamation and Water Storage Have Been Subordinated to Hydroelectric Power Generation

Both the 1902 Reclamation Act and the 1956 Colorado River Storage Act were passed as a result of proirrigationists’ demands for “federal assistance in building irrigation systems that could provide cheap water to farm the arid and semiarid lands of the West.”\(^\text{73}\) The framers of both Acts envisioned subsidized irrigation systems that could facilitate settlement of public lands by the urban poor, and private lands by ranchers and farmers.\(^\text{74}\) Ultimately, the intent of reclamation law during the early years of the Bureau of Reclamation was “to open the West to settlement on public lands.”\(^\text{75}\) Since 1902, however, the original intent of reclamation law has been lost. The multitude of water storage projects, as evidenced by the CRSP system that includes the Grand Canyon, have outgrown their original purpose. Public land available for settlement has long vanished, and the water projects are now primarily used for storage and power generation.

The original purpose of the 1956 Act has been eclipsed as well. The storing of water for irrigation, flood control, and consumptive use, while still an important factor, has steadily given way to the demands of power generation. Individual studies conducted by the NPS, the Bureau of Reclamation, and numerous environmental groups all show that the fluctuating ramping rate of Glen Canyon Dam is causing serious downstream resource damage. Yet, the dam has been allowed to continue its power generation maximization in spite of these findings. The intent of the original legislation has been lost. Part V explains how the federal

\(\text{72. } \text{Id.}\)

\(\text{73. } \text{DAWDY, supra note 65, at 2.}\)

\(\text{74. } \text{Id.}\)

\(\text{75. } \text{Id. at 16.}\)
management infrastructure has allowed itself to become a proponent of energy interests, while losing sight of the collateral environmental effects of energy production.

V. JUDICIAL RESTRAINT AND INTERAGENCY CONFLICT PRECLUDES EFFECTIVE REGULATION OF EXTERNAL THREATS

The historical analysis of the Organic Act of 1916 does little to clarify the applicability of current federal authority to regulate outside of park boundaries when challenged in a judicial preceding. The NPS should have the authority to protect the Canyon from adverse development on federal land under its Organic Act and from development on nonfederal lands under the Organic Act when read together with the Constitution's Commerce and Property Clauses. Moreover, while the Organic Act does not have explicit enforcement mechanisms to provide protection outside park boundaries, judicial interpretation of both the Property and Commerce Clauses has resulted in judicial support of regulations that address activities on private or state lands if they are necessary to protect the property of the United States or the "designated purpose... of such property." But if the requisite authority exists, and has been

76. As one author has pointed out, the history of congressional enactments or subsequent legislation should give congressional intent as to the exact purpose of the NPS. Suniveille, supra note 49, at 76. Unfortunately, Congress has not specifically determined how it intended the NPS to carry out its mandate. More important, Congress has not specified how all of the concerned interests are to be addressed given the relevant economic, political, and constitutional considerations.

77. The Property Clause confers upon Congress power to dispose of and make rules and regulations as to the property belonging to the United States. U.S. CONST. art. IV, § 3, cl. 2. The Commerce Clause gives Congress exclusive powers "[t]o regulate commerce with foreign Nations, and among the several States, and with the Indian Tribes." Id. art. I, § 8, cl. 3. See generally John H. Eckhard, Power of Congress Under the Property Clause to Give Extraterritorial Effect to Federal Lands Law: Will "Respecting Property" Go the Way of "Affecting Commerce"?}, 15 NAT. RESOURCES LAW. 663 (1982-83); Sax, supra note 61, at 256.


79. Id. at 31. In Camfield v. United States, 167 U.S. 518 (1897), a private landowner erected fences on his own land that interfered with the operation of federal public lands, and the Court held that no private individual or private corporation could monopolize public lands for private gain. In United States v. Alford, 274 U.S. 264 (1927), the Court used the Property Clause as the basis to uphold the criminal prosecution under a federal statute of an individual who started a fire on private land adjacent to a national park. In Kleppe v. New Mexico, 426 U.S. 529 (1976), the Property Clause was extended to include the authority necessary to maintain a natural ecological balance on the public lands. Shepard, supra note 58, at 494-507. Camfield (1897), Alford (1927), and Kleppe (1976) illustrate the historical consistency of the Court in applying the Organic Act and the Property Clause to give deference to the Secretary of Interior when regulation was necessary to protect parks from incompatible activities on adjacent private land. In several decisions since 1976, however, courts have taken a different
upheld by the courts, why then is the Grand Canyon being threatened by the activities of Glen Canyon Dam when the NPS has the authority to protect it?

One argument is that the NPS fails to adequately protect the Grand Canyon not because of a lack of authority, "but because of a lack of imagination and aggressive stewardship . . . in the face of hostility from other entities." Perhaps this is not entirely the fault of the NPS. It may be a more correct assessment to say that the NPS has not been allowed to assume "an aggressive stewardship" over the Grand Canyon for two basic reasons: First, courts are reluctant to address issues of interagency conflict without a more clearly defined legislative intent. Second, the NPS is heavily constrained in its mandate to protect parks like the Grand Canyon because of conflicting mandates of other involved federal agencies. Herein lies the crux of the Grand Canyon-Glen Canyon Dam debate.

A. Judicial Restraint in Protecting Canyon Resources

Although the NPS has the authority to regulate outside the Grand Canyon's physical boundaries, it has been reluctant to push for regulations where major economic development is placed in direct conflict with


80. Mastbaum, supra note 11, at 2. These entities include organizations within the federal government, private interests, state and local governments, and public interest groups.

81. In many of the cases, the courts have voiced a reluctance to apply the statutory language of 16 U.S.C. § 1a-1 (1988) more broadly, especially in relation to the controversial issue of regulating or restricting activities on private (and public) property without specific statutory authorization. See, e.g., United States v. County Bd., 487 F. Supp. 137, 143 (E.D. Va. 1979). The cost of regulation or restricting the activity determines how willing the court is to uphold the statutory language as sufficient to address activities on adjacent lands. When the cost is high, as with energy-related activities such as hydroelectric generating dams, coal-fired generating plants, and mining operations, the courts concede that issues of unfair taking, pre-emption, and lack of clear legislative intent bar judicial intervention. Id.; cf. Lucas v. South Carolina Coastal Council, 112 S. Ct. 2886 (1992).

82. Shepard, supra note 58, at 494 n.113, distinguishes the fact that the lack of specific congressional enactments concerning the exercise of federal agency authority over activity occurring on semipublic property has posed a serious constitutional question that has yet to be fully adjudicated. Adding to the confusion is that the full reach of the authority granted in the Organic Act regarding incompatible activities on private and semiprivate lands outside of park boundaries has not been adjudicated with any consistency by the courts. See Comment, Protecting National Parks from Beyond Their Borders, 132 U. Pa. L. Rev. 1189 (1984).

83. This authority is based on 16 U.S.C. § 1a-1 (1988), as well as the Property and Commerce Clauses, and is supported with judicial interpretation. See cases cited supra note 81.
The NPS realizes that the courts are not likely to uphold restrictive regulations if harsh economic consequences are to result, as evidenced by the holdings in *Sierra Club v. Andrus* and *United States v. County Board*. Although courts have upheld the restriction of activities outside of park boundaries in some circumstances, each of the cases involved (1) a relatively minor regulatory measure, (2) easily proved harm and causation, or (3) a minute amount of economic cost in rectifying the situation. Regulations that impact major economic activities, and that are directed toward the prevention of future harms, are not likely to be upheld in future cases without significant statutory authorization, given the highly sensitive political nature of such decisions.

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84. One author has noted that many of the western states, where federal lands (park lands in particular) constitute a significant percentage of the total acreage, "fear that imposing specific preservationist duties upon the Secretary will prevent economic development in their states." Comment, *supra* note 82, at 1200.


86. 487 F. Supp. 137 (E.D. Va. 1979). In an action to prevent skyscrapers from impinging upon the aesthetic value of Park Service lands in the Washington, D.C. area, the court refused to prohibit construction on the grounds that "[t]o sustain such an interference with the use of private land without compensation as an exercise of the police power has been farther than the courts have been willing to go." *County Bd.*, 487 F. Supp. at 143. Similarly, in *Sierra Club*, 487 F. Supp. at 449, which addressed an action to force the NPS to protect federally reserved water rights to protect park resources, the court held that trust duties distinguishable from statutory duties did not exist. In both cases, the price of restricting the activities on the private land was enormous. Arguably, these examples illustrate that the greater the price, the shorter the reach of the Organic Act and the Property Clause. Moreover, as the economic cost of restricting the incompatible activity grows, the more the courts have turned to the vague language of the Organic Act as justification for not extending legal doctrine to restrict the incompatible activity in question. Comment, *supra* note 82, at 1191-200.

87. *Camfield v. United States*, 167 U.S. 518 (1897), involved a relatively low price. The case concerned a fence on private property interfering with public lands and, in 1897 dollars, the cost of rectifying the situation, by removing the fence, was slight. In United States v. Alford, 274 U.S. 264 (1927), the issue was whether the government could prohibit the doing of acts on private lands that imperiled public forests. The Court ruled that it could, and here causation of harm to the parks (forest fire destroying forest service timber) was easy to prove. In *Kleppe v. New Mexico*, 426 U.S. 529 (1976), the regulatory measure in dispute concerned only the straying of wild animals onto private lands, where both the cost and potential cost of the regulation were minimal at best.

88. The courts have tentatively stated that they would not like to go much beyond even their current rulings without additional legislative action. Ross, *supra* note 16, at 32. The courts have adopted this stance as one way to adequately address both the need for preservation and conservation, as evidenced by the growing environmental movement in the 1970s, and the continued need for economic development to fuel growth and prosperity witnessed since the beginning of the Industrial Revolution. As seen in the *Camfield, Alford*, and *Kleppe* cases the courts have moved away from a straight application of the Organic Act for two basic reasons: one, the difficulty in proving causation between activities on adjacent, or even nonadjacent lands, given the complex scientific and technological problems resulting from the
The courts have also been reluctant to interpret the public trust doctrine as imposing a duty on the NPS to protect parks like the Grand Canyon from activities outside of park boundaries. In the relatively few cases that involve the public trust doctrine, the courts have reached conflicting conclusions as to whether it imposes any trust duties on the NPS beyond those contained in the Organic Act. One of the seminal public trust cases, Knight v. United States Land Ass’n, decided in 1891, held that the Secretary of the Interior was a guardian over the public lands and had a legal duty to preserve the public domain. However, given the minuscule amount of economic value at stake at the time and the extreme cost of such a decision today, a modern court is not likely to embrace the public trust doctrine with any great exuberance. In fact, the doctrine has been rejected by one court in a more recent opinion.

Finally, the common law of nuisance has proved inadequate on several counts. First, it has not historically addressed aesthetic values. Sec-

many possible sources and actual threats (see Village of Wilsonville v. SCA Servs., Inc., 426 N.E.2d 824 (Ill. 1981); supra notes 13-22 and accompanying text); and two, the need for a "balancing of the equities" in order to take into account the high price of restricting activities that may or may not prove to be actual identifiable threats to park resources. E.g., Boomer v. Atlantic Cement Co., 257 N.E.2d 870 (N.Y. 1970).

The public trust doctrine has been interpreted to mean that the federal government and its agents hold public land (and thus park resources) in “trust” for the common good. Therefore, the government has all the duties and obligations of a trustee to protect the trust property on behalf of the beneficiaries, the general public. Freemuth, supra note 10, at 32 (quoting U.S. General Accounting Office, Limited Progress Made in Documenting and Mitigating Threats to Parks 51 (1987)). In the 1970s, environmentalists argued that the NPS had a duty based on the theory that the National Park System was subject to a public trust, and therefore the Secretary of Interior (and the NPS as agent) had an affirmative duty to protect park lands from external threats. The courts have not embraced this theory with much enthusiasm, especially when the costs of doing so are high. See A. Dan Tarlock, For Whom the National Parks?, 34 Stan. L. Rev. 255, 267-69 (1981).

Mantell, supra note 11, at 244.

Knight v. United States Land Ass’n, 142 U.S. 161 (1891).

Id. at 181. The total amount of money involved in the case was $600. Although in 1891 dollars this was a substantial sum, most cases brought today involving an application of the public trust doctrine would concern substantially higher costs if the doctrine were invoked.

Sierra Club v. Andrus, 487 F. Supp. 443, 449 (D.D.C. 1980), aff’d, 659 F.2d 203 (1981). The court determined the 1978 amendments to 16 U.S.C. § 1 represented all of the responsibilities that the NPS must faithfully discharge and did not extend those duties by way of the public trust doctrine. Id; see also Mantell, supra note 11, at 244; Tarlock, supra note 89, at 269. Fear of judicial legislating may be one reason why the courts hesitate to give it credibility. Another may be the fear of unfair taking without just compensation. See Lucas v. South Carolina Coastal Council, 112 S. Ct. 2886 (1992).

A private nuisance is defined as a nontrespassory invasion of another’s interest in the private use and enjoyment of land, and a public nuisance is an unreasonable interference with a right common to the general public. Restatement (Second) of Torts §§ 821B, 821D (1979). Nuissance seems to be applicable whether “one considers the government to be analo-
ond, nuisance is generally inapplicable when causation is difficult, or impossible, to prove.95 Third, congressional legislation (however lacking) pre-empts federal common law nuisance remedies.96 Fourth, interference with private land without just compensation, as would result in a strict application of nuisance doctrine, would open more constitutional questions than most courts are willing to address.97 The narrow focus of the common law has therefore imposed substantial barriers to its applicability as an alternate legal doctrine.

The courts, with regard to these alternative sources of authority, have not provided adequate remedies outside federal statutory law. Economic concerns, conflicting duties regarding the public trust, and the inadequacy of common law remedies have all proved fruitless. The result is that the NPS has little support in formulating regulatory decisions that can mitigate the damage caused by the operations of Glen Canyon Dam.

B. Interagency Conflicts Inhibit the National Park Service from an Aggressive Protection Policy

The Bureau of Reclamation is a sub-agency of the Department of the Interior, yet it owns a large portion of Glen Canyon Dam.98 The Bureau was responsible for overseeing construction of the dam and now oversees its continued operation in conjunction with several sub-agencies of the Department of Energy. Electric power from Glen Canyon's hydroelectric facility is marketed by one of those sub-agencies, the Western Area Power Administration (WAPA), a federal agency fully within the Department of Energy.99 The NPS, on the other hand, is under the sole

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95. In most external threat situations, proving causation is extremely difficult due to problems of latency, multiple sources, and a lack of scientific certainty. See generally NATIONAL PARK SERV., supra note 11.


97. It is, after all, an economic reality that most activities classified as nuisances are profit generators for the area in which they are located. Coggins, supra note 10, at 26-27. Without congressional legislation, nuisance has proved inadequate because (1) the courts are reluctant to enforce nuisance remedies due to the harsh economic results and (2) because problems of pre-emption arise if legislation does exist.

98. 43 U.S.C. § 620 (1988). The legislative history of this Act suggests that the Secretary of the Interior was not only authorized "to construct, operate, and maintain" units of the Colorado River storage project such as Glen Canyon, but also was intended to formulate the standard for power distribution.

99. 42 U.S.C. § 7276 (1988). The power marketing functions of the Bureau of Reclamation, including construction, operation, and maintenance of transmission lines and attendant facilities, were transferred to the Secretary of Energy, id. § 7152(a)(1)(E), (a)(3), and are to be exercised by the Secretary through a separate Administration within the Department of En-
PROTECTING THE GRAND CANYON

It is not difficult to imagine the power struggle inherent in this highly debatable, politically significant issue, especially when the outcome often can be measured in hundreds of millions of dollars. Depending on the political administration, either energy or conservation is given precedence, but seldom both at the same time.

As part of the Department of Energy, WAPA is in charge of marketing thirty-four billion kilowatt-hours of hydroelectric and coal-fired power annually. WAPA's mandate dictates that it sell its power to publicly owned utilities at the lowest possible rates consistent with sound business principles. This language of WAPA's enabling legislation has critics of subsidized federal dams up in arms. Many environmental groups view WAPA as no longer a creature of the free-market system. Instead, WAPA "has become less a federal body and more the financial arm of a great, politically brokered public-power dynasty." By offering some of the cheapest wholesale electric rates in the Southwest, WAPA has acquired a network of about 600 clients, including rural electric co-ops, cities, towns, Indian reservations, and powerful political constituents like national electric cooperatives.

In addition to furnishing power to its regular customers, WAPA has other financial obligations. Under the Colorado River Storage Project Act of 1956, Glen Canyon and other smaller hydroelectric projects must help pay for the cost of nineteen other irrigation projects in the Upper Colorado River Basin. Taken together, the hydroelectric dams under WAPA control must repay the U.S. Treasury $586 million for regulator reservoirs already completed and another $1.17 billion to complete irrigation projects that are under construction or are expected to

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100. 43 U.S.C. § 502 (1988); see also Bishop, supra note 37, at 10-14 (discussing WAPA's role in power distribution).


102. Id.

103. Id.

104. Id.

105. 43 U.S.C. § 620 (1988). WAPA's hydropower dams on the Colorado River must repay the United States Treasury $1.756 billion for completed or unfinished, but expected construction water projects. Another $1.24 billion has been deferred indefinitely because financial and feasibility studies endanger many of the newer projects. Bishop, supra note 37, at 12.

106. Bishop, supra note 37, at 10. These projects include the Dolores Project in southern Colorado, the San Juan-Chama Project in New Mexico, the Seedskadee Project in Wyoming, and the Central Utah Project.
be built.107 With this amount of debt, WAPA's priorities lie not in the realm of environmental concerns, but in maximizing power generation. By having made this huge market for its power, WAPA has to generate as much energy as possible to meet its consumer demands.

Since completion of the dam, maximizing the power generation from Glen Canyon has generated cheap electric rates for a network of large and small power companies, and close to one billion dollars in revenue for the U.S. Treasury.108 In order to meet its huge demand and fulfill its obligations to fund other reclamation projects, WAPA has allowed the ramping rate at Glen Canyon to be adjusted to meet demand. These adjustments cause tremendous fluctuations in the Colorado River flow.109

Given the nature of the controversy surrounding the dam's operation, it is not difficult to imagine the political battle raging between environmentalists and energy producers. Proponents of conservation and preservation voice concerns over the extensive ecological destruction, while energy interests view Glen Canyon as a cheap, efficient means of meeting the Southwest's increasing energy demands. Unfortunately, the government's attempt to reconcile the problem of Glen Canyon is a prime example of a one-sided agency compromise.

C. Proposed Administrative Remedies for the Environmental Damage

Because Glen Canyon Dam was built before enactment of the National Environmental Protection Act (NEPA), no Environmental Impact Statement (EIS) was completed before its construction.110 Consequently, many adverse effects of the dam are only now being fully realized.

Public outcry over the damage to the Grand Canyon finally prompted government action in 1989. The Department of the Interior initiated a series of environmental assessment studies, the most impor-

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107. Id. at 10-12.
108. Id. at 10.
109. See BUREAU OF RECLAMATION UPPER COLORADO REGION, U.S. DEP’T OF THE INTERIOR, GLEN CANYON DAM INTERIM OPERATING CRITERIA (1991). The water fluctuations alone were enough to command this extensive study of the Dam's impact on the downstream corridor.
tart being a formal EIS, scheduled for completion in 1994.\textsuperscript{111} At the same time the formal EIS was called for, the Department of the Interior directed the Bureau of Reclamation to perform an Interim Operating Assessment analysis to determine if alternative dam operations—namely, reductions in water level fluctuations—would provide interim protection of downstream resources until completion of the EIS.\textsuperscript{112} The Bureau found that reductions would not have an adverse impact and issued its report finding no significant impact.\textsuperscript{113}

But these findings are truly misleading. Although the report found that reduced flows would not adversely affect resources, its findings were based on the effects of the unregulated water flows. Certainly, reduced flows will not have as great an impact as do unregulated flows. The report, therefore, is actually a self-serving analysis; reducing flows will cause less damage, but any fluctuations, other than natural, cause serious resource degradation. Natural fluctuations often occur over large periods of time, days or even weeks, but artificial fluctuations can be created in minutes. Many environmental groups view the \textit{Finding of No Significant Impact and Environmental Assessment}\textsuperscript{114} report as nothing more than the Bureau of Reclamation providing justification for the continued maximization of power generation at just slightly lower levels than before. Once the EIS is completed (also to be undertaken by the Bureau of Reclamation), the operating criteria for Glen Canyon will be finalized based on recommendations from the Bureau of Reclamation and WAPA.

After persistent lobbying from environmental groups, the Department of the Interior in 1991 finally ordered interim steps to curb the destruction. “After spending eight years and $15 million on environmental studies, Interior Secretary Manuel Lujan in August, 1991, ordered interim controls on the water fluctuations through the turbines of Glen Canyon Dam . . . reduc[ing] fluctuations by 75 percent and the high water level by one-third.”\textsuperscript{115} These interim controls, while eliminat-

\textsuperscript{111} BUREAU OF RECLAMATION UPPER COLORADO REGION, supra note 109, at iii; see also Glen Canyon Dam Water Operation, supra note 110, at 2.

112. BUREAU OF RECLAMATION UPPER COLORADO REGION, supra note 109, at iii.

113. \textit{Id.} at iv-v.

114. This incredibly detailed report states that reduced flows will not impact in a significantly different manner than do the current rates of flow. The analysis is misleading because \textit{any} reductions in flow will have less impact than do current flows. It therefore does not follow, although correct to a certain extent, that no further degradation of resources will occur. What the report fails to mention is that serious damage to downstream resources will continue regardless, although to a slightly lesser degree.

115. Bishop, supra note 37, at 12.
ing the huge changes in ramping rates, have not eliminated the devasta-
tion caused by the still unnatural river levels.\textsuperscript{116} Most environmental
groups view the merely reduced fluctuations as a direct result of pressure
from the Department of Energy and power industry lobbying.\textsuperscript{117}

The NPS will likely have little influence in this overall evaluation and
decision-making process if past experience is a guide. As early as 1980,
the NPS issued a report detailing the extensive damage caused to park
resources by water-related threats such as dams.\textsuperscript{118} However, it was not
until 1989 that extensive studies of Glen Canyon were called for, and it
will be at least 1994 before a full-scale EIS is prepared. In the meantime,
even with the decreased flows limiting the water level fluctuations, the
water levels will still be shifting to some degree. Even government offi-
cials admit that “[t]he interim flows are just a stopgap measure to mini-
mize the loss of the resources that remain until a more permanent
solution can be developed.”\textsuperscript{119} It does not take many thirteen foot fluc-
tuations in river flow to erode and seriously undermine fragile habitats
and ecosystems. Even when the EIS is completed, there are no guaran-
tees that the Bureau of Reclamation’s findings will lead to any drastic
change in the “reduced flow” scheme recently approved by the Bureau.

Arguably, therefore, this administrative structure, while beneficial to
the energy interests, leaves the Grand Canyon as a secondary concern
forced to endure the damaging impact of the upstream dam. If the
Grand Canyon and resources within its basin are to be saved, adminis-
trative restructuring is essential.

VI. POSSIBLE SOLUTIONS TO THE GRAND CANYON/GLEN
CANYON PROBLEM

Robin Winks, a noted environmental scholar, attributes ignorance as
the greatest threat to the future of national parks such as the Grand
Canyon.\textsuperscript{120} In the nineteenth century, the idea of a national park system

\textsuperscript{116} Even the government’s own Glen Canyon Dam Interim Operating Criteria stated
that “[t]he interim operating criteria are a temporary measure designed to ameliorate the rate
of adverse change on downstream resources resulting from past dam operations.” \textsc{Bureau
of Reclamation Upper Colorado Region, supra} note 109, at iii. “Ameliorate” is a far
cry, however, from “stopping” or, even better, “reversing” adverse effects resulting from past
dam operations.

\textsuperscript{117} \textit{See generally} Bishop & Blake, \textit{supra} note 4.

\textsuperscript{118} \textit{See Office of Science & Technology, supra} note 11, at 21.

\textsuperscript{119} Randall, \textit{supra} note 24, at 26.

\textsuperscript{120} Robin Winks, Yale University, The Future of the National Parks: Recreating the
Alliance Between Commerce and Conservation, Key Note Address at Symposium, External
began as an alliance between commerce and conservation. Winks argues that public and governmental ignorance about the parks system led to the polarization of the two broad communities, and fragmentation among conservation and preservation groups. This destroyed the alliance that made the national parks system viable at its inception. Ignorance of the present harm, as well as the resultant future loss to our national parks cannot continue. Commerce and conservation must again work together to preserve places and symbols, such as the Grand Canyon, that reflect a nation’s pride.

The most feasible and practical solutions to the adverse effects of energy-related economic projects such as Glen Canyon Dam may lie less with the application of various legal doctrines and more in solutions that involve the reorganization of federal agency management and cooperation as initially conceived to best preserve the national park concept.

A. Corrective Measures Under the Existing Administrative Structure

Keeping in mind the goal of “cooperation,” several possible solutions under the existing bureaucratic infrastructure arise. One option is for the NPS to seek cooperative agreements with other federal land management agencies in their land use planning and regulatory decisions. However, given the very different nature of these government agencies, cooperation seems a distant reality. The Superintendent of the Grand Canyon National Park, Bob Chandler, has stated that his first priority is mitigating the damage wrought by the upstream dam on the Park’s natural resources; power generation and water storage are secondary concerns. Barry Wirth, spokesperson for the Bureau of Reclamation, indicated that from the Bureau’s standpoint, a balancing test must be utilized, factoring in power interests, the recreation community, ecosys-

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121. Id.
122. Id.
123. Id.
124. George C. Coggins, Protecting National Park Resources: Wildlife, in EXTERNAL DEVELOPMENT AFFECTING THE NATIONAL PARKS, supra note 10, at 20. As David Mastbaum also points out, federal, state, and local environmental and land use laws, while establishing general standards, “do not take account of the special natural and cultural values for which the parks were created, and therefore fail to protect them.” Mastbaum, supra note 11, app. A at 8.
125. GRAND CANYON: THE PRICE OF POWER, supra note 2.
tem damage, and wildlife habitat, but clearly with power interests having priority.\textsuperscript{126}

Understandably, each agency has different priorities. The NPS looks to preservation and conservation, while the Bureau of Reclamation is firmly behind continued power generation, with the effects of that power generation a secondary concern. Both agencies, however, have a tremendous impact on the Grand Canyon National Park. The real issue becomes how to best integrate the concerns of both agencies so that the Grand Canyon is afforded adequate protection. Integrating these concerns cannot be accomplished under the existing administrative framework. Instead, a restructuring of the administrative management is in order.

\textbf{B. Restructuring of Government Control over Power Generation and National Park Areas}

The Bureau of Reclamation and the NPS cannot continue to have independent priorities inherently opposed to the other. In light of the deadlock between existing government agencies, Congress must act if this issue is to have any real chance of being resolved in time to save the endangered habitats. Several possible solutions must be considered. First, either the NPS or the Bureau of Reclamation could be given full authority over Glen Canyon power generation and preservation of the Grand Canyon. That way one agency must account for its decisions based on a balancing test, while also being responsible for the adverse impact of those decisions on the Grand Canyon's resources and environment. Presently, there is no accountability as each agency strives to fulfill its mission at the expense of the other.

Such consolidation, while good in theory, obviously poses problems. Integration might at least slow down the competition for conflicting agency goals, but it would not address the competing concerns of energy versus the environment. The amount of necessary information and relevant oversight difficulties would make it extremely difficult for one agency to effectively administrate both concerns. Moreover, if this consolidated power was placed within the Department of the Interior, preservation would naturally have the upper hand; conversely, if placed under the Department of Energy, concerns of preservation would most likely be subordinated to concerns of power generation. The best solu-

\textsuperscript{126} \textit{Id.}
tion places the interests of the power industry and preservation on equal footing.

One smaller, yet powerful, independent agency with control over only Glen Canyon Dam and the Grand Canyon National Park might be the best solution. Such an organizational structure would narrow the realm of operations for the agency, thereby making it much easier to define its goals and mandates. This agency would be responsible for the entire administrative management of both concerns. Such an agency might be called the Grand Canyon Power Administration ("Canyon Power") and would be responsible for information gathering, policy formulation, and rule implementation. With one agency having control over the entire process, courts would be more likely to uphold challenges to rules and procedures that infringe on private and public activities. The preservation of the Grand Canyon could be pursued and maintained by judicial adjudication, something that has been lacking, especially given the persuasiveness of the powerful energy lobby. Additionally, any decisions by this agency would apply only to Glen Canyon and the Grand Canyon. By making power generation decisions dependent on the immediate effects on the downstream environment, the lag-time response under the current organizational structure would at least be eliminated.

This solution will most likely give rise to a host of political, economic, and practical difficulties, which is perhaps the strongest reason why Congress has yet to directly address the issue. The alternative of destroying the Colorado River corridor below Glen Canyon Dam makes it axiomatic that such action be taken. The original reclamation laws made power generation incident to water conservation and storage. Over the years, however, environmental protection under the Department of the Interior has become incident to power generation under auspices of the Department of Energy and WAPA. If a national treasure like the Grand Canyon is to be preserved, creation of an agency like Canyon Power would be a forceful step in the right direction.

127. Specifically, in each of the legislative water reclamation enactments, power generation has been uniformly made incident to water storage and reclamation; the original intent of the framers was to create useful irrigation projects and provide long-term reclamation in the process. The language of the statutes also indicates that preservation of then existing national monument sites was to be observed, and not subordinated to interests of power generation. See Colorado River Storage Project Act, 43 U.S.C. § 620 (1988) (providing the exact language that makes preservation of national monuments a higher priority mandate than power generation).
C. Congress Must Legislate Combined Management of Power Generation and Grand Canyon Preservation

The best solution, as outlined above, negates the physical and geographic factors without unduly infringing on expansive economic development. Conceptually, such a solution involves accurately defining the scope of federal authority and the means of implementing that authority in order to provide comprehensive management and regulation schemes that prevent further degradation of park resources.

Congress has not provided an adequate roadmap for the NPS to use in protecting the Grand Canyon from major development projects like Glen Canyon. Specifically, the current infrastructure fails because of (1) a lack of specifics in how these threats are to be regulated and (2) economic realities that make preserving park resources at the expense of energy concerns extremely unpopular political decisions. As it now stands, the Bureau of Reclamation and WAPA manage their operations while giving mere lip service to the concerns of the environment impacted by the operation of Glen Canyon. No one seems willing to face the undeniable fact that Glen Canyon, if not checked, will destroy the resources, monuments, and ecosystems the Grand Canyon National Park was meant to preserve.

Ultimately, Congress can best determine how all the competing interests should be addressed. Creating an agency directly answerable to the President and combining power generation and Grand Canyon environmentalism into one ongoing concern would improve administrative management. This consolidation would also expand the possibilities of environmentalism in regard to the management of natural resources. The Grand Canyon Power Administration could then manage both sides of this intricate environmental issue. The agency's focus must be narrow, involving only the Grand Canyon and Glen Canyon operations. To be effective, the agency could not concern itself with other national park issues; other national parks vary so much in size, resources, location, and susceptibility to external forces that this solution would be inapplicable in every situation. The importance of the Grand Canyon and the need for cheap electric power in the desert Southwest does, however, mandate the creation of such an agency.

The EIS due in 1994 on Glen Canyon Dam will have little impact without an effective infrastructure to implement its findings. The current administrative organization has proved that interagency conflicts merely lead to one-sided compromise. The Interim Plan, which the Bureau of Reclamation has stated causes no ill-effects (a more correct assessment is that the plan does not cause more damage), has merely
slowed the rate of resource depletion, not stopped, or better yet reversed the process. Furthermore, funding for Glen Canyon Environmental Studies (responsible for providing much of the raw data to be used for the EIS) is forty-two percent below what was requested, which raises questions about whether the EIS will have adequate scientific information upon which to base operation decisions.\textsuperscript{128}

Power interests under the current system are still dictating policy. As long as this policy is allowed, the Grand Canyon will continue to suffer the ill-effects of Glen Canyon Dam, and the degradation of resources will continue unabated to any degree sufficient to ensure adequate environmental protection for the Grand Canyon and Colorado River corridor. A recent analysis using computer models "showed that a steady-flow operation would raise [production] cost by less than one percent—an expense easily negated by cost-efficient conservation measures."\textsuperscript{129} Yet, close to four million people visit the Canyon annually,\textsuperscript{130} with over 22,000 of those visitors rafting the Colorado River Basin.\textsuperscript{131} Putting the interests of both the energy and the environment on equal footing, under the control of a specialized and empowered agency, is the best solution for recognizing the need for power without eliminating sound environmental policy.

VII. Conclusion

While no factor single-handedly threatens the future of all our national parks, the consensus of environmental groups,\textsuperscript{132} concerned governmental agencies, and authors in the scientific and academic community is that the aggregate impact of Glen Canyon Dam must be addressed soon, or we risk the complete degradation of the Grand Canyon's natural environment.\textsuperscript{133} There is no agreement on how to solve

\begin{itemize}
\item 128. Randall, supra note 24, at 26.
\item 129. Id. at 32.
\item 130. ENVIRONMENTAL DEFENSE FUND, supra note 1, at 1.
\item 131. Randall, supra note 24, at 28-29.
\item 132. "By adopting a stance of 'pristine nature versus contaminating man', policy makers for the parks movement have tended to foster an attitude in park managers and wardens that has not always helped the image of the parks in the modern world." Myers, supra note 10, at 657. Proponents of using the parks for their natural resources have gone overboard at times as well. See JOHN ISE, OUR NATIONAL PARK POLICY 655 (1961). The key to this entire threat problem is finding an acceptable solution that makes either extreme position equally unattractive.
\item 133. See Coggins, supra note 10, at 26. For an excellent description of the current status of external threats affecting the Grand Canyon National Park and the Colorado River system, especially concerning water fluctuations from Glen Canyon Dam and scientific studies on air quality and visibility impairments from coal-fired generating plants, see ENVIRONMENTAL DE-
the problem. As one author has remarked, the appropriate solution is "one more of politics than of power . . . [as] [a]ny effective approach must necessarily deny someone the right to do what they want to do." Obviously, these rights are sometimes quite diverse. Rafting the Colorado River or preserving the breeding habitat of the humpback chub is a far cry from providing cheap hydroelectric power for an entire region. Deciding which rights and resources to protect is difficult in any political environment. However, without a serious attempt at restructuring the current administrative management, the Grand Canyon will indeed become a needless sacrifice at the altar of power generation.

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FENSE FUND, supra note 1. For the government’s perspective on the challenge of preserving park resources, managing for effective visitor experience, and solving the external threat issue, see NATIONAL PARKS & CONSERVATION ASS'N, supra note 59.