

Options for Managing Natural Resources in Parks Having Natural,
Cultural, or Recreational Legislative Purposes

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[Author's Note: This essay was prepared in response to the following request: "Describe the possible management options for dealing with natural resources in primarily natural settings, primarily cultural settings, and primarily recreational settings. Please use examples. (degree of intervention to preserve species diversity, preserve biological diversity, let ecosystems work and species that cannot be supported by park disappear, total artificial management for non-natural objectives, etc.)." The resulting essay is a synthesis of ideas developed through many years of working on natural resource problems in cooperation with many people. The essay reflects, but does not acknowledge, the ideas and concerns of many people. The content as presented here is solely the responsibility of the author.]

Introduction

The Organic Act of 1916, as amended, provides an important holistic orientation that guides management of the immense diversity of places and resources contained within the National Park System. This guidance implies that processes, as well as objects, are to be protected and that all park resources not specifically excluded are to receive protection. The key passages of this body of legislation read: "the national park system ... include(s) superlative natural, historic, and recreation areas ...; ... these areas, though distinct in character, are united through their inter-related purposes and resources into one national park system ...; ... their superb environmental quality ...; ... the fundamental 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 ...; ... the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may ... be ... specifically provided by Congress."

For the purposes of the discussions in this paper, I have assumed that the statutory direction is to ensure effective preservation, as appropriate, for all resources found in the parks. Based on this assumption, I see two pathways for determining which specific resources are to be protected and/or managed actively. One pathway is administrative determination of the park purpose and resource management program through the key elements of the park planning program - Enabling Legislation, Statement for Management, General Management Plan, and Resource Management Plan. The second pathway is the incorporation into ongoing park management of customary or traditional resource management practices that deal with resources which are not addressed in statute or procla-

mation and which normally might not be considered part of the park resource base (e.g., the fruit orchard in Capitol Reef National Park, recreational skiing on Manassas National Battlefield Park, domestic gardens of park and concession employees within park boundaries). Using the following definition of resource management :

Resource management is the manipulation of human activities to achieve predetermined resource conditions

I assume that future resource management decisions will be based on the conscious administrative determination of park purpose and management needs rather than on the unconscious continuation of any customary practices that may have developed over time.

I also assume that, although the 1963 Leopold Report provided the Service with policy guidance that has influenced management decision-making for nearly a third of the life of the National Park Service, the findings of this report no longer are sufficient to guide decision-making for the next 25 years. I make this assumption for several reasons: 1) debate over the meaning of a Leopold Report phrase "vignettes of primitive America" has polarized, rather than illuminated, management thinking; 2) understanding of ecological and global processes has advanced greatly in the intervening 25 years; 3) technological developments have given humans immense power to both measure and change natural systems; and 4) many of the broad landscapes of which parks are a part have experienced significant amounts of developmentally induced fragmentation. For the purpose of the following essay, I have assumed that, although the Leopold Report has made a significant contribution to the development of park management philosophy and policy, it no longer is the guide that it once was, there no longer is value in continuing to debate its meaning, and instead we should value it for the context it gives us for evolving the philosophy and policy needed in the next 25 years.

The following discussion has six components. The first is a general consideration of similarities and differences among natural, cultural, recreational, and special use management orientations. The second is a discussion of the nature of park purpose in terms of legislative, administrative, and customary directives. The third is an examination of the impact on these orientations and purposes of managing for single resource components in contrast to managing for entire ecosystems. The fourth is a comparison of management practices that focus on natural processes with management practices that focus on preservation of biological diversity. The fifth is a consideration of whether differences between human time frames and natural resource time frames have any influence on determining how resource management activities can be planned, structured, and implemented. The last deals with situations where natural and cultural resource needs conflict.

Comparison of Management Orientations

Because management orientations for the various park units have been vague and sometimes overlapping, there is value for the purposes of this discussion in arbitrarily stating what is meant by natural, cultural, recreational, and special use parks (zones). A natural park has a primary purpose of preserving and providing for human enjoyment one or more components of its natural systems, with little regard given to specific cultural, recreational, or special use opportunities it may offer. A cultural park has a primary purpose of preserving and providing for human enjoyment one or more specific cultural properties, including the historic scene within which the cultural event being commemorated took place, with little regard given to natural resource opportunities that may be available. A recreational park has a primary purpose of providing for outdoor recreation within a natural setting, with no special emphasis given to any specific natural or cultural resource. A park with a special use activity has a primary purpose of providing for the special use activity to occur within the context of park natural, cultural, and recreational activities.

Establishing Park Purpose

A great deal of latitude exists in defining the resource purpose of most parks. On the one hand, the purpose identified by legislation or proclamation often is so general as to be uninformative in guiding resource management decisions (e.g., "for the benefit and enjoyment of the people," "recreational park purposes" - Big Bend National Park; "preserve for the benefit, inspiration, education, recreational use, and enjoyment of the public" - Pictured Rocks National Lakeshore; "in its natural condition for the public benefit" - Petrified Forest National Park). In other cases, this language is so focused on specific resources that it offers no guidance for how the unmentioned majority of a park's resources are to be managed (e.g., "the public interest would be promoted by reserving deposits of Dinosaurian and other gigantic reptilian remains of the Juratrias period," "reserve lands which have situated thereon various objects of historic and scientific interest" - Dinosaur National Monument; "the mineralized remains of Mesozoic forests are of the greatest scientific interest and value," "a certain approach highway and additional features of scenic and scientific interest," "adjoining lands for administrative purposes" - Petrified Forest National Monument - now Park). Even the more recent enabling acts, which provide greater detail regarding the purposes of parks, still leave much room for interpretation (e.g., to maintain the environmental integrity of the Noatak River and adjacent uplands within the preserve in such a manner as to assure the continuation of geological and biological processes unimpaired by adverse human activity, to protect habitat for, and populations of, fish and wildlife, including but not limited to caribou, grizzly bears, Dall Sheep, moose, wolves, and for waterfowl, raptors, and other species of birds, to protect archeological resources, and in a manner consistent with the foregoing, to provide opportunities for scientific research - Noatak National Preserve).

The use purpose of most parks is more clearly described, because it generally is a restatement of the phrase "enjoyment ... by such means as will leave them unimpaired for the enjoyment of future generations" that is found in the Organic Act. Hunting or taking of animals by any means other than hook and line for fish is prohibited by specific statute in some, but by no means all, parks and monuments, and by regulation in all, other than some in Alaska. Hunting or hunting and trapping specifically are permitted in recreation areas and preserves, and fishing by means other than hook and line is permitted in some park and monument areas, as well as recreation and preserve areas. Disposal of timber, destruction of animal and plant life, grazing of livestock, leasing of land for accommodation of visitors, and construction of roads and trails are various types of uses specifically permitted by statute. In general, however, the Service has a broad authority to determine what proportion of a park's limited resources are unavailable for use, almost regardless of whether the area is a natural, cultural, recreational, or special use area.

The customary use purpose already has been mentioned - it is whatever uses have developed as traditional prior to, and following addition of, an area to the National Park System, regardless of whether the area is natural, cultural, recreational, or special use. In general, however, such uses are mediated post-establishment by the nature of the primary resource designation of the park.

With respect to the management of use of natural resources found within natural, cultural, recreational, or special use areas, decision-making likely gives greater weight to resource preservation in natural and recreational areas than in the others. Such decision-making tends to fit customary uses into the management scheme regardless of type of area, although modifications of the uses may occur because of the type of area. For example, off-road use of snow machines occurs in Grand Teton and Voyageurs National Parks even though both are predominantly natural area parks. Grazing generally is prohibited in natural areas, except where it pre-existed establishment of the park, but often is permitted in recreation areas and in the form of pasturing is used actively as a management tool in some cultural parks. On the other hand, picking of berries and other living plant parts for onsite personal consumption generally is permitted as a recreational activity in most parks, regardless of type of park.

Component or Ecosystem?

For some parks, management attention is drawn to a single natural resource component - saguaro cacti in Saguaro National Monument, grizzly bears in Yellowstone National Park, historic scene in Gettysburg National Military Park, use of the dune field for recreational hang gliding in Wright Brothers National Monument, or grazing and mining in Glen Canyon National Recreation Area. For other parks, management attention is diverted to maintaining artificial systems unrelated to the natural resource management objectives of the park (e.g., stocking of fish in naturally fish-free lakes in Sierra and Cascades parks, maintaining populations of horses on

Assateague Island and other seashore parks, keeping orchards in Capitol Reef and other parks, regulating the lake levels in Voyageurs National Park).

In othersituations, the management focus tends to be more ecologically structured - the contribution of spawned-out, dying anadromous fish to food chains in Olympic National Park; the influence of defoliation of oak forest by gypsy moths on the behavior and population dynamics of mammals and birds that use the forest for cover or food at Shenandoah National Park; the influence of hunting and trapping on fur bearer population dynamics in a number of parks in the Southwest Region; the interrelationships of prescribed fire, successional stages of vegetation, and deer population size and behavior at Saratoga National Historical Park; or the ecological and economic influences of continuation of domestic livestock grazing as a special use at Capitol Reef National Park.

In a single component approach to resource management, attention in each of these situations would be focused on the most immediately affected resource, with little or no effort applied to management of related resources. In a natural area, the affected resource more likely would be viewed as a subcomponent of the ecosystem, such as the tree species in Shenandoah National Park that may be at risk due to feeding by the exotic gypsy moth. In a cultural area, the affected resource likely would be limited to the immediate scene, such as the peach orchard at Gettysburg. In a recreational area, only the resource directly utilized for recreation, such as a hunted population of deer, would receive management attention. For parks experiencing non-conforming special uses, such as grazing, only the productivity of the range for livestock would be given management consideration.

For an ecosystem approach to resource management, attention would be given to the secondary ecological effects and opportunities associated with resource management actions, regardless of legislative purpose of the park. The application of this orientation to a natural area park would expand the consideration from a single ecosystem subcomponent to all subcomponents likely to receive significant effects, a shift that would be more quantitative than qualitative. The investigation of bird and mammal responses to possible tree defoliation at Shenandoah reflects concern for ecological linkages and secondary impacts. Similarly, the intensive research now focused on the northern elk herd at Yellowstone National Park deals not merely with elk population dynamics and ecological impacts, but also with the roles that fire, climatic change, and bedrock type may be playing in vegetation dynamics, changes in species diversity, and sedimentation of streams.

For the other three types of park purpose, however, the shift from single component to ecosystem orientation would bring a marked change in viewpoint and management result. In a cultural area, the application of an ecological viewpoint would lead to seeking opportunities for supporting appropriate natural resources while meeting the primary purpose of recreating the historic scene. For example, the sizes of fields being maintained to provide the proper historic scene would be reduced slightly to provide spaces for corridors of natural vege-

tation and associated native animal communities along fence rows; hay fields or pastures, rather than the row crops that existed at the time of the events being commemorated, would be used to provide the necessary open scene while at the same time reducing soil erosion and demands for use of pesticides; or riparian forest patches or strips would be reestablished along stream channels to reduce soil erosion impacts on the streams, maintain native plants and animals in the park, and keep the streams more nearly in natural conditions of water temperature, oxygen content, sediment load, and aquatic plant and animal population structures and dynamics.

In a recreational area, the application of an ecological viewpoint would bring management of the recreational area more closely in line with management of a natural area. For example, hunting and trapping activities would be adjusted to encourage the complete elimination of exotic species from the park; specific limits on harvest by sex and age, as well as number, would be established to ensure that neither quantitative nor qualitative components of the ecosystem were being changed significantly because of the human harvest activities; off-road use of motorized equipment would be regulated more stringently wherever such use was adversely affecting park resources; and greater management efforts would be placed on identifying, determining locations of, and developing protection requirements for, significant natural resources.

In areas supporting special uses, the application of an ecological viewpoint would result in greater limitation being placed on the conduct of those uses. For example, in a park open to mineral exploitation subject to certain limitations imposed for resource protection, all components and processes of the ecosystem, no matter how small or insignificant in appearance, would be used in determining what areas would be withdrawn from mineral entry or in which areas time-of-year or type-of-equipment restrictions would be applied. As another example, decisions on where, when, and how many livestock could be grazed would be made based on the need to minimize impacts to more components of the ecosystem than merely forage production, including rare plants, habitat for ground and shrub nesting birds, small mammal and reptile habitats, soil, fragile geological structures, or aquatic systems.

The Service's current practice of developing management plans according to resource zones within a park (natural, cultural, development, special use) rather than park type (natural, cultural, recreational), reflects a current tendency towards the ecological, rather than component, approach to resource management.

Protection of Natural Processes or Biological Diversity?

The philosophy underlying management of park natural resources has evolved significantly since establishment of the first park in 1872. The first step in this evolutionary process was to prevent poaching. The second step was to control specific features of the system, such as fire or predators, that were considered "bad". The third step was development of the ecological awareness that natural components of the system are neither "bad" nor "good", but that

they in fact are integral parts of the system and that human manipulative activities such as fire prevention or predator control are, in fact, "bad". The fourth step was recognition that resource degradation due to human activities grows as the intensity of human use increases and, therefore, that limitations on human uses of parks are necessary. The fifth step has been the recognition in recent years that parks do not exist in isolation from neighboring lands and continents and that legitimate human activities occurring outside parks may be having significant impacts on the ability to preserve resources inside parks.

The sixth step in this evolutionary process is now on the table for consideration - the harmonious integration of park resource management into larger, regional land use management patterns that have as a major goal the sustaining of natural features representative of the region. Under this concept, parks would provide the major sites for natural resource preservation, but other components of the regional landscape would participate as appropriate. In carrying out their roles in regional landscape management, the parks could be managed either to preserve the natural processes characteristic of the parks, themselves, with a probable loss of some plant and animal species from the parks that are characteristic of the broader region; or the parks could be managed to preserve as much of the biological diversity of the broader region as ecologically could fit into the parks, with an associated loss of free play of the natural processes within the parks.

The current management philosophy, articulated largely from concepts developed in the Leopold Report, is to minimize human intervention in the functioning of natural processes and to accept the results of whatever unimpeded natural processes bring. This philosophy provides the best and least expensive management strategy for large, undisturbed parks that are surrounded by relatively undisturbed lands and that are not subject to any significant impacts from airborne products of human activities. Theoretical considerations and practical experience indicate that this philosophy will produce small to large perturbations of park resources, especially with respect to conservation of natural biological diversity, in direct proportion to the degree of alteration of natural landscapes outside parks, to the amount of airborne products of human activities, and to the number and invasiveness of exotic species entering the park. In addition, these considerations suggest that the diversity and severity of perturbations will be larger for smaller sized parks. Application of the natural process approach to park management over the next few decades likely will result in larger, natural parks remaining relatively unaltered due to human impacts, with the smaller natural parks and both cultural and special use parks experiencing some losses in native biological diversity and some additions of non-native biological diversity. To the degree that the recreational parks largely are managed as natural areas now, probable changes to their natural resources would parallel those of comparably sized natural parks.

Management practices required to maintain the natural processes as unimpacted as possible would include such existing practices as removing exotic species (e.g., goats and pigs from Hawaii Volcanoes and Haleakala National Parks, melaleuca

from Big Cypress National Preserve, tamarix from Death Valley National Monument, mountain goats from Olympic National Park), restoring the role of natural fire through use of fire prescriptions that include the deliberate setting of fires (e.g., Sequoia/Kings Canyon National Parks, Everglades National Park), removing animals when populations inside fenced parks exceed the ability of the vegetation to support them (e.g., elk and bison at Wind Cave National Park, bison at Badlands National Park, horses from the herd maintained for the historic scene at Theodore Roosevelt National Park), reducing the likelihood of airborne impacts from sources outside the parks (review of permit applications for new sources of air pollutants for their effects on parks, such as at Theodore Roosevelt National Park), preventing the drawdown of ground water where it would jeopardize the survival of park biota (the Devil's Hole pupfish at Death Valley National Monument), or managing human use of parks to prevent that use from impacting park natural resources (e.g., restrictions on backcountry use in Glacier National Park to prevent alteration of natural behavioral patterns of park grizzly bears, restrictions on use of off-road vehicles in seashore parks to protect dune and tidal zone ecosystems, prohibition of consumptive fishing in selected streams in Shenandoah or Yellowstone National Parks to ensure preservation of older aged (and thus larger) fish in the ecosystem, or restricting independent, non-guided use of caves to prevent loss of fragile geological formations).

Managing by letting natural processes operate unimpeded possibly will result in the loss of natural biological diversity over time - either through loss of genetic diversity as the population of a park species becomes very small due to a small habitat base (e.g., grizzly bears at Yellowstone National Park, Florida panther in Everglades), loss of species diversity as species become extirpated from parks (e.g., woodland caribou in Voyageurs National Park, badger in Zion National Park), or loss of ecological diversity as the mix of plant and animal community types and age classes becomes reduced through either disappearance of dominant species (e.g., simplification of some eastern deciduous forests due to loss of the chestnut as a dominant species) or loss of entire habitats due to successional or catastrophic change (e.g., loss of pine forests in isolated patches of eastern deciduous forest that are maturing to hardwood species, loss of relict communities due to global climatic change).

Preventing the loss of biological diversity may require active intervention in the operation of natural processes in parks, and especially in the smaller parks and in those parks which at present actively manipulate natural communities to maintain the historic scene or for other purposes. Active intervention to preserve biological diversity most likely would be designed to mimic natural processes, such as fire, windthrow, flood, or landslide, but would be managed to occur at times and places most likely to support the meeting of the resource management objectives. The setting of resource management objectives and the carrying out of active intervention activities clearly would be dependent on both thorough knowledge of park ecological processes, species occurrences, species population dynamics, and species genetic frequencies, and also an active, carefully designed, and committed resource inventory and monitoring program. An active program to maintain a representative example of the natural biological

diversity of a park, or of the landscape of which the park is a part, would be very intensive in the portions of a cultural park where it would be possible to perpetuate natural resources without jeopardizing the historic scene or purpose. Similarly, it would be very intensive in those portions of special use areas of parks where the biological diversity goal would be compatible with the special use purpose. Such a program would be progressively less intense in recreational and natural parks in proportion to the degree that the park had not been altered to meet past or present human use needs. It also would be less intense in the larger sized parks compared to the smaller parks.

In smaller parks, or in selected high intensity human use areas of larger parks, the effort to maintain representative biological diversity could generate a product reminiscent of a zoo or a botanical garden. The fencing and frequent management of populations of wide-roaming species, such as occurs with elk and/or bison in the prairie parks to prevent the animals from becoming a nuisance to park neighbors, is zoo-like in concept. The growing of alpine plants in a garden near the visitor center in Acadia National Park is similar to what is found in a botanic garden. The prescribed burning of sequoia forests in the Sierran parks done to maintain the role of fire in the ecosystem is reminiscent of an arboretum's efforts to maintain a desired tree species.

Putting aside individual differences of opinion about whether "zoo" or "botanic garden" are antithetical to the concept of "park", the key question is whether or not it is our desire to ensure the survival of as many native species as possible within the National Park System. An ancillary question is whether "native" refers only to the species that actually were in the park, itself, or to all of the species of the entire landscape of which the park is a part.

Human Time Frames or Natural Resource Time Frames?

The choice of what management goals to pursue and of what techniques to apply will be influenced by both desired (human) time frames and practical (natural resource) time frames. For example, due to the life span and growth characteristics of the coast redwood, a desire to replace the cutover forest of Redwood National Park with a mature redwood forest will take several hundred years, even with the restoration efforts now being conducted. Similarly, a desire to understand the natural cycling of wolves on Isle Royale may take 90 or more years to achieve (three or four multiples of what only now is beginning to appear as a 30 year cycle), and for caribou in northern Alaska it may be 210 or more years (three or four multiples of what may be a 70 year cycle). In another way to assess the time concern, a mouse may experience a third of a park superintendent, a deer may experience two or three superintendents, a grizzly bear 8 to 10 superintendents, an oak tree 70 to 80 superintendents, and a redwood tree 350 to 400 or more superintendents during their respective life spans.

Similarly, habitat needs of species that move may also vary over time. Some species occupy different habitats on a daily basis (e.g., deer moving from feeding to resting habitats), others may need different habitats on an annual

basis (e.g., elk, peregrines, monarch butterflies moving from summer to winter ranges), and some need different habitats at different life cycle stages (e.g., 17 year cicadas live in the soil for nearly 17 years and then switch to trees for a crucial several weeks of reproductive frenzy).

In addition, many plant and animal species have habitat requirements that depend specifically on presence or absence of disturbance occurring at predictable intervals that often are of much different frequencies than those to which humans are accustomed. For example, annual plants and the insects that associate with them need habitat renewal every year, as occurs naturally in the desert with each year's spring rains or artificially in human ecosystems with the plowing of ground each spring. In many areas, pine trees, the insects that feed on the trees, and the birds (especially the endangered red cockaded woodpecker) that feed on the insects require a significant disturbance like fire or extensive windstorm only at infrequent but regular enough intervals to ensure the continual availability of hundred-plus year old, decadent pines. In the extreme case, some species, such as the spotted owl and some of the small mammals on which they feed, require vegetation which has not experienced disturbance for a long time and which therefore requires a long time, up to 200 to 300 years, to be replaced once lost.

Management responses to these different ecological time frame needs may vary depending on the natural, cultural, recreational, or special use purposes of a park. A natural or recreational area park will experience no need for directed management so long as the park is being managed strictly to preserve natural processes and management is willing to accept the possible loss of some species of plants or animals. To the degree that a natural or recreational area park is managed to preserve its natural biological diversity rather than its natural processes, the management of the park may require intervention in ongoing natural processes to mitigate for impacts either of loss of adjacent habitat (insularization), loss of natural processes (wildfire), presence of atmospheric pollutants (ozone, sulphates, acid precipitation), or loss of suitable environments due to global climate change. Such interventions in natural processes may occur as deliberate removal of old growth to create early stage habitats or as deliberate protection of old growth from natural fire to ensure retention of necessary quantities of such habitat. These interventions also may include deliberate moving of species from one area to another to mitigate any loss of genetic exchange caused by insularization, to simulate probable natural range extensions that are blocked by insularization, or to assist permanent natural range changes to occur in response to climatic change. To the degree that a recreational area park is managed to maintain consumptive activities such as hunting, fishing, or trapping, management intervention may include active manipulation of landscapes to ensure presence of appropriate distributions and abundances of habitat time sequences required for supporting the recreationally used species. Although management actions in cultural parks generally will not reflect all of these possible time frame needs since cultural park management normally focuses on development of an appropriate historic scene fixed in time, cultural park management may provide for some of these needs on the fringes of

the cultural scene. Special use park management may choose to ignore the needs of native species and systems in the special use areas, or it may seek to manage the distribution and timing of the special uses to be supportive of identified natural resource goals, such as long term maintenance of disturbed conditions through grazing management regimes, or development of a patchwork of disturbed habitats through controlling the phasing and access patterns of such activities as mining or oil and gas extraction.

Internal Conflicts Between Natural and Cultural Resource Management

Many parks have more than one type of resource, and in a number of cases the management needs of the various types may conflict, rather than be compatible. For example, Mesa Verde National Park, principally a cultural park, contains both a large number of archeological sites and ruins and an unusually dense pinyon-juniper forest. Although the denseness of the forest may relate to the unique mesa top location of the park, it perhaps more likely relates to many past decades of fire prevention carried out at least in part to "protect" the cultural resources. The resource management question that must be answered today is whether or not the park should adopt a prescribed fire program and, if so, how to conduct such a program without risking degradation of archeological resources. The first step in answering this question is to establish what role fire naturally has played in the forest ecosystem. The second step is to determine whether or not any past natural fires that did occur have had any detrimental impacts to the archeological resources. The third step is to establish how a modern prescribed fire program could be carried out without degrading the archeological resources. The last step is to decide whether or not to restore the natural role of fire, and if so, exactly how. There is an additional element to this story that provides an exciting opportunity for interpretation - can the fire management program be designed in such a way that it also will restore the "historic scene" that is thought to have existed at the time the archeological sites were occupied? A decision to answer this question brings together into a partnership not only cultural and natural research, cultural and natural resource management, but interpretation as well.

A second example of internal conflicts between natural and cultural resource management is being revealed by an ongoing biological diversity related initiative to identify the presence, types, and abundances of historic orchard tree cultivars found in units of the National Park System. This study developed out of a training course on using integrated pest management for orchard management, during which it became apparent that the National Park System contains a great diversity of old, historic genetic types of domesticated trees. The natural/cultural conflict generated by this presence of once domesticated species occurs wherever natural area parks are restoring former orchard lands to natural conditions - with the resulting deliberate removal of the exotic, but perhaps historically significant orchard trees. To prevent any unknown loss of a valuable historic, living, but exotic resource, the Service can use the results of the survey to identify for any given park whether or not the natural values of ecosystem restoration outweigh the historic values of preserving the genetic cultivar being proposed for removal.

Conclusion

The designations of parks as natural, cultural, recreational, or special use is one variable around which management to ensure preservation of park natural resources could be organized. Such an orientation, however, may lead to lost opportunities for effective preservation of natural resources in the face of increasing insularization of parks, decreasing levels of air quality, and onset of global climate change. A more resource conservative approach would be through planning to assess the potential that each park, regardless of its original designation, has for contributing to the preservation of all of the natural resources found in the National Park System, and through active management to ensure that each park achieves its potential.