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Effective Environmental Management of the National Park Service: A Case Study of Channel Islands National Park

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CLAREMONT McKENNA COLLEGE
EFFECTIVE ENVIRONMENTAL MANAGEMENT OF THE NATIONAL PARK
SERVICE: A CASE STUDY OF CHANNEL ISLANDS NATIONAL PARK

SUBMITTED TO
PROFESSOR MORHARDT
AND
DEAN GREGORY HESS
BY
DANIEL TREVOR OLMSTED

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SENIOR THESIS
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List of Acronyms

CDV	Canine Distemper Virus
CINP	Channel Islands National Park
ESA	Endangered Species Act
FWS	Fish and Wildlife Service
FY	Fiscal Year
IWS	Institute for Wildlife Studies
NPS	National Park Service
SCI	San Clemente Island
SMI	San Miguel Island
SNI	San Nicolas Island
SRI	Santa Rosa Island
TNC	The Nature Conservancy

Preface

National parks are the best idea we ever had. Absolutely American, absolutely democratic, they reflect us at our best rather than our worst.

–Wallace Stegner

The topic of protected area management serves as the focal point of my thesis. The fundamental question I seek to answer is, what constitutes effective environmental management and how is it exemplified in the National Park Service (NPS)? How exactly does the NPS continually earn the trust and confidence of the American people when so many other government agencies are viewed in a negative light? How does the Channel Islands National Park, in particular, shape the economic and political framework in which it operates to achieve its goals? How does this agency effectively manage such a complex ecosystem spanning across five unique islands and the surrounding waters? More specifically, how do they design and implement strategies to simultaneously monitor a variety of endemic species, some of which are on the endangered species list, into feasible tasks and fundable projects? These questions will be addressed in much greater depth in subsequent chapters, however it is helpful to begin by providing a brief history of the formation of the national park service as well as its evolution throughout its nearly century long existence. Finally, there is an overlapping mix of jurisdiction responsible for protecting the Channel Islands and I will also be examining the collaborative processes that take place among the multiple stakeholders such as the U.S. Navy, Catalina Island Conservancy, and The Nature Conservancy.

Outdoor recreation and nature-based tourism have continued to rise. This positive trend reflects the fact that Americans continually value the splendid natural landscapes found in the national parks. A wealth of information exists providing salient recommendations for improving endangered species recovery efforts, but this paper provides a detailed comparison of two contemporary recovery programs dealing with independent declines of the same species: the island fox. The first is a recovery program implemented by the Catalina Island Conservancy and the second is an on-going effort implemented initially by the NPS with subsequent support from the Nature Conservancy and the U.S. Fish and Wildlife Service.

As the following chapters describe, the impact of collaboration of multiple stakeholders of the Channel Islands National Parks has yet to be comprehensively explored. Although significant research and historical literature on the national parks currently exists, especially pertaining to some of the most famous parks, little attention has been devoted to the Channel Islands National Park. It is argued that the Channel Islands represent a microcosm of all the relevant issues affecting the NPS today and in many ways provides clear examples of effective management. Specific cases within the Channel Islands National Park are examined to illustrate some of these issues in greater depth. Further analysis of the economic structure of the National Park Service is examined in Chapter 4. The primary purpose of this thesis is to assess the relationships the NPS develops with other agencies in order to fulfill its mission within the context of the Channel Islands.

Chapter 1: The National Park Service – An American Innovation

Mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of life.

-John Muir

Although ideals represented in the national parks are entrenched in the American identity, it is easy to take the parks for granted. National parks offer the public much more than beautiful scenery; they allow people to reflect, observe, and truly experience nature in a tranquil environment. Furthermore, they provide us with a chance to mutually appreciate the heritage of our country. It is this holistic approach, providing a service to a community at large, and not merely for the benefit it brings to individuals or private groups, which makes the NPS so compatible with democracy. A nation's self-identity, consisting of values and ideals, should be embodied in symbols that capture and express that identity, and so help people personally and meaningfully relate to it.ⁱ The need to establish and reinforce a national identity served as a major catalyst of the national park movement. Recognizing that the United States could not match the cultural achievements of Europe, Americans began to take pride in their own natural monuments, the awesome mountains and canyons of the West that far surpassed the more tranquil scenery of Europe.ⁱⁱ By depicting some of the most magnificent landscapes in the country, the national parks have themselves become ingrained in the American identity. Ultimately, it was this search to find a national identity that allowed the national park idea to come to fruition. Early proponents of the national park idea, such as John Muir considered it an opportunity for our young nation to compete with European culture through "scenic nationalism."

Rather than adding grandiose cathedrals and castles, the United States has uniquely contributed to world culture by immortalizing such notable parks such as the Grand Canyon, Yosemite, and Yellowstone.

It may be that the essential purpose of the national parks is to help bind us together as Americans. National parks have meaning and purpose higher and apart from purely recreational or economic values. Through the power of unification, the national park idea gained tremendous momentum and support from the public. Today, national parks play many significant roles but perhaps none more important in the 19th century than defining what our country should value. The Progressive era of the early-twentieth century was the first point in American history where resource management became a national priority. During this time, the notion of conservation was gaining significant traction among the American people. Americans were becoming genuinely concerned about their environment; a reflection of the national indignation at concentrated wealth and the monopoly of natural resources. Another contributing factor to the environmental movement was the widespread acceptance of the philosophy that the central government should be strong and willing to use its strength to serve the public interest.

The Antiquities Act

The Antiquities Act, passed by Congress and signed into law by Theodore Roosevelt in 1906, has proven to be one of the most far-reaching pieces of park legislation ever enacted. It gave the president authority, by executive order, to declare any site on federal property containing outstanding historic, scenic, or scientific values a national monument. This revolutionary act empowered the President to quickly protect

certain “historical landmarks” found on public land without first seeking approval from Congress. The Antiquities Act therefore permits a president to recognize a significant area as a national monument, thus granting immediate protection, until Congress can be persuaded to make it into a national park. National parks and national monuments are not completely analogous. Whereas parks tend to encompass vast expanses of land, monuments are more modest in proportion. Furthermore, parks are, with rare exceptions, free from any type of commercial exploitation. In comparison, monuments may be subject to commercial development in some instances. Before the creation of the NPS, the parks were little more than administrative stepchildren within the federal government, with operational responsibility scattered.ⁱⁱⁱ No well-defined, accepted policy existed to guide administration. Park management was unorganized and disconnected. Continuity between different park personnel was completely absent.

The Organic Act: The Birth of the National Park Service

The NPS is called upon to play a broad role of preserving, protecting, and conveying to the public the meaning of those natural and cultural resources that contribute to the nation’s values, character, and experiences.^{iv} In this way, no institution is more symbolic of the conservation movement in the United States than the national parks.^v The experience of nature through the parks has instilled and will continue to instill positive environmental values for many generations to come. The National Park System serves as an excellent example of a common good, one that is shared indiscriminately by all. However, it is the government’s responsibility to ensure that this common good is provided for not only for the current members of society but for future

generations as well. The 1916 Organic Act, in which Congress laid out the purpose of the NPS states:

The [NPS]...shall promote and regulate the use of the...national parks, monuments, and reservations...by such means and measures as...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 a manner and by such means as will leave them unimpaired for the enjoyment of future generations.^{vi}

These two seemingly incompatible goals, “conservation and public use” have been a major source of controversy. However, whenever a conflict arises between conserving resources and values and providing for enjoyment of them, conservation usually prevails. This is how courts have consistently interpreted the Organic Act.^{vii} In carrying out its responsibilities, the NPS must consider both natural and cultural resources in conjunction with the interactions between people and these resources. As the visitation to the parks increases so does the challenge of the NPS to balance these two contradictory views. Almost every decision affecting the parks involves the balancing of preservation and use values. Because there is no conceivable way to quantify all the factors involved, each decision is the product of the best-informed judgment of knowledgeable people, framed with a mindful consideration of the attitudes and opinions of the visiting public.^{viii}

Evolution of the NPS: Combining Science with Management

During the past 30 years, several reviews conducted by independent experts and the NPS itself have concluded that park management must be guided much more by scientific knowledge and less by managerial guesswork.^{ix} As one of the main guardians

of our nation's priceless natural and cultural heritage, the NPS is obligated to be among the most progressive resource management agencies in the federal government. The NPS cannot under any circumstance conduct or allow activities that would impair natural resources. Adhering to this mandate requires thorough scientific research of the potential impacts. The NPS's original management strategy generally assumed that its mission could be achieved through passive management, simply by keeping direct human encroachment to a minimum and by maintaining the "natural" status quo for recreational enjoyment.^x Science and environmental management should not and cannot be two mutually exclusive items; rather scientific research should direct NPS staff in their decision making process. One cannot deny the importance of building a science-based understanding of park resources yet the question of whether leadership of the NPS science program should be centralized or decentralized remains controversial. The decentralized or regional approach allows scientific research to be more responsive to park needs; however, this process can sometimes lead to inefficiencies or fragmentation. Competition may arise in instances where research and resource management projects are funded from the same portion of the budget. It is imperative for managers to incorporate the analyses of scientifically trained resource specialists in their decision-making.

Science has demonstrated that few if any park units can fully realize or maintain their physical and biological integrity if managed as "biogeographic islands".^{xi} Rather, parks must be managed in the context of their larger ecosystems. For nearly a century the NPS has held the dual responsibility to conserve the resources of parks and to provide for their enjoyment by the American people. Despite being an innovative piece of legislation in 1916, the Organic Act considered protection to be the key to conservation of park

resources. It has become evident that accomplishing the mission of the Park Service requires far more than passive protection; it requires sound understanding of park resources, their status and trends, the threats they face, and the measures needed to correct or prevent problems in these dynamic ecosystems.^{xii} The NPS has since realized how vital a role research plays in any restoration project. Effective park management requires a solid scientific foundation. It was once believed that a national park should represent a vignette of primitive America. However, protected parks do not exist as isolated pockets of nature. They are interdependent with other natural resources and completely inseparable from human communities. In order to restore an altered ecosystem back to its original condition, it is imperative to know the native flora and fauna that existed. Only through careful scientific examination can this information be obtained. Today, it is commonplace for parks to have scientists engaged in research in order to help the superintendent make sound resource management decisions. The superintendent overseeing the Channel Islands National Park for example can call upon the services of wildlife biologists, geologists, botanists, and even archeologists to decide the best course of action.

Organization of the NPS

As is typical of most federal agencies, the NPS operates on three levels of management: the central headquarters in Washington D.C., the regional offices, and the parks themselves. Park policies originate in Washington and field coordination is determined at the regional level. Although parks differ drastically in size, their administrative organization remains largely the same. Each park must carry out the

following functions: protection of park resources, interpretation and visitor services, maintenance and repair of physical facilities, and financial and personnel chores.^{xiii} Each individual park is headed by a superintendent who in turn must report to one of 10 regional offices located throughout the country. The regional offices exist as an intermediary between the central office and the actual parks. Realistically though, the sheer size and diversity of the system prevents tight control from Washington, which increasingly must defer to the regional offices on day-to-day operational matters.^{xiv}

As the nation's principal conservation agency, the Department of the Interior is responsible for the majority of the nationally owned public lands as well as its natural and cultural resources. The NPS is a bureau of the U.S. Department of the Interior whose primary objective is to promote wise use of our precious land and water resources for future generations. They pride themselves on being stewards of the some of the most ecologically, culturally, and historically significant areas in the entire country. Led by a director, who is nominated by the President and confirmed by the U.S. Senate, the NPS operates 58 national parks, over 100 historical sites, and dozens of monuments and battlefields.^{xv} Beneath the director are senior executives who manage national programs, policy, and budgeting issues as well as seven regional directors who are in charge of implementing specific programs. Collectively, these members make up the National Leadership Council and administer all service-wide policies. The NPS fulfills its responsibilities to parks located in all 50 states under the authority of federal laws, regulations, and Executive Orders and in accord with policies and Director's Orders established by the Director of the NPS and the Secretary of the Interior.^{xvi}

During the Carter administration, a considerable number of national parks were added to the system. Consequently, this inflicted an enormous financial strain on the organization. Unlike the traditional parks of the early 20th century, in which all of the land was acquired by the NPS, more recent parks have been created in which ownership of the land is divided among federal, municipal, and private holders, with administrative authority shared among several governmental entities. No better example of this modern day park can be found than the Channel Islands National Park (CINP). CINP may only oversee a chain of five islands off the coast of Southern California, but it exemplifies the leadership qualities required for effective environmental management.

Chapter 2: From Monument to Park – The Creation of CINP

Who will gainsay that the parks contain the highest potentialities of national pride, national contentment, and national health? A visit inspires love of country, begets contentment, engenders pride of possession, contains the antidote for national restlessness...

-Stephen Mather

Federal efforts began in 1938 when President Franklin D. Roosevelt exercised the Antiquities Act, therefore proclaiming the islands of Anacapa and Santa Barbara as National Monuments. Santa Rosa and Santa Cruz were privately owned and San Miguel was under the control of the U.S. Navy until 1976 when an agreement with the National Park Service was made, allowing supervised visitation on the island. In 1978, a conservation partnership between the Nature Conservancy, a national nonprofit conservation organization, and the Santa Cruz Island Company provided for continued protection, research, and educational use of most of privately owned Santa Cruz. In 1980, President Jimmy Carter signed into law a bill abolishing Channel Islands National Monument and instead raised the status of these islands to create the 40th national park, thus acknowledging their unique natural and cultural significance. Included in the bill were the waters extending one nautical mile around Santa Cruz and Santa Rosa. This area was augmented by the designation of Channel Islands National Marine Sanctuary later that year. Administered by the National Oceanic and Atmospheric Administration (NOAA) the sanctuary expanded the protection boundaries to six miles offshore, encircling the remaining northern islands and their interconnecting channels. Today, the park consists of nearly 250,000 acres, half of which are under the ocean. Even though the islands are located in close proximity of the densely populated, southern

California coast, their isolation has left them relatively undeveloped.

The CINP embraces the fundamental ideals outlined by President Woodrow Wilson when he signed the Organic Act that created the National Park Service in 1916. Above all else, they seek to preserve and protect the terrestrial and marine habitats contained within the park while leaving them unimpaired for the enjoyment of future generations. Each Channel Island is home to its own variation of endemic species found nowhere else in the world. Once the high degree of diversity was realized on the Channel Islands, swift action was taken to ensure that those areas would be protected. When the NPS first inherited the Channel Islands, the overall habitat conditions were dismal. Decades of improper land use, including habitat degradation caused by overgrazing of non-native mammal species, had several negative impacts on the islands' ecosystem. Furthermore, years of over harvesting greatly reduced the biodiversity and productivity of park waters and almost lead to the extinction of the white abalone. Even though the park has extended its no-fishing Marine Reserves, it will take time for the depleted fisheries to recover fully.

Ecology of the Channel Islands

The Channel Islands, sometimes aptly referred to as the “American Galapagos” occupy a unique niche in the ecology of the United States. The park's diversity of animal and plant life is second to none in Southern California. More than 2,000 species congregate at the Channel Islands, and of those, 145 can be found nowhere else on earth. In terms of marine life, the Channel Islands boast an impressive collection, ranging from microscopic plankton to the largest animal to ever live on earth, the blue whale. The

isolation of the eight islands in the chain has played a significant role in building that diversity, as has its location where the cold, nutrient-rich waters moving south from northern California and the warm water current moving north from Baja California intermingle. The mixture of these two currents is conducive for upwelling conditions to occur. Essentially, upwelling brings the denser nutrient-rich water that normally lies at the bottom of the ocean, up through the thermocline and to the surface, therefore replacing the nutrient-depleted warm water layer. This influx of nutrients provides the necessary sustenance to support hundreds of marine species. The diversity of seals and sea lions at Point Bennett on San Miguel Island is an excellent example of the biological diversity so characteristic of the Santa Barbara Channel. As the largest pinniped rookery in the world, San Miguel Island provides a vital breeding ground for Northern Elephant Seals, Harbor Seals, Northern Fur Seals, California Sea Lions, and the rare Guadalupe Fur Seal. Furthermore, the Channel Islands are arguably the most important nesting grounds for seabirds on the West Coast. Collectively, the Channel Islands act as the last remaining refuge for some species that used to have home ranges all along the California coastline. Despite being used by fishermen and sport divers and subject to mainland water pollutants, the kelp forests of the Channel Islands harbor extraordinary amounts of plant and animal life. One of the most obvious values the islands provide is the fact that they support some of the last remnants of coastal Southern California plant communities, which have been rapidly disappearing from the mainland as a result of human development.

Despite being located 60 miles away from 18 million people, the park provides a pristine environment for a multitude of species, protected forever from any future

development by federal law. That is not to say that these islands are immune to the profound changes associated with an expanding Southern California metropolitan area. On the contrary, the CINP is deeply embedded in the highly developed and rapidly changing surrounding environment. Human activities have altered island and marine environments in the park for centuries but the rate of change is accelerating. Consequently, the park must overcome numerous outside threats that have the potential to alter the ecological integrity of the islands. The Service seeks to restore human disturbed areas to their natural conditions. Prior introduction of non-native invasive species by misguided private landowners has caused devastating effects on the Channel Islands, adding a tremendous amount of stress to the ecosystem. Decades of intentional clearing, grazing, and fires have contributed to the transformation of island vegetation. The park plant list consists of 334 species; of these 23.6% are considered to be alien to the southern California flora whereas only 10% are considered endemic.^{xvii} Invasive plants can overwhelm ecologically balanced native flora, especially on island communities. Because an exotic species did not evolve in concert with the species native to the place, it may exist in the absence of any predators or possess certain selective traits that allow it to outcompete the native species. Despite the park's best effort to remove these disturbances from the islands, certain exotic species such as the ice plant are not only winning the battle against their exterminators, they are also out competing the native vegetation. Even though native plant communities are starting to recover, mainly due to the park's effort to systematically remove alien species, alien species continue to persist and in some cases represent 25-70% of the vegetation cover.^{xviii}

Isolation is the defining characteristic of the islands. Several unique species have evolved over time and adapted to their isolated environments. Evolutionary adaptation has given rise to the cornucopia of life found on the Channel Islands today. However, the same forces that allowed such rich biodiversity to occur on the islands also make these species particularly vulnerable to outside threats. The rich biodiversity found on the Channel Islands is indicative of its inherent value. Our changing attitudes are reflected in the laws we have passed and the public money we are willing to spend. Where the National Park Service budgeted \$605 in fiscal year 1942 for the protection and restoration of unique wildlife on San Miguel Island and the two other islands it administers, in 1991 the figure for protection and administration of the five-island national park exceeded two million dollars.^{xix} As illustrated in figure 1, the NPS budget has increased steadily over the past decade. In order to meet the demands of increased visitation to the parks, as indicated by figure 2, the NPS must expand their budget. These corresponding graphs exhibit the positive trends in both NPS budget and visitation.

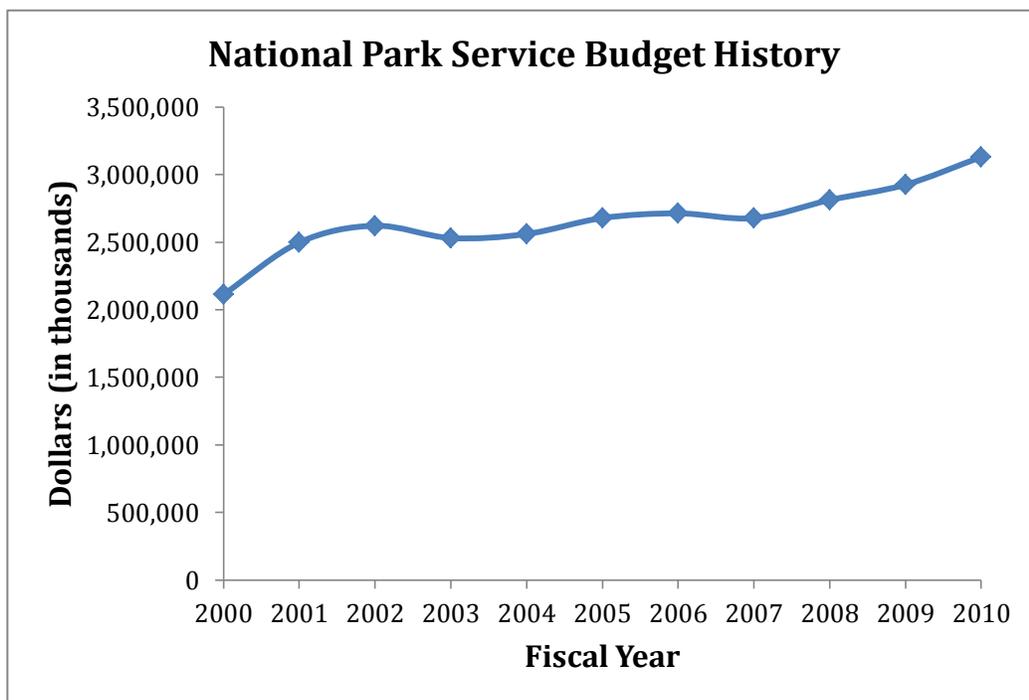


Figure 1.

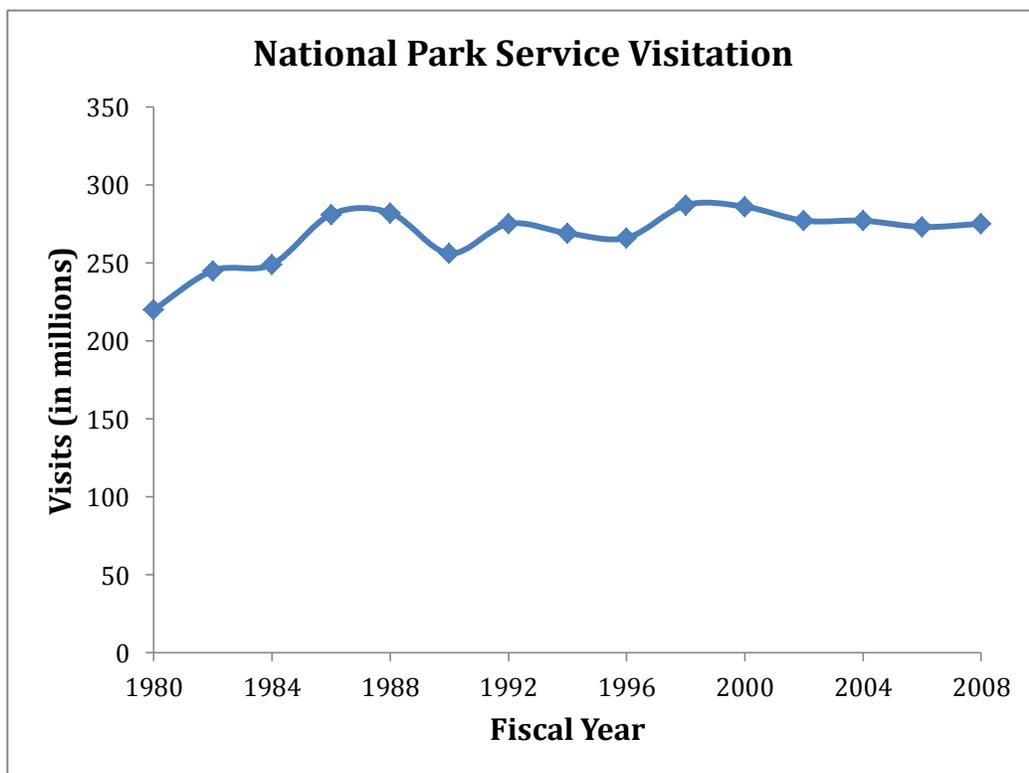


Figure 2.

Leadership Structure

There is a certain stigma associated with the federal government, namely that it is plagued by inefficiencies caused by the bureaucratic process. The NPS Directives System was devised to cut through the red tape of bureaucracy and streamline everyday tasks by providing instructions and guidance documents to NPS managers and staff. Important information pertaining to NPS policy and recommended actions are passed along to managers who in turn implement those policies in their specific parks. This system is intended to reflect the NPS's organizational values of teamwork, delegation to the most effective level, empowerment of employees, accountability, and reduction in overall paperwork.^{xx} The Directives System is composed of three "levels" of documents:

- Level 1 consists of the policies that set the broad framework, provide direction, and prescribe parameters for making management decisions.
- Level 2 is Director's Orders, which articulate new or revised policy on an interim basis between publication dates of NPS Management Policies. They also provide more detailed interpretation of Management Policies and outline requirements applicable to NPS functions, programs and activities, and are a vehicle by which the Director may delegate specific authorities and responsibilities. The main target audience for Director's Orders is superintendents, for whom they serve as an "executive summary" of important policies and procedures.
- Level 3 contains materials including handbooks, reference manuals and other documents containing comprehensive information in support of field and programmatic operations. A typical handbook or reference manual will include relevant legislation, regulations, management policies, other instructions or

requirements issued through a Director's Order.^{xxi}

There is a clear hierarchical system of leadership within the NPS, with major decisions coming from the top and circulating down the chain of command. This top down process ensures that vital information reaches subordinates in the most efficient manner.

The NPS has undertaken the monumental task of carefully monitoring, protecting, and restoring the natural and cultural resources found on the five Northern Channel Islands. In order for the Channel Islands National Park Service to manage such a widespread archipelago, they are organized into six main divisions: protection, island rangers, maintenance, interpretation, cultural resource, and natural resource. Each division can further be divided into more specific departments. For example, the natural resource management division has several departments, each specializing in a particular ecosystem or faunal group. In order to assess the overall health of the islands, the NPS monitors terrestrial vertebrates, land and sea birds, kelp forests, and intertidal zone. In this way, the park service acts as the main stewards of the islands. However, the National Park Service is only one of many organizations with a vested interest in the Channel Islands. Although the bulk of the management duties ultimately rest upon the park service, several stakeholders such as the U.S. Navy, U.S. Fish and Wildlife Service, and the Nature Conservancy share the responsibilities.

The NPS relies heavily on its partnerships to advance their mission. Each partner shares a unified goal, namely to act as a bulwark for cultural and biological diversity, preserving the islands' history and prehistory, and protecting vital habitat for scores of marine and terrestrial plant and animal species.^{xxii} By establishing strong coalitions with

other agencies and maintaining close relationships, the NPS utilizes leadership teams to accomplish its goals. Given the scope of its responsibilities, the NPS has an obligation not only to demonstrate leadership in environmental stewardship, but also promote it in other governmental agencies as well as the public at large.

The Value of Partnerships

Conservation of a natural area is dependent upon its surrounding areas since disturbances do not stop at fence lines. Many wildlife species face encroachment from development. Shrinking the available habitat limits the carrying capacity of the species so it is more likely to become endangered. Therefore, establishing cohesive partnerships is an essential component for the National Park Service to fulfill its mission. Fostering a shared sense of stewardship and finding common ground with a multitude of organizations across the country is of the utmost importance. The NPS can attribute much of its success to cultivating cooperative relationships. By articulating its mission, values, and resources to partnering organizations, the NPS is able to build strong bonds. Creating lasting partnerships is both a skill and an art that the NPS has sought to master. Shifting away from a mentality of self-sufficiency, the NPS now embraces the idea of collaboration by empowering others through partnerships. Placing more emphasis on division of labor and coordination has yielded positive results.

Partnerships have become a way to get things done both within and beyond park boundaries. Some NPS parks and programs operate almost exclusively through partnerships. Many of the parks established in the last thirty years, such as CINP, have clear mandates to partner. Ecosystem-based resource management requires close

collaboration with an array of managers and stakeholders across the ecosystem. Many solutions for park operation, transportation, visitor service and employee issues can only be found in concert with the park's gateway communities, user groups, and the tour industry. NPS is a key player in a Nationwide System of Parks, Historic Places, and Open Spaces Initiative, which relies heavily on partnerships across political, jurisdictional, stakeholder, and land ownership boundaries.

Looking across the National Park Service, there are several examples of exemplary partnerships on many levels for a wide range of program activities and functions. CINP in particular has been especially successful in building and maintaining a strong, highly productive partnership culture. Partnerships are encouraged throughout the government as a way of leveraging resources and accomplishing more than any one group could do on its own.^{xxiii} Partnership management has become a core competency to carry out the NPS mission and deliver public service at a higher level.

National Park legislation restricts the jurisdiction of the Park Service to the lands contained inside the park boundaries. Therefore, appropriated funds must only be spent within the park. The implication is that protection essentially ends at the park boundary. Inside the park everything is planned; beyond the park anything goes, including the development of such flashy gateway towns.^{xxiv} When parks were generally far removed from densely populated areas, there was little concern for outside threats. Increasingly, the national parks are threatened by events that occur outside the NPS designated areas. These so-called “gateway communities” can significantly impact an ecosystem and therefore compromise the integrity of the park. Parks now face the added pressures of coping with air pollution, development threats, and clear cutting up to the border. The

need for effective partnership is becoming ever important to address the issues of encroachment. By working cooperatively through both formal and informal lines of communication and consultation, the Service will better achieve park management objectives and the protection of parks' natural resources.^{xxv}

The U.S. Navy

Thus far, the discussion has revolved around the leadership structure of the NPS and its jurisdiction over the five Northern Channel Islands. However, as previously mentioned, the United States Navy is a key actor in the management of the Channel Islands. The Navy owns and operates San Clemente Island (SCI) and San Nicolas Island (SNI), two of the islands that make up Southern Channel Islands. Furthermore, ever since the beginning of World War II, the Navy has assumed ownership over San Miguel, primarily using it as a bombing range, but has agreed to relinquish control over to the NPS. Unlike other organizations that focus solely on conservation efforts, the Navy, which operates under the Department of Defense, must balance national defense duties with responsibly preserving the island's natural resources. While fulfilling its mission to train Navy and Marine Corps personnel to be fully prepared and ready for various national defense and humanitarian situations, the protection of natural resources remains an important goal for the Navy.^{xxvi} However, the Navy's definition of 'sustainability' differs substantially from the NPS. This disconnect arises from the fact that these two agencies have vastly different objectives. Above all else, the Navy seeks to maintain a fleet ready for war at any time. The Channel Islands provide the Navy with a secluded environment in which to train and prepare soldiers for war under a variety of different conditions.

However, the Navy must comply with all federal environmental regulations and consult with the U.S. Fish and Wildlife Service. Failing to adhere to environmental laws will jeopardize their mission. Once a plant or animal is federally listed on SCI, it becomes protected by law under the Endangered Species Act (ESA). This applies to the Navy as well as all other military services. Defending the United States requires rigorous real life training and SCI and SNI provide the ideal training facilities. Therefore, violating the ESA is not only considered criminal, it also encumbers the military mission.^{xxvii} In order to maintain a vital training resource on SCI and SNI, the Navy must not jeopardize the continued existence of listed species as stated in the ESA. In conjunction with this training, the Navy is an active participant in protecting and minimizing the effects of their activities on the environment through several conservation programs.

The United States Navy relies heavily on SCI because it provides the necessary space and facilities to conduct realistic readiness training, weapons testing, research development, and evaluation activities in a maritime environment. SCI simulates the harsh and challenging environments the Naval Special Forces may encounter in actual combat. Thus, the Naval Special Forces is committed to being good stewards of the environment. The Navy fully realizes the ramifications of interfering with the natural wildlife on SCI, which supports a relatively small population of very unique species that have evolved over time in an environment with little competition and few predators.^{xxviii} However, this makes them particularly susceptible to invasive species. The isolated nature and relatively small size of SCI is a double-edged sword. A single disease or introduced species has the potential to wipe out an entire native plant or animal population. One such instance almost occurred in the 1950s when the introduction of

goats, pigs, and deer caused severe habitat degradation. Although these invasive animals are no longer present on SCI, their impacts are still widespread. As a response, the Navy has spent a great deal of time and effort in restoring denuded vegetation on the island back to its original form.

Similar to the neighboring Channel Islands, SCI is home to an exceptional variety of marine life. However, with the exception of Santa Catalina Island, SCI faces an added challenge due to the high amount of human activity. All marine mammals are protected by the Marine Mammals Protection Act. The Channel Islands are well known for their rich diversity of native plant life and SCI is no exception. The Navy has instituted several programs designed to conserve native vegetation and enhance sensitive habitats. The invasion of non-native plant species can disrupt an ecosystem by adding more competition to an already fixed amount of resources. All military and non-military members must comply with certain rules meant to reduce the risk of spreading non-native species such as removing any visible plant material, dirt, or mud on equipment or shoes before setting foot on SCI.

Of all the species the Navy is committed to protecting, the San Clemente Loggerhead Shrike, one of the rarest birds in North America, is at the top of the list. In addition to long-term population monitoring, the Navy has also implemented a captive breeding and rearing program, reintroduction/release program, predator management program, and the ongoing habitat enhancement program.^{xxix} The Navy has gone to great lengths to ensure that the Loggerhead Shrike receives adequate protection. However, in its effort to protect this highly endangered bird species, the Navy has resorted to “euthanizing” island foxes that were interrupting the shrike-breeding season as part of the

predator management program. This contributed to a 40-60% decline in the population size of the San Clemente Island Fox.^{xxx} The lethal control program implemented to protect shrikes from island foxes elicited strong opinions about the perils of managing one rare species at the expense of another.^{xxx} In particular, the importance of the genetic distinctiveness of the Loggerhead Shrike and hence its conservation value was questioned in relation to the genetic conservation importance of island foxes.^{xxxii} This ethically challenging issue was eventually resolved when the NPS suggested an alternative method that would protect the shrike without harming the foxes. The Navy's willingness to cooperate with the NPS to find a more suitable solution, one that did not involve killing island foxes, reveals a great deal about the relationship between these two agencies. Mitigation efforts have shifted from euthanasia to live-capturing and removing foxes from sensitive nesting sites. During the late 1990s, the U.S. Navy experimented with other means of predator control, namely using a commercially available shock collar system to exclude foxes from a limited area surrounding shrike nest sites.^{xxxiii}

Even though the ESA provides critical protection to threatened or endangered wildlife, it provides minimal guidance on identifying taxa worthy of conservation, lacks guidelines for resolving endangered species conflicts and subsequent recovery programs often focus on the species rather than the ecosystem.^{xxxiv} Careful review of the Navy's actions and their impacts on native species helps ensure their compliance with the endangered species act. For example, the Navy is permitted to test ordnance so long as the water detonations are timed, thus drastically reducing the chance of injuring or killing any unsuspecting sea birds. Furthermore, any military aircraft must follow a

predetermined flight plan. Defined safety zones indicate areas with a large animal presence.^{xxxv}

Chapter 3: Endangered Species Management – Island Fox Recovery

Wilderness is not a luxury but a necessity of the human spirit.

-Edward Abbey

More than ever, national park managers across the country are confronted with increasingly complex and challenging issues that require an understanding of the status and trends of each park's natural resources. A manager's ability to make informed decisions, work with other agencies, and communicate with the public to gain support is dependent upon detailed scientific knowledge of the park's natural systems and native species.^{xxxvi} Perhaps one of the most challenging issues facing the Channel Island National Park Service in recent years is the island fox recovery program. The diminutive island fox, a relative of the mainland grey fox, occurs on six of the eight Channel Islands with each island supporting a genetically unique subspecies. Among the six subspecies, four are currently on the endangered species list. Neither the San Clemente nor the San Nicolas island fox is federally listed and the Navy is taking every precaution in order to keep it that way. The Navy is concerned that if one of their fox species were to get listed, it would be a major hindrance to their already limited training regiment. Ironically, humans are the greatest threat to the island foxes on SCI with road kill as the number one cause of mortality. As a preventative measure, the Navy has funded the Institute for Wildlife Studies (IWS) to monitor island foxes on San Nicolas Island since 2000. IWS conducts trapping to monitor the impacts the Naval operations have on island foxes as well as provided cares for injured foxes. Overall the fox population on San Nicolas Island remains healthy and there is no evidence to suggest this subspecies is in danger of being listed.

Similarly, Santa Catalina Island has achieved stable populations of considerable density and size. Estimates place the total number of foxes between 700-1000, with annual survival equaling 90%.

The Island Fox Recovery program on Santa Catalina, Santa Cruz, Santa Rosa, and San Miguel has been nothing short of miraculous. One could argue that the rapid recovery of the island foxes may be the most successful recoveries of an endangered species to date. Without the swift and decisive action of the NPS, Catalina Island Conservancy, and several other organizations, the fate of the island foxes would certainly be different. The overall effectiveness of the island fox recovery program can be attributed to a large extent to the cooperation among management agencies, scientists, and the public in developing and implementing recovery strategies.^{xxxvii}

To achieve conservation results that are ecologically viable, it is necessary to conserve networks of key sites, migration corridors, and the ecological processes that maintain healthy ecosystems.^{xxxviii} With threatened and degraded habitats in every state, conservation organizations such as the NPS face a daunting task. Their strategy is to focus on key areas rich in biodiversity. How best to save a threatened animal species has been a fiercely contested subject. In an ideal world, all animals would be conserved in their natural habitat. However, with habitat destruction occurring at such a high rate, captive breeding programs are sometimes the only viable option to save a species from extinction. It is becoming more commonplace today for conservation movements to include captive breeding programs in addition to conserving and managing the habitat in which that species thrives. Generally speaking, in order to keep a species genetically diverse and healthy, the population must have at least 250 to 500 individuals. When the

San Miguel island fox captive breeding program began in 1999, there were only 15 surviving individuals. Among those, only eight were physically able to reproduce. Because all the current foxes on San Miguel are direct descendents from those four pairs, there is a significant genetic bottleneck. Low genetic diversity places these foxes at extreme risk to disease.

At the turn of the century, fewer than 100 total foxes remained on Santa Cruz, Santa Rosa, and San Miguel islands. Despite such precipitous declines, the Fish & Wildlife Service did not officially list the island fox until March 2004.^{xxxix} Fortunately, the NPS, The Nature Conservancy (TNC) and the Catalina Island Conservancy were already well underway in implementing their recovery programs by this time. These programs would later prove instrumental in a viability analysis that formed the biological basis for the fox recovery plan.^{xi} The extraordinarily low density of island foxes galvanized several governmental and non-governmental agencies into action. Drastic measures were taken by a multitude of different organizations to save the remaining foxes from the brink of extinction. The ownership and management of Santa Cruz Island is split between the NPS and TNC, which controls about 75% of island. The NPS and TNC worked closely with one another to devise a feasible recovery strategy that included: 1) captive breeding and eventual release of island foxes to the wild, 2) monitoring of the wild fox population remaining on Santa Cruz Island, 3) live-capture and removal of golden eagles, 4) reintroduction of bald eagles as a possible deterrent to nesting golden eagles, 5) eradication of feral pigs, and 6) control of invasive plants such as fennel.^{xli} Establishing continuity between the recovery programs across all four islands was crucial because it kept members from different teams on the same page. These two

organizations in particular exhibited shared leadership. In just over a decade, the fox population has rebounded from the verge of extinction to levels approaching biological recovery. Estimates indicate that the fox population on the three northern islands has climbed steadily to over 1,700 individuals.

All too often species endangerment is a consequence of anthropogenic, or human influences. It seems logical to assume that a successful recovery of an endangered species is contingent upon removing the anthropogenically-induced agents. However, endangered species recovery is a complex process, encompassing several dimensions such as societal values, institutional policy, political agendas, and the organization structure of recovery teams and stakeholders. Endangered species recovery often requires strategies that are risky, contentious, and difficult to implement. Two separate but concurrent programs involving island foxes highlight the many dimensions of species recovery efforts. The Catalina Island Conservancy, a non-profit organization, successfully averted the extinction of the Catalina fox due to canine distemper virus. The National Park Service, along with several partners, continues the on-going effort to recover the three critically endangered subspecies of island foxes on Santa Cruz, Santa Rosa, and San Miguel. In-place monitoring programs, biology of the decline agents, geography, adaptive management, organizational structure, and public perception all played influential roles in the island fox recovery efforts.^{xlii}

Fox Recovery on Santa Catalina Island

Santa Catalina Island is the only one of the eight islands with a permanent civilian settlement. Residents are allowed to own and transport pets, including domestic dogs, to

and from the island. It is hypothesized that in 1999, a dog infected with canine distemper virus (CDV) was brought to Santa Catalina, which in turn infected the endemic fox population. When residents noticed a decline in fox sightings, an intensive island-wide trapping ensued resulting in a significant reduction on the eastern portion of the island. There was conclusive evidence that an outbreak of CDV had swept through the island causing the entire island fox population to decline by 90%.^{xliii} The Catalina Island Conservancy responded by developing a fox recovery program characterized as adaptive management and backed by scientific research. Central to the program's success was the involvement of the Institute for Wildlife Studies (IWS). The IWS and the Catalina Island Conservancy used a multifaceted approach in their recovery strategy. The Catalina Island Fox Recovery program serves as an important case study in conservation in which a critically endangered species was recovered within a relatively short period of five years.

Fox Recovery Program of the Northern Channel Islands

Initially, the sharp declines of the northern island fox population were thought to be either a natural occurring fluctuation or triggered by the same disease that afflicted the Catalina foxes. Unlike the situation on Santa Catalina, the decline in foxes was not restricted to a portion of one island, it occurred across three islands. Once it was discovered that golden eagles were the main culprit of fox predation on Santa Cruz, Santa Rosa, and San Miguel, an intensive effort to remove the birds ensued. Originally attracted by the large presence of an exotic feral pig species on Santa Cruz, the golden eagles eventually colonized the northern Channel Islands. Pigs indirectly caused the decline in foxes through a process known as hyperpredation. Hyperpredation is a form of apparent

competition whereby an introduced prey, well adapted to high predation pressure, indirectly facilitated the extinction of an indigenous prey by enabling a shared predator to increase in population size.^{xliv} Put differently, the golden eagle turned to an easier target, the island fox to supplement their diet. Due to their high fecundity, the pigs could cope with the increased levels of predation by producing more piglets, however, with an average litter size of only one to two pups, the island fox population rapidly diminished. Predation by a novel apex predator, the golden eagles, had an asymmetrical effect on the unwary fox.

To make matters worse, years of sheep grazing denuded much of the native chaparral cover, leaving the foxes exposed to an aerial attack, thus perpetuating the problem even further.^{xlv} Although golden eagle sightings on the islands were not uncommon during their migratory period, these transitory birds typically did not linger for an extended period of time. Historically, the more dominant and highly territorial eagle species, the bald eagle, prevented the smaller golden eagles from establishing a long-term presence on the islands. Because the native bald eagles feed predominantly on marine life and not land animals, they essentially shielded the island foxes from golden eagle predation. However, once the bald eagle population started to plummet as a result of years of DDT contamination, golden eagles were free to occupy the islands relatively undisturbed. In addition to the lack of competition from bald eagles, golden eagles were lured to Santa Cruz by the readily available source of non-native feral pigs. The presence of approximately 5,000 pigs encouraged the golden eagle to set up a permanent residence on the island. It was only a matter of time until the golden eagles stumbled upon the utterly defenseless and unsuspecting fox. For thousands of years, the island fox occupied

the highest position on the food chain therefore there was no pressing need to adapt to an aerial predator. Within a period of 10 years, golden eagles were responsible for decimating 95% of the island fox population on Santa Cruz.^{xlvi} This dynamic also had community-level implications. The island fox regulates its ecosystem from the top down. Once considered the top predator in the terrestrial food chain, the foxes were responsible for controlling the deer mice population. As the fox population started to dwindle, deer mice densities exploded on San Miguel Island (SMI). Moreover, the decline in foxes also resulted in an increase in island spotted skunks on Santa Cruz Island.

The NPS decided that it was a necessary precaution to take the remaining foxes into “protective custody” and initiate a captive breeding program. It was inevitable that if the foxes were not protected from golden eagle attacks, they would soon become extinct. The NPS sought input and support for such drastic action by convening a group of island fox and rare species conservation experts.^{xlvii} The NPS and TNC understood that whatever success the captive breeding programs produced, it would ultimately be undermined by the presence of golden eagles once the foxes were released back into the wild. The second phase of the massive undertaking to save the foxes required the cooperation and innovation of several other stakeholders including the Fish & Wildlife Service, the Department of Fish and Game, and private contractors. When national parks need help with special projects that require an expertise outside their range, they will seek out private contractors and consultants for assistance. For example, in 2005, a New Zealand company was hired to eradicate the feral sheep and pigs on Santa Cruz for two purposes: to remove the main source of food for the golden eagles and to help restore vegetation. However, eliminating the food source was only a partial solution to a much

more complicated matter. The next phase of the fox recovery program, the removal of a federally protected bird of prey, had significant legal challenges. The Migratory Bird Treaty Act makes it illegal for people to “take” migratory birds. Additionally, the Bald Eagle and Golden Eagle Protection Act stood as yet another hurdle for the NPS. The NPS had no choice but to file for an appeal. Due to the special circumstances and eventual loss of biodiversity, the Secretary of the Interior granted the relocation of the golden eagles inhabiting the Channel Islands. This exemplifies how solving conservation problems is often more complex than redressing its primary cause. Often times, managers are faced with a difficult dilemma involving several species. One cannot deny the obvious paradox: the protection of the island fox, an endangered species, depends upon the complete removal of a small population of golden eagles, also a protected species. The removal of golden eagles from the Channel Islands, though a necessary step in the island fox recovery program, was emotionally charged, politically unsavory, and legally challenging.

Eventually, the remaining golden eagles were live-captured and relocated to Northern California, an extremely costly but necessary endeavor. Finally, bald eagle chicks were reintroduced and carefully raised on the island under the close supervision of the IWS as part of a feasibility study funded by the settlement money from a DDT contaminant case. Given its magnitude, it is not surprising that such an intensive and ambitious project came with a high price tag. Collectively, the fox recovery program on the three Channel Islands amounted to over \$18 million.^{xlviii} As a result, all three subspecies have rebounded and are well on their way to reaching full biological recovery. Current survivorship on SMI is at an all time high of 94%. Santa Cruz Island boasts a fox

population of over 1,000 individuals, with an annual survival rate of about 96%. Although predation has stalled recovery on Santa Rosa Island, in 2009, annual survivorship increased to over 80%. Three-year averages of adult mortality and adult population size give the Santa Catalina, Santa Cruz and San Miguel subspecies a probability of extinction to be less than 5% in the next 50 years. This common barometer may indicate that the likelihood of extinction is now negligible but despite such tremendous progress, the NPS must remain vigilant in their management of island foxes. Continued long-term population monitoring will be required.

An annual Island Fox Conference, held every July, stands as a testament to the continued cooperation of the many stakeholders who have a vested interest in the fox recovery program. Sponsored by The Nature Conservancy, the conference brings together approximately 60 empirical biologists, managers from various agencies, quantitative ecologists, and veterinarians to conduct long-term population viability analysis of the island fox species. The group presents a report on the current status of the island fox populations on each of the six Channel Islands that supports a subspecies as well as identifies measure for continued island fox monitoring, research, and protection.

The two recovery programs discussed, though similar in some aspects, differed in many key ways. Both programs were able to quickly identify the source of the island fox decline. Nevertheless, the biological agents responsible for the declines as well as the duration of impact, and the required interventions necessary to encourage recovery were quite different.^{xlix} For example, the proposed solution of administering CDV vaccinations was widely accepted in both the scientific and public communities. However, the proposed solution of removing golden eagles from the northern Channel Islands was met

with significant public opposition. From a strictly biological perspective, the lethal removal of golden eagles seemed like a perfectly plausible course of action because it would certainly reduce the number of fox deaths as well as cut down long-term economic costs. Yet the implementation would surely elicit a negative public response both for the program and the organization involved. Another fundamental difference between these two programs is the organization of the Catalina Island Conservancy compared to the NPS. Given the multi-layered, hierarchical decision-making processes of large governmental organizations, the NPS simply cannot act with the same degree of swiftness as the Catalina Island Conservancy. Further, annual federal budgets have funds “ear-marked” for specific purposes but rarely are flexible enough to be used in an emergency. For example, in order to investigate whether golden eagles were also the agent of decline on SMI, the Resource Management division requested \$40,000 from the National Park Service Western Region in 1996 to implement a survival study using radio telemetry.¹ The request was initially denied but the NPS ultimately obtained the funding a year later after conveying the severity of the situation. In contrast, many non-governmental organizations are more streamlined in their decision-making and more horizontal in nature, meaning they have more flexibility when it comes to allocating resources. Private organizations that are not bound to annual fiscal constraints are more likely to take immediate action whereas regional or national directors responsible for making the major fiscal decisions in governmental organizations tend to be far removed from the issue at hand. Species decline is a convoluted ordeal no matter what organization is trying to remedy the problem.

The Threat of Premature Delisting

One highly contentious issue facing the organizations involved with the fox recovery program today is whether or not the island fox should be completely removed from the endangered species list, downlisted, or continue to be listed. There is a tremendous amount of pressure from the Fish and Wildlife Service (FWS) to de-list the island fox, thus illustrating the effectiveness of their program. Rarely do endangered species recover with the same degree of success as the island fox. More often than not, the road to recovery is a long, arduous process. Showing success is vital in order to gain public support and FWS is quick to highlight the fox recovery as proof that the endangered species programs are working. It comes as no surprise that delisting is the ultimate goal of the ESA. Preemptive delisting may portray FWS in a positive light but may negatively impact the species in question. Before delisting can occur FWS must determine that the species in question is no longer threatened based on population size, recruitment, stability of habitat quality and quantity, and control or elimination of the threats.^{li} If only some of these criteria are met, FWS may elect to downlist the species from endangered to threatened. Despite the initial success of the island fox recovery program, ongoing management will be essential to ensure a full recovery. Premature delisting could cause a variety of adverse effects, namely a reduction in funding would make it increasingly difficult to properly monitor the foxes. Without adequate funding and monitoring, it is conceivable that another collapse could come about. Currently, the fox recovery program is entitled to base funding and receives a consistent influx of money each year. Slashing this pool of money will negatively affect the NPS role to properly assess the health of the three endangered subspecies.

The Channel Islands National Park Service demonstrated effective leadership by reaching out and gaining the support of several different stakeholders with a common interest such as the U.S. Navy and the Nature Conservancy to save an endangered species of island foxes. By collaborating with other organizations, the NPS was able to acquire the expertise needed to implement a successful captive breeding program and ultimately save a rare species from extinction. Moreover, by fostering close partnerships to better achieve their mission, the NPS deserves to have stewardship over our nation's most treasured places. To grow and strengthen effective partnerships in the future, the National Park Service must continue to develop insightful ways to attract other governmental agencies and nonprofits.

Hunting on Santa Rosa Island

One of the most controversial issues currently taking place on the Channel Islands is the non-native ungulate population and the number of adverse effects associated with their presence. Santa Rosa Island continues to harbor herds of introduced mule deer and elk. Ungulate browsing has taken a heavy toll on the native chaparral and bishop pine forests. Subsequently, SRI is now largely composed of non-native annual grasses. Grazing has also caused a reduction in top layer soil, thus leading to widespread erosion. Game trails created from these large herbivores have fragmented plant communities, making dispersal more challenging.

Despite being included as part of the Channel Islands National Park in 1980, Santa Rosa Island did not officially become NPS property until 1986. The former owners of SRI agreed to sale the island to the federal government but with two stipulations: 1)

that they would retain their rights to continue their commercial sport hunting operation for another 25 years, and 2) they would be allowed to keep their ranch house as well as the surrounding 8 acres of land for family use.^{lii} Unlike national preserves, hunting is strictly prohibited in all national parks because it does not fall under acceptable recreation activities. However, the former owners were specifically permitted by statute to continue the hunt on SRI. The NPS grants the family successive 5-year Special Use Permits. The former owners still run a lucrative private hunting business for four months of the year in which they fly their clients out to the island and provide them with access to trucks so they can increase their chances of returning home with a big game trophy. Some hunters are willing to pay as much as \$17,000 to shoot elk and deer stocked on the islands.^{liii} Though hunters do not have free roam over the entire island, they are not confined to the main roads that the park service adheres to. The implications associated with prolonged ungulate populations on SRI are far reaching. During the hunting season, public access to SRI is limited and confined to approximately 10% of the island. Limited public visitation, though a necessary safety precaution while the hunt is on, undermines the park's ability to fulfill its mission to provide for the enjoyment of the people.

Historically, the NPS has struggled to find appropriate strategies to manage ungulate populations. Efforts to cull herds of deer and elk for the sake of balancing populations have come under scrutiny and remain a controversial issue in a number of parks. Besides a decrease in public access, three decades of hunting has cause irrefutable damage to the native flora and fauna on SRI. There is evidence of deer browsing on an endangered species of Manzanita, a direct violation of the ESA. It is also believed that the presence of deer and elk on SRI attracts mainland golden eagles that in turn prey on

the endangered native fox population. Lastly, the deer and elk have negatively affected the numerous archeological sites on SRI by trampling and destroying artifacts. The 25-year agreement will officially end in 2011 and the NPS has made it a priority to extirpate the remaining deer and elk on SRI.

By utilizing GIS software, the park service was able to digitize the hunting roads on SRI, thus quantifying the amount of damage created from the hunting operation. A high-resolution aerial photograph was taken of SRI. With a bird's eye view of the island, hunting tracks were easily identified by their characteristic meandering nature from the main roads. Appendix A illustrates the extensive coverage of the hunting roads, especially in the northern region of the island. Prior to this map, the natural resource management division had no concept of the widespread use of the hunting roads. The pragmatic approach of the CINP should include removing the ungulate population from SRI and limiting the amount of vehicle use as a way to cease degradation and facilitate ecological restoration.

Chapter 4: Economic Structure of the Channel Islands

We have to remain constantly vigilant to prevent raids by those who would selfishly exploit our common heritage for their private gain. Such raids on our natural resources are not examples of enterprise and innovation. They are attempts to take from all the people for the benefit of a few.

-President Harry S. Truman

Budget Planning

National Parks frequently face difficult budget decisions. It is a known fact that every park is constrained in terms of the number and scope of projects due to limitations placed on the budget. This implies a need for budget scrutiny. It is therefore necessary for park managers to understand the economics behind making efficient budget allocations. Weighing the benefits and costs poses a unique challenge to managers because they are dealing with park resources, such as scenic beauty and species and habitat preservation, which are neither priced in markets nor easily quantifiable. Observable prices and demand curves for these non-rivalrous and non-excludable public goods are difficult to determine. Nevertheless, people do receive economic benefits from the utility provided by pristine environments contained within the parks. Although the costs associated with park management are in dollar terms and therefore easy to calculate, the benefits pose a much greater challenge. Nonmarket valuation is an economic tool that offers a solution to this problem by estimating the value of resources not exchanged in markets. In this way, economic valuation has the potential to bring a more balanced perspective to the allocation and management of natural resources.^{liv}

Before arriving at a decision, park managers must first weigh the benefits and costs a proposed project will have on the overall budget.

Essentially, economic valuation allows those benefits to be treated equally, dollar per dollar, with market goods and costs, so as to ensure that society receives the maximum benefit from all its scarce resources whether marketed or not.^{lv} Without a common monetary metric to compare costs and benefits, park managers will not have adequate information when making natural resource allocation decisions. The NPS utilizes nonmarket values in its evaluation about whether to remove dams on the Elwha River that are blocking salmon migration in Olympic National Park and in natural resource damage assessment.^{lvi} The Channel Islands National Park could use nonmarket valuation to estimate a visitor's willingness to pay for access to the park for use in establishing access fees.

Another shortcoming of cost-benefit analysis is that it does not factor in externalities. A Positive externality gives an external benefit to a third-party. An example of a positive externality is the aesthetic and scenic amenities experienced by persons living near a national park or scenic river.^{lvii} Failing to account for externalities can have serious social consequences. For instance, net benefit of economic development in gateway communities for a protected area is overstated when development imposes negative externalities on the protected area, and understated when it generates positive externalities for the protected areas.^{lviii} It is therefore imperative for the government to enact policies to reverse this process and correct market failure by discouraging negative externalities and encouraging positive externalities. Ignoring the positive externalities could result in insufficient funding support for national parks. The benefits of national

parks have an immediate “spill over” effect to the current members of society but the benefits also accrue largely in future years for future generations. Positive externalities, by definition occur when the marginal social benefit exceeds the marginal private benefit. Market failure creates an important opportunity for the government to improve market performance in ways that would increase social surplus.

CINP Business Plan

Each park in the system adopts a business plan to more clearly communicate their financial status with principle stakeholders. The business planning process is designed to accomplish three main tasks: 1) it provides the park with a synopsis of its funding history, 2) it presents a clear, detailed picture of the state of current park operations and funding, 3) it outlines park priorities and funding strategies.^{lix} Park activities are divided into five functional areas, which are further separated into forty programs. Every park follows this forty-program structure in order to provide a measure of comparability. Completing the business plan process not only enables a park to produce a powerful communication tool, but also provides park managers with financial and operational baseline knowledge for future decision-making.^{lix}

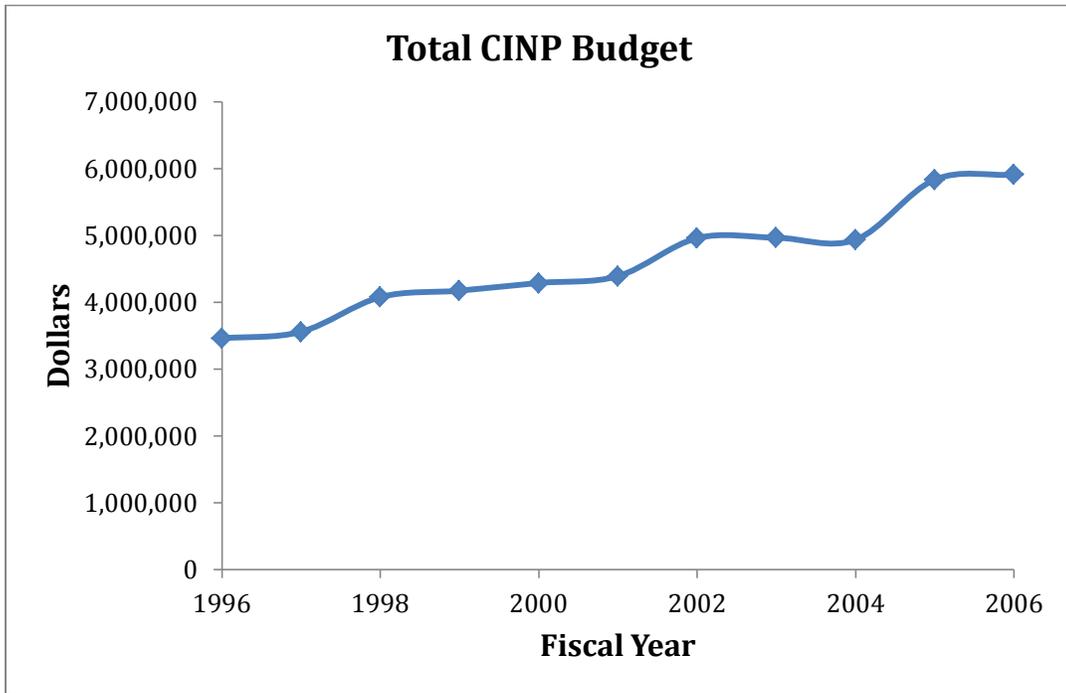


Figure 3 illustrates the steady increase in the CINP budget since 1996

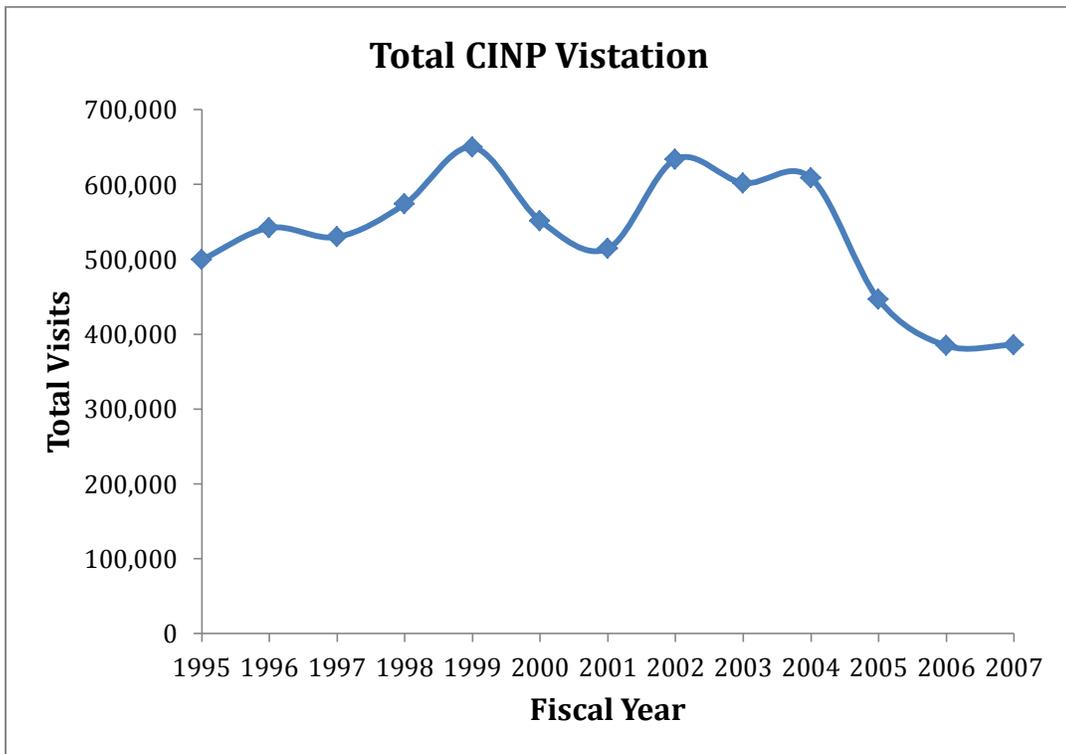


Figure 4 depicts a volatile trend in CINP visitation

Annual visitation to the park's mainland visitor center in Ventura fluctuates yearly but is consistently above 300,000. However, visitation to the islands and waters is low in comparison, with about 30,000 and 60,000 annual visitors respectively. Despite a recent reduction in the amount of overall visitation, the CINP budget has continued to increase in nearly a linear fashion. Although most visitation occurs during the summer months, visitors frequently flock to the Channel Islands during the winter and spring to catch a glimpse of the blue whale migration.

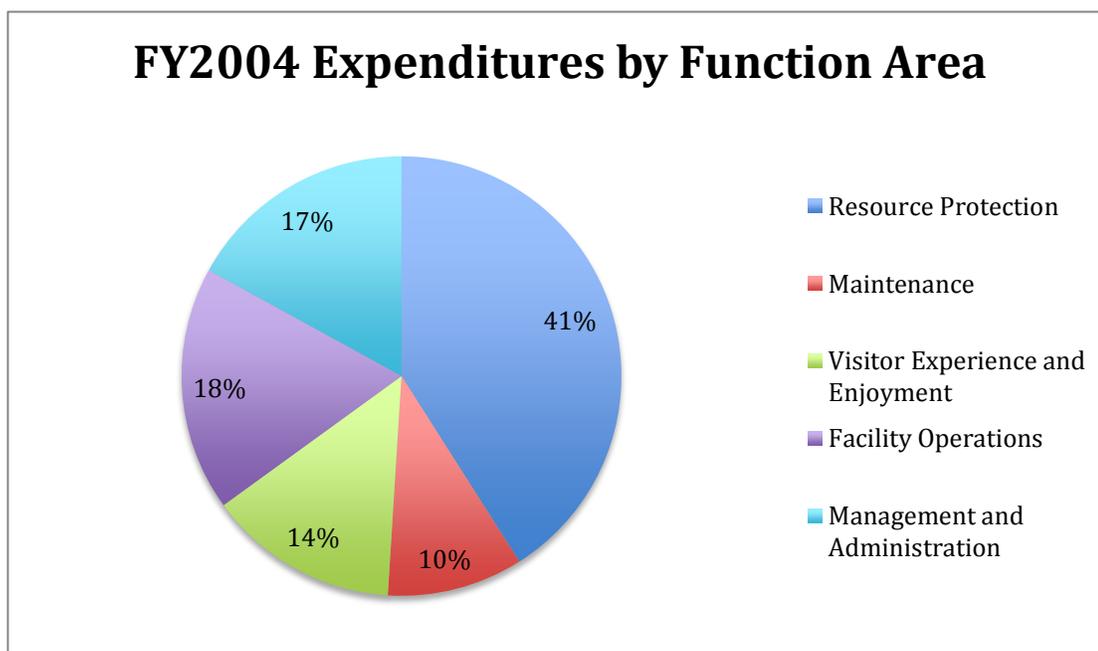


Figure 5. Source: Channel Islands National Park Business Plan Fiscal Year 2004

The latest CINP business plan was released in fiscal year (FY) 2004 and was intended to provide potential strategies for decreasing park costs and increasing partnerships and revenue over the next five years. The 2004 business plan summarizes Channel Islands National Park's funding history, the state of current park operations and

funding, and an outline of priorities and funding strategies. Resource protection consistently receives the largest portion of park funding (41%). With approximately \$2.5 million allocated to programs such as ecological monitoring, management, and restoration in FY2004, CINP devoted over 40% of its total available funding to the protection of natural and cultural resources.^{lxi} In addition, resource protection received more than one-third of the park's staffing resources. About 80 percent of the park's appropriated base funding pays for fixed costs such as salaries and benefits for permanent staff, utilities, required travel, mandated trainings, and contract services. The remaining portion of the base budget covers park operations, including transportation and logistics.^{lxii} Based on the amount of money allocated, it is evident that CINP places a strong emphasis on understanding, protecting, and restoring its resources. Finding the appropriate financial resources to fund increasing operational and maintenance costs will continue to challenge CINP.

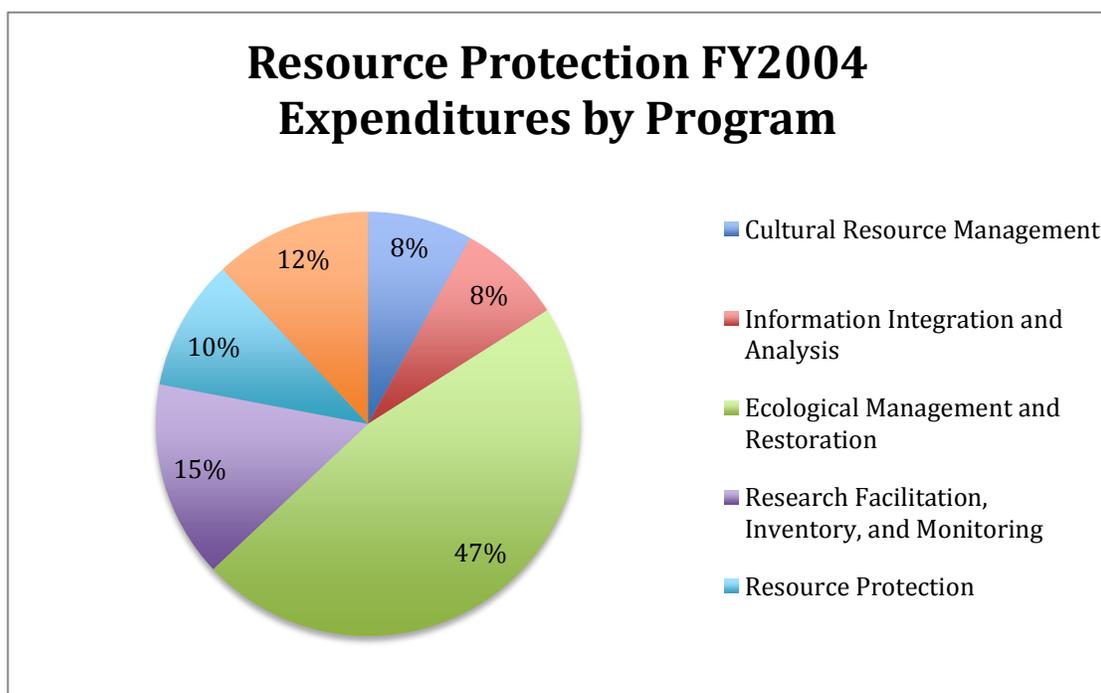


Figure 6. Source: Channel Islands National Park Business Plan Fiscal Year 2004

CINP funding is derived from four main sources. Authorized by Congress, appropriated base funding provides annual operating expenses for permanent staff and recurring costs related to the exclusive responsibilities of the park. Appropriated non-base funds are allocated annually on a competitive basis to support one-time projects or investments through specific Federal program funding sources. Reimbursable funds result from cost recovery for services provided to other entities. Lastly, revenue is generated through visitor and concessionaire fees, as well as donations.^{lxiii} When the three subspecies of island foxes were officially listed in 2004, there was an increase in the base funding for long-term population monitoring. Despite fluctuations in the CINP budget, the fox program receives steady financial support. Although the base funding for this particular program has remained relatively unaffected by changes in the budget, several

other programs are subject to funding alterations. A reduction in the overall budget would force CINP to respond by making cutbacks such as limiting the amount of bat monitoring on Santa Cruz Island, a non-base funded program. Non-base funding accounted for 37% of the park's total financial resources in FY2004, therefore these types of programs are more susceptible to yearly changes. Conversely, an increase in the budget may allow for more biological inventory and monitoring of kelp forests. It would not, however, be absorbed in the fox program. The island fox recovery program is thus inelastic to changes in the overall budget. Maintaining long-term flexibility is critical to the park's ability to successfully manage its resources. It is inevitable that budgets are subject to changes on a yearly basis and CINP must be prepared to address this challenge by diverting funding from one program area to another. However, certain base funding, such as the island fox recovery program or personnel salaries, remain largely inelastic.

Interpretation and Education

Since its inception, one of the chief functions the NPS has undertaken is to educate the public. As mentioned previously, the Organic Act outlines the dual task of the NPS to conserve park resources and "provide for the enjoyment of the same in such matter and by such means as will leave them unimpaired for future generations." Interpretive programs are methods utilized by the NPS to connect people to their parks on an emotional level. That connection is made by linking a park's tangible resources to the intangible values and meanings found in those resources.^{lxiv} Facilitating these connections through effective interpretive and educational programs encourages public support for the national parks but perhaps more importantly, it fosters a sense of

environmental responsibility. It is through interpretation that allows the public to truly understand the meaning and relevance of park resources. Enjoyment of the parks is the fundamental part of the visitor experience yet that experience becomes heightened when it progresses from mere enjoyment to a deeper understanding of the reasons for the park's existence and the cultural heritage it seeks to protect. There is a concerted effort to provide visitors with background information pertaining to the major features and notable events occurring within the park.

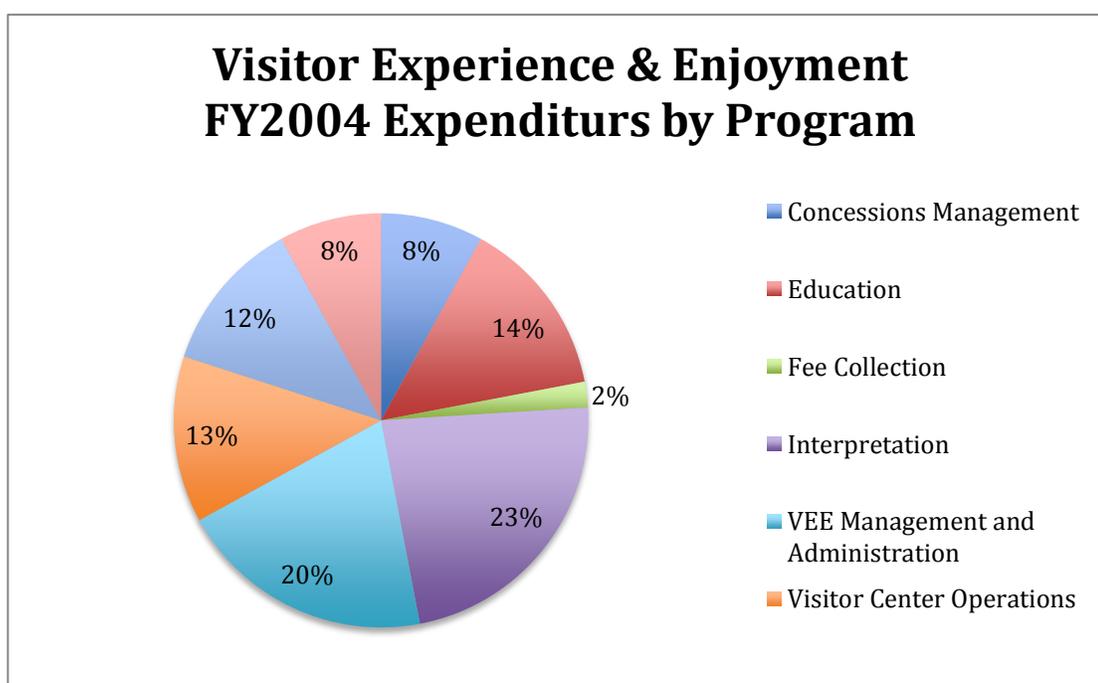


Figure 7. Source: Channel Islands National Park Business Plan Fiscal Year 2004

The Channel Islands National Park has implemented new and innovative ways to engage and cultivate support from a more diverse array of visitors. They have revamped their interpretation program to be more closely aligned with modern technology. For example, the Channel Islands offer the public a virtual visit to the islands through live interactive broadcasts and webcams. The Bald Eagle Webcam, in particular, has attracted a considerable audience. People from around the world can experience the remarkable

return of bald eagles on Santa Cruz Island without actually going to the island. From the moment the first bald eagle chick hatched unaided by humans on the Channel Islands in 2006, the park service decided to place a solar powered camera near the nest site to provide those interested with a live feed.

The Channel Islands National Park has adapted to incorporate new technology into its interpretation. Most visitors of the Channel Islands rarely witness the underwater environment even though it contributes to almost half of the park's 250,000 acres. Channel Islands Live, an interactive broadcast program, provides a glimpse of the vast kelp beds along with the plethora of species that inhabit the ocean habitat. From the landing cove at Anacapa Island, park rangers wearing special microphone-equipped dive masks descend into the kelp forest camera in hand.^{lxv} Those watching the live feed on the Internet can ask questions on the spot. Although the majority of interpretive programs are directed towards the natural resources of the Channel Islands, the park is also distinguished for its cultural resources. It contains some of the most well preserved archaeological sites on the west coast. More than 2,500 archeological sites have been identified within the park boundaries.

Conclusion

If future generations are to remember us with gratitude rather than contempt, we must leave them something more than the miracles of technology. We must leave them a glimpse of the world as it was in the beginning . . .

-President Lyndon B. Johnson

Preserving the natural conditions of Channel Islands National Park for the future depends on resisting the pressure placed on the park today. Almost every park has been subject at one point or another to pressure from powerful interest groups seeking to exploit resources and develop the land for short-term gain. Unfortunately, support for public goods such as national parks are usually overwhelmed by demands from private interests. CINP serves as a perfect example of the ongoing struggle between private interests and the public good. Faced with significant funding and staffing shortfalls, Channel Islands must rely increasingly on partners and volunteers to bridge the gap between what is needed and what the park can afford. Natural resources assistance comes from university researchers, other federal agencies, and private institutions. The National Oceanic and Atmospheric Administration conducts research in the Channel Islands National Marine Sanctuary on ecosystem health, focusing on living marine resources, the impact of human activities, and the effects of resource management activities. Universities assist Channel Islands National Park with the study and monitoring of cultural resources such as terrestrial archaeological sites.

Conceived by the United States, the national park concept is an inspiration to the rest of the world.

America's National Parks have set an impressive standard for environmental stewardship and subsequently, more than one hundred countries have drawn upon the NPS for policies, programs, and training. Because the United States serves as the primary example for how parks should be operated, it is essential that the NPS continue to abide by the highest possible standards. The carrying of the national parks idea into fruition in the U.S. has continued to be an inspiration to the rest of the world.^{lxvi} The sanctity of the parks, the careful blending of architecture, the ways of doing things to give animals and plants and scenery their foremost places: all this is appreciated abroad as well as at home.^{lxvii}

There can be no absolute set of standards and statement of policy that governs all 58 national parks throughout the country. By virtue of each park's individual beauty and history, effective management calls for flexible, park-specific policies. The National Park Service must recognize the enormous complexity of ecological communities and the diversity of management procedures required to preserve them. Diversity throughout the parks has rendered obsolete the notion that one sweeping policy is appropriate for all situations. However, by looking at the Channel Islands National Park as a case study, developing partnerships, adapting environmental strategies based on scientific research, and improving public awareness will help preserve the invaluable natural and cultural resources for generations to come.

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