

Statement of Purpose

Successful acquisition and management of parks and protected lands can be an important defense against the accelerating loss of biodiversity in California. This case study of Joseph D. Grant Park examines conflicts between biodiversity protection and historical and current land-use, including recreation and cattle grazing, and provides recommendations for management solutions.

Methodology

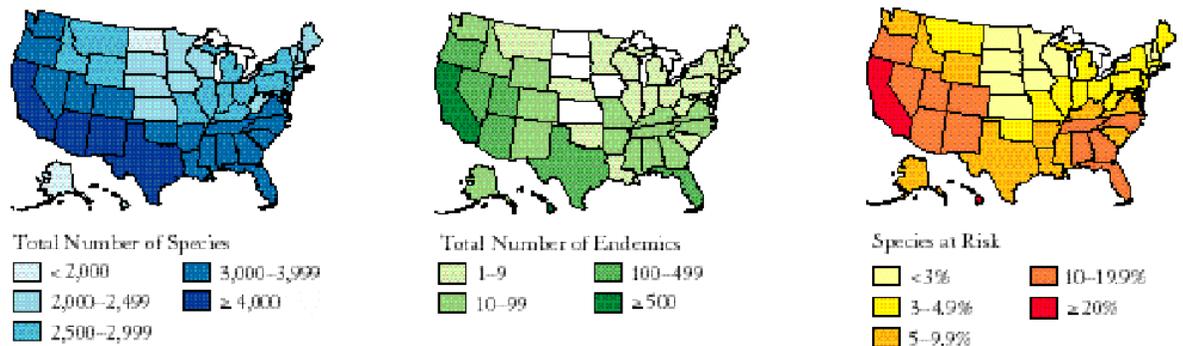
A literature review was conducted on the topics of urban-wildlands interface and parks and recreation use conflicts, with a particular focus on the effects of cattle grazing on biodiversity in the Western United States. This review included an analysis of The Santa Clara County Parks and Recreation Strategic Plan (2003) and the Joseph D. Grant Natural Resource Management Plan (1996). To provide geographic context, the population and housing patterns of Santa Clara County were researched via Census 1990 and 2000 data. Two in-person interviews were conducted, one with Theresa Nance, Park Ranger at Joseph D. Grant County Park, and the other with Don Rocha, Parks Natural Resource Program Supervisor, County of Santa Clara, Department of Parks and Recreation.

Background

Biodiversity can be defined as the natural variety and variability among living organisms, and the ecological complexes in which these organisms occur (Redford and Richter, 1999). With over 1,800 rare animal species and more than 5,000 native plant species, California is one of the nation's leaders in biodiversity (Nature Conservancy, 2000). This remarkable heterogeneity has developed, in part, because of the state's large size and its variety of different terrains and climates; California spans arid deserts to redwood forests, and everything in between.

During the more than 10,000 years that Native Americans were the only humans in the Western United States, the environment was altered somewhat, but not disturbed in any significant way. Since the 1500's, European and American settlement and urban growth have reduced grassland, old-growth forest, wetlands, and other important habitat to a fraction of their former extent (Alden, et al. 1998). Habitat destruction is accelerating, and today native animals and plants worldwide (not just in California) are suffering an unprecedented, human-induced die-off. Extinction rates at present are between 1,000 and 10,000 times the rate they were before humans began to exert such significant pressure on the environment (Wilson, 2002). In this arena, California is a leader yet again with the third highest number of extinct (and presumed extinct) species in the United States, trailing only Alabama and Hawaii (Nature Conservancy, 2000). Figure 1. shows the patterns in the state of species diversity, endemism (local specificity), and rarity.

Overall state patterns of diversity, endemism, and rarity



Source: *Precious Heritage* (2000) © TNC, NatureServe 5-1a,b,c

Figure 1. Source: The Nature Conservancy.

Although extinction rates provide important information, it is also crucial to look at the losses of population and habitat that lead up to extinction (Hobbs and Mooney, 1998). A primary threat to biodiversity both in the state and nationwide is habitat alteration. Of the imperiled species in this country, 85% are in that position as a result of development for residential, commercial, or agricultural purposes (Nature Conservancy, 2000). This is an especially potent threat in California, where skyrocketing real estate prices have continually spurred development onward - and outward into formerly rural areas. Other factors that threaten biodiversity (albeit to a lesser extent) are cattle grazing, outdoor recreation, invasive species and pollutants from cars and industry (Nature Conservancy, 2000).

Geographic Context

This precarious position of biologically diverse areas threatened by impending land conversion is replicated and intensified in the San Francisco Bay Area. Santa Clara and the greater Bay Area are part of the California Floristic Province, an internationally recognized hotspot of endangered biodiversity (Conservation International, 2006, Wilson, 2000). This region was designated a global hotspot in 1996, and has received international conservation attention in part because of its high number of endemic species; animals or plants that are found only here, and nowhere else (California Academy of Sciences, 2006). For example, of the nearly 3,500 species of vascular plants found in this area, 2,120 are endemic (Conservation International, 2006). If this area is notable for its geographically-specific biodiversity, it is equally so for its astronomical increases in the price of housing. In 1990, the median value of owner-occupied housing units in Santa Clara County was \$195,500 (Census Bureau, 1990). By 2000, it had shot up to \$446,400 (Census Bureau, 2000). These price increases are accompanied by increases in the pressure to develop areas further and further from the city center.

Because of their size and the context of their surroundings, parks and protected lands in the Western United States can serve as “habitat islands” for imperiled and endemic species adrift in a sea of ever-increasing urbanization. These habitat islands can be regional, state, or local parks (not usually city parks), open space districts, land belonging to government agencies that has been left in a semi-natural state, and

privately owned lands surrounding these preserves that is being used for low-impact activities (Leeuw, 2002).

Land preserved on a local scale significantly strengthens the protection available to rare and endangered species. Although land acquisition and management for biodiversity enhancement has traditionally been thought of as corresponding to federal and regional legislative bodies, cities and counties can play a vital role in protecting habitat for local species, especially for populations with small ranges (Press et. al. 1996).

Santa Clara County Parks and Joseph D. Grant

The Santa Clara County Parks system was established in 1956 with the vision of creating a 'necklace of parks' linked by trails and stream corridors. It has since grown to include 27 units and 44,000 acres (Strategic Plan, 2003). Press et al. (1996) estimate that Santa Clara County has approximately 20% of its land under some form of open space designation or protection; "more area than is needed to preserve many rare, endemic plants and animals" (p. 6).

Ecosystems found in Santa Clara County Parks include riparian corridors, tidal marshes, watershed areas, oak woodlands, grasslands, rare serpentine rock habitat, and redwood forests. More than 800 species of flora, 49 of mammals, and 177 of birds can be found in these parks (Natural Resources Database, 2006).

At 9,553 acres, Joseph D. Grant is the largest of the county parks. It had been a ranch for several hundred years before being donated to the Save the Redwoods League and the Menninger Foundation, who sold it to the Santa Clara County Parks

system in 1972. (County of Santa Clara, 2004). Grant is located 10 miles up narrow, winding Mt. Hamilton road, and is only accessible by car and bicycle. It's surrounded by sprawling, exurban development, some ranchland and two properties preserved as open-space. The primary habitats found at Joseph D. Grant are grassland and oak woodland. The park is at the convergence of three different watersheds. Five animal species found in the park are listed or proposed for federal listing as endangered. These include California Red-Legged frog and Swainson's Hawk. Forty-four other species are candidates for listing, or are species of special concern, including California Tiger Salamander, and Burrowing Owl (Resource Management Plan, 1996). "Grant County Park has a comparatively high level of plant and wildlife diversity compared to the region" (Resource Management Plan, 1996, p. 48).

Theoretical Framework

When examining use conflicts, the question arises: who is this park for? Is it for people, whose recreation needs include hiking, biking, fishing and horseback riding? People also benefit from the ecosystem services the park provides, such as the maintenance of water quality, erosion control, and climate regulation. The open space and green hillsides of the park positively enhance life even for those who have never visited it. Or is the park for cattle? Citing historical context and vegetation management rationales, the park service leases out grassland grazing rights to a local cattle operation. Is the park for wildlife? Wilson (2002), Redford and Richter (1999) and others advocate that biodiversity and wildlife habitat should be preserved for their own intrinsic value - aside from the services or benefits they provides to human populations.

Does this park, then, belong to the more than 250 animal species that call it home? In examining use conflicts, the question of which uses are prioritized at the expense of others is key.

Redford and Richter (1999) suggest a conservation biology approach to analyzing use conflicts which evaluates the composition, structure, and function of genetic, population, and species diversity for a variety of use impacts. They propose: "The compatibility of various human activities within a conservation site should be evaluated with the rigor suggested by our analytical framework, which explicitly considers all components and attributes of biodiversity" (p. 5). Although some technical aspects of this approach are beyond the scope of this paper, the need to evaluate human activities on conservation sites can be approached from within a social science, rather than a conservation biology background. Following the tradition of Wilson and the suggestion of Redford and Richter, this paper applies an eco-centric analysis to park management documents and practices within the context of current literature on grazing, park use, and other issues. It will evaluate whether as much as possible is being done to protect the wildlife and ecosystems that depend on the park for survival.

Historical Impacts

Invasive Grassland Species: Much of the damage to the naturally occurring ecosystems of this park was caused hundreds of years ago. The grasslands that cover most of Joseph D. Grant's slopes are not native to California, but are exotic annuals introduced by Spanish ranchers centuries ago to provide cattle with their accustomed forage. Transplanted to a new place with no natural competitors, and aided by

overgrazing and drought, these annuals such as ripgut brome and foxtail chess soon displaced the native perennials like purple needlegrass and California brome (Resource Management Plan, 1996). Seabloom et. al. (2003) estimate that 9.2 million hectares of California grasslands have been invaded by exotic annuals, causing "one of the most dramatic ecological invasions worldwide" (p. 1). Native California perennial bunchgrasses are now 99% extinct in the wild (Lowry, 1999). Much of the park's current-day vegetation management strategies center around this imbalance:

"Management of non-native plant species cannot be expected to restore the native vegetation communities in the park, but it can be expected to increase the absolute numbers of native plants, help to preserve and maintain the local gene pool, and help to control the introduction of non-native plant species" (Resource Management Plan, 1995, p. 131).

Trails Based on Old Ranch Roads: The park's current-day trails for hiking and mountain biking are adapted from old ranch roads. These roads were cut through the landscape to follow the shortest and most convenient route, with no concern for sensitive habitat. For example, in Deer Valley, the park's main wetland area, the road is channelizing the terrain; displacing water from where it naturally occurs. In converting the roads to trails, "They [the park service], wanted to get the public out there ASAP and the design wasn't the best for resource management" (Don Rocha, pers. comm).

Invasive Feral Pigs: About 40 European wild pigs were released in California in the 1920's and 30's. These animals later mated with domestic pigs escaped from farms in the area. From these modest beginnings, the feral pig population has grown to an estimated 80,000 feral pigs in this state alone, found in a range of 40 different counties (Stanley and Bland, 1994). . The feral pig populations roaming Joseph D. Grant park compete with native species such as quail and deer for food and shelter

from oak trees. In rooting for bulbs and food, feral pigs dig up large swaths of land. This displaces native plants and opens up the area to invasive exotics, inhibits oak regeneration, and tramples and damages riparian flora (Resource Management Plan, 1996).

Non-Native Wild Turkeys: The park has a thriving population of wild turkeys, which were released in county parks by the department of Fish and Game in the 1970's as a nursery crop for hunting (Rocha, pers. comm.). Their populations have since become established and have expanded and spread to neighboring areas. Although the turkeys do not cause direct environmental and vegetation damage as the feral pigs do, they compete with native species, such as California quail, for scarce food and shelter.

Present-day Impacts

Land-Use Issues - Sprawl: Present-day use impacts can be divided into land-use issues and recreation-use issues. Between 1990 and 2000, the population of San José grew about 15% (City of San José, 2006). This is part of a larger pattern of intense growth in population and industry which has profoundly changed the spatial land-use character of the city and surrounding areas. San José's sprawling pattern of development is widely acknowledged, and is underscored by the fact that 65 percent of its total housing stock consists of single unit dwellings (Figure 2).

Total housing units, Santa Clara County	579,329	100.0
UNITS IN STRUCTURE		
1-unit, detached	323,923	55.9
1-unit, attached	52,736	9.1
2 units	11,112	1.9
3 or 4 units	35,259	6.1
5 to 9 units	31,041	5.4
10 to 19 units	28,441	4.9
20 or more units	77,146	13.3
Mobile home	19,102	3.3
Boat, RV, van, etc.	569	0.1

Figure 2. Source: US Census Bureau

The impact this has on the character of land-use becomes clear when it is compared with a denser spatial pattern; for example, only 32.1% of San Francisco's housing stock is single-unit dwellings (Figure 3).

Total housing units, County of San Francisco	346,527	100.0
UNITS IN STRUCTURE		
1-unit, detached	62,653	18.1
1-unit, attached	48,752	14.1
2 units	37,677	10.9
3 or 4 units	43,174	12.5
5 to 9 units	39,152	11.3
10 to 19 units	35,055	10.1
20 or more units	79,504	22.9
Mobile home	377	0.1
Boat, RV, van, etc.	183	0.1

Figure 3. Source: US Census Bureau.

The metropolis of San Jose has been sprawling outward, and the cities of Gilroy, to the south, and Milpitas, to the north, have grown exponentially, in turn. The area around Joseph D. Grant, to the east of the city, has not been exempt from this trend, and as San José's population has grown, land surrounding the park, once deemed suitable only for ranching and farms, has skyrocketed in price and real estate desirability. More and more housing has moved up the hill, until the park is now surrounded by a veritable panoply of gated communities and large single family estates. As this exurban sprawl continues to intensify and spread, it will have an impact on wildlife populations within the park. The Resource Management Plan (RMP) states that the high species richness within the park is due, in part, to the presence of movement corridors (undeveloped areas which connect this park with other open spaces), and rural or undeveloped lands adjacent to and surrounding the park. As development surrounds Joseph D. Grant, mounting edge effects will begin to degrade its biodiversity. Parks and Harcourt (2002) found that the probability of species' extinction within Western national parks correlated significantly with human population density surrounding the park. Exotic plants from gardens and landscaping can invade the ecosystem. Domestic animals can threaten and kill wildlife. Noise and disturbance from human population can make the perimeter lands of the park less desirable habitat, and as animals migrate to the interior, competition will intensify, and the relative amount of land available as wildlife refuge will shrink.

Automobile Hazards and Impacts - The other land-use impacts on the park are primarily caused by automobiles. The park is located eight miles before James Lick Observatory, on winding Mount Hamilton Road, which bisects the park through the

middle and wraps around part of its northern boundary. Sunny weekend days reveal dozens of motorists and motorcyclists speeding through the park. Both parties interviewed stated that the heavy and rapid vehicle traffic is a safety hazard for wildlife.

The park itself is heavily oriented towards vehicle use. There are hundreds of parking spaces, yet even busy summer days draw at most a couple of dozen visitors. Yearly use rates reflect this as the park ranks 20th out of 25 county parks total (Strategic Plan, 2003). Approximate annual use is 27,749, as compared to 195,185 for Coyote Hellyer, or 512,175 for Rancho San Antonio (Strategic Plan, 2003). Ranger Theresa Nance stated that the rationale for constructing so many spaces was that people want to be able to find a parking space during the one or two large events the park holds each year.

Recreation Use Impacts: Somewhat surprisingly, the anthropogenic impacts caused by current-day recreation patterns represent the least threat to biodiversity of all the categories of impacts reviewed. Although the following seems a laundry-list of problems, in comparison with the wide-scale habitat destruction and conversion of the past, it's possible that, if park management enforcement and education efforts are continued, these behaviors will not have significant cumulative environmental impacts.

The most serious present-day use impacts relate to fishing. Joseph D. Grant has two small lakes which both had man-made barriers installed during the days the park was used as a ranch (Resource Management Plan, 1996). These barriers limit the movement of native fish. The lakes are also stocked with warm water fishes, such as large-mouthed bass. The stocking is in itself problematic, as large-mouthed bass can be an invasive species in California waters. Fishing itself also poses some concerns,

since other exotic species have been introduced via bait (Rocha, pers. comm.). These non-native fish, in addition to competing with native fish, prey on the young of sensitive native amphibian and turtle species (Resource Management Plan, 1996). In addition, fishermen leave fishing line out, and birds and small mammals get caught on it. Fishing users also pull out small shrubs if those are in the way of their cast, and the lake's shoreline is slowly becoming eroded (Nance, pers. comm.).

Other current-day use impacts as cited by park staff include campers leaving food out which attracts wildlife, especially feral pigs. People bring their dogs into the park off-leash and those then chase and kill wildlife. Hunters trespass into the park and poach deer and pigs; because the park is so large, many people have what Rocha calls 'their own private entrance'. Both staff spoke of a perception that park users feel that vehicle and penal codes don't apply within the park. Rocha says "People think 'it's my park; it's my tax dollars that bought this park, and that's what it's here for.'"

Cattle: Citing vegetation management concerns and historical context, the park currently leases grazing rights to a cattle operation. Cattle are measured in AUM's, or Animal Unit Measurements. One AUM is equal to one brood cow with one calf eight months or younger. A bull is 1.50 AUM. Of the park's 9,522 acres, 6,390 acres are classified as 'suitable' for grazing, providing for a total of 4,923 AUM's (Resource Management Plan, 1996). Cattle have been maintained in the area since it was converted to a park, and were previously present during its tenure as a ranch. Rocha feels that the grazing has been 'very successful,' citing, for example, that about 90% of yellow star thistle, an invasive plant, has been removed in conjunction with the grazing program.

The grazing issue, however, is not as cut-and-dried as it may seem. Whether grazing is beneficial to natural ecosystems, especially in the drought-prone West, is very much open to debate. Beginning in 2000, the National Parks Conservation Association put grazing and attendant threats to biodiversity on the head of its policy agenda (Wilkinson, 2000). In citing a National Wildlife Federation report, Wilkinson states "Grazing contributed directly or indirectly to a minimum of 340 species listed or becoming candidates for listing under the endangered species act" (Wilkinson, 2000, p. 2). Kimball and Schiffman (2003), after surveying native and alien species cover in adjacent grazed and ungrazed plots of California grassland, concluded that "The strategy of livestock grazing for restoration is counterproductive. It harms native species and promotes alien plant growth" (p. 1). Harrison, et. al, (2003) found that the impacts of grazing vary depending on the soil and presence or absence of fire. They concluded that grazing did not increase native species richness on non-serpentine soils.

Fleischner (1994) provides the most complete exploration of the ecological impacts of cattle grazing. He found that grazing disrupts ecosystem functioning, and interferes in nutrient cycling and ecological succession. It alters the species composition on a landscape, reducing species richness and changing the organization of the biotic community. Grazing also changes the vegetation of the area, contributes to soil erosion, and decreases water availability to plants and wildlife:

"By virtually any measure, livestock grazing has serious ecological costs in Western North America. Grazing has reduced the density and biomass of many plant and animal species, reduced biodiversity, aided the spread of exotic species, interrupted ecological succession, impeded the cycling of the most important limiting nutrient (nitrogen), changed habitat structure, disturbed community organization, and has been the most severe impact on one of the biologically richest habitats in the region." (Fleischner, 1994, p. 9).

Even the Resource Management Plan acknowledges the harmful effects of grazing; when examining possible factors for the suppression of willow and sycamore trees in a riparian area: "Cattle grazing and feral pig wallowing are thought to be the primary means of new growth suppression" (p. 81). In discussion of the lake and pond habitat: "Most of the ponds...as well as several of the lakes on Grant County Park have been significantly disturbed by cattle" (p. 84). This disturbance includes denuding native vegetation, introducing non-native species, and degrading the water quality. The question of oak regeneration is of serious concern in the Resource Management Plan. Oaks are the basis for survival for many of the plant and animal communities in the park; as Don Rocha put it: "Everyone out there wants acorns, and that's limited." Grant Park has 2,455 acres of oak savannah habitat, which has been experiencing a low recruitment or regrowth rate; most of the trees within the savannahs are mature, with few seedlings or saplings. There are several factors the RMP cites as possible inhibitors of oak regeneration; one of these is cattle; "Livestock...in the process of grazing...browse on, trample, or uproot oak seedlings, roots, and acorns" (p. 116).

While there is a growing body of evidence that cattle grazing is harmful to California's biodiversity, the argument is by no means one-sided. Hayes and Holl (2003) studied the effects of grazing on a California coastal prairie plant community (different from the native perennial grasslands in Grant park), and found that native annual species richness and cover were higher in grazed than in ungrazed sites, concluding: "Cattle grazing may be a valuable management tool with which to conserve native annual forbs in the ecosystem we studied" (p. 1). Fried and Huntsinger (1998), in describing the controversy over an effort to remove cattle from Mt. Diablo State Park,

state: "For every 'scientifically supported' argument put forth to call for an end to grazing in the General Plan, it seemed that there was an equally "scientifically supported" argument that supported continued grazing in letters and editorials" (Fried and Huntsinger, 1998, p. 3). They conclude that closely managed grazing can be the best tool for vegetation management in California grasslands; "by virtue of selectivity, low cost, and absence of off-site impacts." (p. 8).

Park personnel interviewed feel that grazing is appropriate in part because of its historical context. In addition, they believe in (and cite first-hand experience with) its efficacy in controlling invasive species, especially when the grazing program is carefully monitored and regulated, as Grant Park's is. The Resource Management Plan also cites grazing's potential to control the encroachment of poison oak scrub and to control fuel loads, which can reduce the risk of wildfire - a very real concern in this geographic area.

However, these values may not be the entire answer to why grazing is still conducted at the park. In listing the benefits of grazing, the Resource Management Plan states "Grazing is readily available, relatively cost-effective, and easily regulated when properly managed" (p. 95). Fleischner (1994) posits that 'economic underpinnings' (p. 11) may influence the decision to continue grazing in parks and protected lands in the face of mounting evidence of its negative effect on biodiversity. The revenue from grazing for 1996 (the year the Resource Management Plan was published), was \$41,730. This is almost as much as the revenue from entrance fees (\$21,800) and camping fees (\$20,650) combined (Resource Management Plan, 1996). It seems that historical context ("This park has always been grazed" (Don Rocha, pers.

comm.) may combine with economic factors with an end result of continuing to do things as they have always been done - even in the face of a growing tide of ecological literature to the contrary.

Remedies for Use Conflicts

Historical Impacts - Invasive Grassland Species: Both interviews and park management documents revealed that there is a theoretical and practical focus on combating invasive plants and restoring California natives. To this end, in addition to selective use of grazing, the park uses prescribed burns, mowing, discing, herbicides, and manual weeding - especially the Bradley Method, a specific technique designed to eliminate exotic plants and re-establish natives.

Suggestions: Although the RMP suggests that native perennial grasses will not re-establish well in non-native grassland areas without extensive site preparation, Seabloom et al. (2003) indicate that invasive annuals are not necessarily competitively superior. They suggest that seed production and dispersal are a main factor in the reintroduction of native perennial grasses. Park staff should maintain and perhaps increase efforts to cultivate and distribute native seeds and regenerative plant materials.

Trails Based on Old Ranch Roads: In the absence of a trails master plan for the park, (which will be developed within the next several years), park staff are re-working and repairing the trails so that their harmful effects on the ecology are minimized (Rocha, pers. comm.). Seep crossings are being armored and re-rocked to allow the water to flow through the trail and out into the landscape where it is needed. The trails

master plan, when completed, will have re-routed some of the main roads based on ecology rather than convenience.

Invasive Feral Pigs: The park is engaged in a program to control feral pig populations. Although feral pigs will never be eradicated, their capacity to double their population every year (Resource Management Plan, 1996) means that steps must be taken to prevent the park from being completely overrun. A contractor traps, and kills feral pigs, which are then taken to a rendering plant.

Non-Native Wild Turkeys: Wild turkeys are neither as damaging to biodiversity, nor as quickly reproducing as feral pigs, and there are no plans to control their population at this time (Rocha, pers. comm.). However, park staff are mindful of enhancing habitat for native species, such as creating brush piles out of downed trees as habitat for California Quail.

Present-day Impacts - Land-Use Issues: The Department of Parks and Recreation's options are limited in terms of preventing or combating exurban sprawl. However, when housing or other developments are proposed that would impact the park's wildlife corridors or migration access, park planning staff provide comments on Environmental Impact Report mitigation. As well, the parks district is actively seeking to expand its holdings. The department does not use eminent domain, but, according to Rocha, is always on the lookout for willing sellers. In addition, the Strategic Plan details how the department is looking for partnership opportunities in terms of land acquisition, recreation programs, and funding. Given that there are two open-space areas near the park, inter-agency cooperation in land-use planning and acquisition in the general area could be an important step towards maintaining the integrity of habitat within the park.

Automobile Hazards and Impacts: Although the Strategic Plan suggests investigating options to bring public transit to Santa Clara County Parks, it does not detail any steps that may be involved in doing so.

Suggestions: Whereas, because of the distance and difficulty of Mt. Hamilton Road, it may never be feasible to provide public transit to Joseph D. Grant, park management should consider promoting and helping to organize carpooling among those using the park for large events. In addition to reducing safety hazards for wildlife, this would lessen the need for hundreds of rarely-used parking spaces. In the future, perhaps it would even be possible to remove some of those spaces and restore them to the formerly rich habitat characteristic of the valley floor. Bicycling as a means of alternative transportation to the park should also be encouraged. One way to do this would be by waiving the entrance fee for those arriving by bicycle.

Recreation Impacts: Park rangers and volunteers continually work on educating diverse user groups. According to Don Rocha: "It's education, and education through enforcement, unfortunately." Of particular focus are outreach efforts to fishing users. This, combined with ongoing restoration efforts around the lakes, is expected to stave off severe ecological damage. There are also plans to enhance infrastructure development; installing improved fencing and self-closing gates is expected to help keep park users where they are supposed to be.

Suggestions: The park does not presently conduct outreach or education in any languages other than English. In order to be effective in a majority-minority city such as San José, brochures and in-person education should be multi-lingual and culturally appropriate for user populations. If park staff do not currently have these capabilities,

bi-lingual capacity should be emphasized during the hiring process for any new staff. In the meantime, San José's large size and ethnic diversity provide a wealth of opportunities to recruit potential volunteers to help in this area.

Cattle: Acknowledging concerns about cattle's negative impact on biodiversity, the grazing program is closely controlled and monitored. Cattle are rotated through different fields and habitats depending on vegetation management goals for that particular area and time of year. Plant diversity and biomass are periodically monitored to assess how much impact grazing is having, and range management plans are modified accordingly. Most cattle are moved out of the park during summertime, after the fuel loads have been reduced to an acceptable level. Those cattle that remain behind during this time are used for 'spot' grazing in specifically controlled areas (Resource Management Plan, 1996). Several habitat areas of special concern, such as the Deer Valley wetland area, are off-limits to cattle. There are plans to install self-closing gates which will minimize recreation users accidentally permitting cattle to enter off-limits areas.

Suggestions: The National Park Service is slowly beginning to phase out grazing in many areas of the country, such as in the Great Basin and Great Smoky Mountains National Parks. Fried and Huntsinger (1998) chronicle the elimination of grazing on all but 600 acres of Mt. Diablo State Park as part of a shift in priorities towards 'managing for natural processes.' It is important for Santa Clara County Parks to stay up-to-date on the current debate about grazing and biodiversity, and to at least consider the option of whether or not cattle are a necessary and beneficial part of vegetation management in their grassland parks.

Funding

80% of the park's budget comes from the Park Charter Fund, a dedicated portion of the county's homeowner's tax (Strategic Plan, 2003). This fund was first approved in 1972, at \$.10 per \$100 assessed valuation. Over the years, the amount has decreased sharply. The last election, in 1996, saw the fund passed at \$.015 per \$100, to decrease to \$.01425 in 1998. Many, if not all, of the current and suggested remedies for use conflicts require resources such as tools, labor, equipment, seeds, and staff time. In order for the park to adequately fulfill its function in protecting biodiversity while still providing for the recreation needs of users, it is imperative that it receive sufficient funding. Adequate funding could also help to reduce any potential economic motivation for the continuation of the grazing program. The Strategic Plan outlines detailed steps for pursuing and securing ongoing and additional funding. Ongoing public outreach and collaboration could also be helpful in bolstering support to achieve funding objectives. There is a need for more people to realize the inherent values of biodiversity as well as appreciate the recreation and ecosystem services it provides - and vote accordingly.

Conclusions

California's rare and endemic plant and animal species are both unique, and uniquely threatened. Santa Clara Valley, as part of the San Francisco Bay Area, is a potent illustration of a biodiverse hotspot confronting steep development pressures spurred by population growth, sprawling land-use patterns, and the spiraling cost of housing. Local parks and protected areas, when properly managed, can be an

important bulwark in the battle against the increasing homogenization of our habitats and wildlife. Joseph D. Grant park, because of its size, habitat diversity, and distance from the city, provides a valuable opportunity for biodiversity preservation. In an analysis of whether the park was utilizing this opportunity fully, it was found that the main human use impacts and management concerns were from the past. The bulk of the threats to the park's biodiversity were incurred between 30 and 400 years ago. Park management and staff are cognizant of these threats, and are taking many appropriate measures to counteract them. There are some present day recreation-use issues. Both historical and current use impacts continue to require intervention and innovative approaches. The impact of cattle grazing on biodiversity in Western grasslands is of ongoing concern. As the debate evolves in the national, regional, state and local parks management communities, Joseph D. Grant park staff and directors should remain open to possible alternatives, such as reducing grazing or phasing it out altogether. Adequate funding could help improve measures available for biodiversity protection. Although park management is taking steps to balance biodiversity protection with human use, there is further progress that could be made in this area.

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