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Introduction

The Puente Hills Preserve (Preserve), located at the eastern edge of Los Angeles County, is part of the Puente-Chino Hills Wildlife Corridor (see map below). It has hilltops ranging from 700 to 1,400 feet and drainages from 400 to 600 feet. With minimal development, it provides ecological refugia and opportunities for recreation in an otherwise urban and suburban environment near the communities of Whittier, Hacienda Heights, La Habra Heights, and Rowland Heights.

The Preserve was created in 1994 as a requirement of the conditional use permit for the Puente Hills Landfill (Landfill) to protect open space and ecological resources in the area. The Preserve is managed by the Puente Hills Habitat Preservation Authority (Habitat Authority) through a Board of Directors with members from the City of Whittier, Hacienda Heights Improvement Association, the County of Los Angeles, and the Sanitation Districts of Los Angeles County. The Preserve currently consists of nearly 4,000 acres, but is connected to other undeveloped public lands (e.g., Schabarum Regional Park) or lands slated for preservation or recreational uses (e.g., the now-closed Landfill).

Map 1. The Puente Hills Preserve in Los Angeles County, California.
The Preserve attracts considerable recreation use, including hiking, running, dog walking, biking, horseback riding, and wildlife viewing. Most of this use occurs along trails emanating from six access points, with the highest use coming from Whittier and Hacienda Hills. Recreation use has increased considerably over the past nine years, with impacts on ecological values and the quality of recreation experiences. Recreation use is expected to continue its upward trend in the future, and the Habitat Authority is interested in developing recreation management guidelines to address these issues.

**Guideline objectives**

- Identify and prioritize recreation management issues.
- Identify indicators of resource health and recreation quality for top-rated issues.
- Assess the ways impacts are related to recreation uses and behaviors.
- Identify possible standards that specify when impacts or trends become unacceptable.
- Identify management actions of increasing intensity that could be used to address unacceptable impacts or behavior.
- Identify options for developing and maintaining a monitoring program.

**Background and assumptions**

The Preserve has an existing Resource Management Plan (RMP) that identifies issues and management objectives. The present document is a supplement to the RMP; it provides more detail about recreation management issues, standards that define resource health or recreation experience quality, and actions that might be used to address them. Other assumptions are listed below.

- Protecting the biological diversity of the Preserve in perpetuity through restoration and preservation is the primary mission of the Habitat Authority, but providing low-impact recreational opportunities and outdoor education are important secondary purposes.
- There are five developed trailheads and one additional access point as well as a network of designated hiking and multiple use (biking, horse riding, and hiking) trails. There are also dozens of other user-created access points and trails from nearby residences and neighborhoods. The RMP designated several main trails (and closed others); this document continues the process of defining a sustainable trail system, acceptable trail conditions, and acceptable types/amounts of use based on monitoring and standards.
- Depreciative behavior by nearby residents or recreation users (including dumping, vandalism, dog waste, litter, trail erosion, and wildlife disturbance) are related issues. The guidelines identify types and causes of this behavior, and consider education and regulation/enforcement actions that would reduce them.
• The existing RMP includes authority to open/close trails and otherwise regulate recreation use in the area, although enforcement is an on-going challenge. The guidelines identify education and enforcement opportunities.

• The guidelines identify visitor use issues, indicators and standards of resource health and recreation opportunity quality, and management actions of increasing intensity to address impacts.

• The guidelines identify a structure for future monitoring efforts. In most cases, effective management actions are more likely to emerge if additional planning, research, and monitoring can identify trends and causes of impacts. This may require specific monitoring and observations of ecological resources (e.g., species, life stages, habitats, behaviors) and recreation or other human-related impacts.

• The guidelines are conceived as a “working document” that allows adaptive management as new information is developed or the consequences of management actions become more clear. The document allows the Preserve to try different management actions, assess their effectiveness, and re-evaluate additional actions.

• Major management actions may require additional authorization by the Habitat Authority and its Board of Directors.

Guidelines process

The guidelines were developed over a six month period from September 2014 through March 2015. The process began with a review of existing information and fieldwork in September 2014. Draft guidelines were developed through an interactive process between researchers at Confluence Research and Consulting and staff at the Habitat Authority through early 2015. After formal review by Habitat Authority staff and its Advisory Committee and Board, Final Guidelines will be adopted in April 2015. The guidelines identify management actions to be considered by the Habitat Authority and its Board, but monitoring and adaptive management will continue after final guidelines are adopted.

Issues are organized into three categories: (ecological, recreation, and depreciative behavior). A series of sidebars (in shaded boxes) provide additional background on recreation management concepts, research, or the Puente Hills Preserve. Appendices include the 2005-07 trail evaluation form and 2007 RMP goals and objectives related to recreation management.
**Background on capacity and visitor management**

*This background section was adapted from “Capacity Reconsidered – Finding Consensus and Clarifying Differences” by Whittaker, Shelby, Manning, Cole, and Haas (2011).*

Visitor capacity (also known as carrying capacity) has a long history in natural resource management and has been applied to timber, rangelands, fish and wildlife populations, and recreation use. With philosophical roots that stretch back to Malthus’ population principle and Hardin’s “tragedy of the commons” (1968), capacities recognize that environments have limits and that ever-increasing use is likely to degrade conditions and become unsustainable. Applications of capacity in park settings followed rapid growth in outdoor recreation after World War II, prompting public concern over wild lands being “loved to death” (Wagar, 1946). Focusing on the *amount* and *type of use* that natural areas can accommodate without impairing their values, visitor capacity continues to play a fundamental role in the effort to protect high-quality environments and experiences.

Several natural resource decision-making processes from the 1960s and ‘70s recognized the importance of capacities. The National Environmental Policy Act (NEPA, 1969) and equivalent state laws (e.g., California’s CEQA) encouraged agencies to systematically consider alternative management actions and their consequences. More specific land designation laws (e.g., Wild and Scenic Rivers Act, National Trails Act) also had mandates to address capacity and related visitor management issues.

Parallel research explored ecological and experiential impacts in these settings, showing that some impacts might occur even with low use levels. Deciding which conditions are desirable, how much impact is unacceptable, how use levels affect conditions, and how much use should be accommodated became the focus. Researchers emphasized the importance of clear management goals and specific objectives for specific ecological, cultural, and experiential resources; they developed several planning frameworks with terminology and steps that helped identify and address impacts from recreation use (such as the Recreation Opportunity Spectrum [ROS]; Limits of Acceptable Change [LAC]; Carrying Capacity Assessment Process [C-CAP]; and Visitor Experience and Resource Protection [VERP]). Although there are technical differences among these frameworks, they all recognize potential trade-offs between different use levels, resource conditions, and management actions while providing high-quality experiences (Whittaker et al. 2011).

A few basic concepts are at the center of these frameworks, including 1) the importance of separating descriptive and evaluative information; 2) indicators and standards; 3) use-impact relationships; and 4) the need to identify the range of management actions (including capacities) that work together to keep impacts from exceeding standards.

Visitor capacities and related frameworks are a common management tool used by local, state, and federal agencies (Brown 2001), and have been the focus of several national conferences, recent review papers (Whittaker et al. 2011; Graefe et al. 2011), and federal interagency task forces (Haas et al. 2002; Cahill et al. 2012). Many agencies have established capacities or considered them in their planning, even if they did not employ all the steps or ideas in the research-developed planning frameworks.

Capacities have been applied to protect natural, cultural, and experiential resources in diverse recreation settings (rivers, lakes, trails, backcountry areas, mountains, and islands, for example); to help define the appropriate size and type of facilities (campgrounds, marinas, boat launches, transportation systems, and visitor centers, for instance); to shape the size of agency programs (interpretation or maintenance, for example); and to determine appropriate levels of commercial and non-commercial uses. Although capacities direct attention toward use levels, the concept applied through modern frameworks is a much broader “umbrella” of protections, and considers a full range of management actions beyond use limits, including education, regulation, and infrastructure.
Frequently asked questions about capacity and visitor management

What are capacities?
Capacities define the type and amount of use compatible with the management prescription for an area. A capacity is a number such as people per day or at one time (PAOT). It has units of use, timing, and location components. Capacities identify the level of use beyond which conditions become unacceptable as defined by management standards.

What is a management prescription for an area?
Management prescriptions are explicit set of decisions that... 
...define goals and objectives for all important uses and values; 
...identify desired conditions and the mix of resource uses and values; 
...establish standards that quantify acceptable levels of impacts for indicator conditions; 
...identify management actions that will be used to provide desired conditions and avoid exceeding standards.

Is a capacity intrinsic to an area and determined by resource characteristics?
No. Capacities are an outcome of a decision-making process. They are derived from a series of judgments about an area’s values, desired future resource and experiential conditions (indicators and standards), and the acceptability of management actions and facilities designed to handle use. Changing one part of the equation (such as more stringent standards) can require a lower capacity; similarly, more regulations, enforcement, or facilities may be needed to allow a higher capacity (while keeping conditions acceptable).

What are the limiting factors to capacity?
The amount of use an area can sustain depends on its resource characteristics, the type and quantity of use anticipated, and the effectiveness of other (non-capacity) management actions. If visitors practice “leave no trace” behaviors and stay on well-designed trails, an area can accommodate higher use. The factors that determine “how much use is too much” depend on desired conditions and the type of use. This may vary across different areas in the Preserve, with different levels of sensitivity for different species, terrain, and types of use. An area may have one or more capacities for key locations and activities depending on the circumstances (for example, different capacities on weekends and weekdays, or during nesting seasons for sensitive species).

How do biological values relate to user capacities?
Biological conditions can be sensitive to an amount of use, in which case they may be a limiting factor in determining capacity. In many cases, however, biological conditions are related to the type of use and how it is managed rather than the amount of use. For example, a trail crossing steep terrain could be vulnerable to erosion or bird nesting habitat could be sensitive to unleashed dogs. In these situations, the behavior or type of use is the problem, not the number of users. Improved trail construction and re-routing to avoid nesting areas, or regulations that limit the trail to hikers or prohibit dogs might allow higher levels of use without causing unacceptable impacts. Once such a trail and regulations are in place, biological impacts may no longer be the limiting factor for capacity. The focus then shifts to other conditions related to numbers of users, such as crowding and social conditions.

Are capacities maximum use levels allowed?
Capacities refer to the highest use that is acceptable to meet objectives and standards. Guidelines assume use will eventually reach capacities on most days during peak season, although lower use levels may occur in the shoulder and off-season. In most settings, capacities eventually become “everyday use levels.”
Issues

This section reviews several ecological, recreation, and depreciative behavior issues in the Preserve. For each issue, the guidelines describe background information, use-condition relationships, indicators, standards, and management actions that can be used to address unacceptable conditions. These discussions are at the “brainstorming” level, and more work is needed to prioritize issues, select indicators and standards, and develop alternative management prescriptions for public and stakeholder review.

Ecological Issues

These issues focus on preservation of biological or physical resources affected by recreation use, the primary purpose of the Preserve. The issues are generally organized from highest to lowest priority, and actions are ordered from easiest to hardest to implement.

Table 1. Indicators, standards, and management actions for ecological issues.

<table>
<thead>
<tr>
<th>Issue / Indicators</th>
<th>Standards</th>
<th>Actions to meet standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coastal California Gnatcatcher</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of nesting pairs</td>
<td>No downward trend</td>
<td>• Increased monitoring and correlate to recreation use.</td>
</tr>
<tr>
<td>Habitat in acres</td>
<td>No net loss</td>
<td>• Coastal sage scrub restoration via invasive removal.</td>
</tr>
<tr>
<td>Number of nesting pairs</td>
<td>No downward trend</td>
<td>• Disallow dogs in known breeding areas.</td>
</tr>
<tr>
<td>Habitat in acres</td>
<td>No net loss</td>
<td>• Increased enforcement in nesting areas – dogs off-leash.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Seasonal (breeding season) trail closures.</td>
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<tr>
<td></td>
<td></td>
<td>• Trail re-routes away from identified nesting areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permanent trail removals.</td>
</tr>
<tr>
<td><strong>Cactus Wren</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Habitat in acres</td>
<td>No net loss</td>
<td>• Increased monitoring and correlate to recreation use.</td>
</tr>
<tr>
<td>Number of nesting pairs</td>
<td>No downward trend</td>
<td>• Cacti habitat restoration or expansion through plantings.</td>
</tr>
<tr>
<td>Habitat in acres</td>
<td>No net loss</td>
<td>• Disallow dogs in known breeding areas.</td>
</tr>
<tr>
<td>Number of nesting pairs</td>
<td>No downward trend</td>
<td>• Increased enforcement in nesting areas – dogs off leash.</td>
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<td>Habitat in acres</td>
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<td>• Seasonal (breeding season) trail closures.</td>
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<td>Habitat in acres</td>
<td>No net loss</td>
<td>• Permanent trail removals.</td>
</tr>
<tr>
<td>Issue / Indicators</td>
<td>Standards</td>
<td>Actions to meet standards</td>
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<tr>
<td>----------------------------------------------------------------------------------</td>
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<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Wildlife disturbance from after-dark use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of people leaving Preserve after sunset</td>
<td>Reduce 50% from baseline average within five years</td>
<td>• Directed education program.</td>
</tr>
<tr>
<td>Number of night-time use incidents (willful violations)</td>
<td>Zero tolerance standard</td>
<td>• Increase clarity of sunset timing information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adopt firm open/closing hours (seasonal differences)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improved information about violation penalties.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hire contractors to close Preserve gates at sunset.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lower fines levied more frequently (for most violations); larger fines for extreme violations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improved ranger consistency on violation enforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tier 2 ranger position(s) with education focus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased direct ranger enforcement (Whittier).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased night ranger patrols for willful violations.</td>
</tr>
<tr>
<td><strong>General off-trail use and wildlife disturbance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify population trend for 3 to 5 indicator species.</td>
<td>No downward trend.</td>
<td>• User-created trail removal -- sensitive areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conduct user survey and use monitoring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Signs, brushing, to “close” user-created trails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Trail re-routes to reduce fragmentation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Night time use education and enforcement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased off-trail use enforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permanent trail removals -- sensitive areas.</td>
</tr>
<tr>
<td><strong>Trail condition and erosion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated miles of user-created trails (8.25 miles)</td>
<td>No new trails; reduce 20% in 5 years.</td>
<td>• Education regarding user-created trails.</td>
</tr>
<tr>
<td>Indicator segments of different types.</td>
<td>No condition class change.</td>
<td>• Signs, brushing, to “close” user-created trails.</td>
</tr>
<tr>
<td>Sedimentation in streams.</td>
<td>No net increase.</td>
<td>• Water bars/ erosion control facilities.</td>
</tr>
<tr>
<td>Counts of high bank locations.</td>
<td>No net increase.</td>
<td>• Grading to create trail crown -- reduce erosion.</td>
</tr>
<tr>
<td>Counts of “switchback cuts”</td>
<td>No net increase.</td>
<td>• Re-vegetation of trail widths to discourage widening.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Retaining walls and steps on steep designated trails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Re-design steepest trail segments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make some steep trails one-way for bikes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Close poor condition designated trails.</td>
</tr>
<tr>
<td><strong>Vehicle-wildlife collisions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number and type of species using underpasses.</td>
<td>No net decrease.</td>
<td>• Education to reduce human use of underpasses.</td>
</tr>
<tr>
<td>Number and type of road kill per survey</td>
<td>No net increase.</td>
<td>• New wildlife underpass on Colima Road.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Consider traffic calming options.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fencing in high road kill areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase ranger enforcement.</td>
</tr>
<tr>
<td><strong>Human-caused fire hazards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of smoking citations</td>
<td>No increase.</td>
<td>• Education hang tag program.</td>
</tr>
<tr>
<td>Number of fire rings/party sites</td>
<td>Reduce to zero.</td>
<td>• Kiosk education.</td>
</tr>
<tr>
<td>Number of arson incidents</td>
<td>Zero tolerance.</td>
<td>• Enforcement – party-site shutdown strategies and work with local law enforcement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enforcement – higher late night and fire ring penalties.</td>
</tr>
</tbody>
</table>
Coastal California Gnatcatcher habitat and disturbance

**Background**
- The coastal California gnatcatcher is a Threatened species under the Endangered Species Act (ESA).
- It has specific habitat needs (shallow slopes with coastal sage scrub habitat).
- Coastal sage scrub habitat comprises about 980 acres in the 3,870 acre Preserve.
- Gnatcatchers may be disturbed by recreation use on trails in close proximity to habitats they use for nesting, roosting, etc.
- Dogs off leash may exacerbate recreation disturbance.
- Redesigned or rerouted trails away from critical habitat may improve gnatcatcher protection.
- Reduced recreation use during critical nesting periods may improve gnatcatcher breeding success.
- Restoration efforts sometimes include removal of invasive species.

**Use-impact relationships**
- Trail proximity may affect whether recreation use disturbs gnatcatchers.
- Gnatcatchers may be more susceptible to disturbance during nesting (mid-February through August).

**Indicators and standards**
- Number of nesting pairs through focused survey (through an annual or biennial survey); no downward trend.
- Total acres of suitable coastal sage scrub (CSS) habitat (through remote sensing); no downward trend.
- Nesting pairs per acre of CSS in higher and lower recreation use areas; no downward trend.

**Actions to reduce or mitigate impacts**
- Identify specific habitat (acres) in high, medium, and low use areas and monitor activity levels and breeding success.
- Coastal sage scrub habitat restoration or expansion through invasive species removal.
- Disallow dogs in new areas where gnatcatchers are now breeding over 2+ seasons.
- Issue citations (Ranger enforcement) in accordance to Preserve rules for dogs off leash, especially in identified nesting areas.
- Seasonal (breeding season) trail closures from specific nesting areas.
- Trail re-routes away from identified nesting areas.
- Permanent trail removals from key habitat areas (identify candidate trail sections).
Cactus Wren habitat and disturbance

Background

- Cooper (2009) mapped and surveyed all known locations of Cactus Wren in the Preserve.
- Cactus Wren is a species of concern (California) and the Puente Hills Preserve may support up to 15% of the remaining Cactus Wren population in Los Angeles County (Cooper 2009).
- It has specific habitat needs (nests and roosts in prickly pear cactus patches with heights of 2.5 to 3.0 feet).
- Cactus patches are susceptible to damage from recreation use (off trail use, litter, collection).
- Wrens may be disturbed by recreation use on trails in close proximity to cactus patches.
- Dogs off leash may exacerbate recreation disturbance.
- Increased cacti habitat provides additional habitat for dispersing wrens.
- Redesigned or rerouted trails away from cacti habitat may improve wren protection.
- Reduced recreation use during critical nesting periods may improve Cactus Wren breeding and roosting success.

Use-impact relationships

- Trail proximity may affect whether recreation use disturbs wrens.
- Wrens may be more susceptible to disturbance during nesting (February through July).
- Wrens commonly forage in morning and late afternoon or early evening when many people are recreating (people often avoid the hottest times of the day).

Indicators and standards

- Number of nesting pairs on entire Preserve (five year survey); no downward trend.
- Nesting pairs per acre of cactus habitat in higher and lower recreation use areas.
- Total acres of suitable cacti habitat (remote sensing estimate); no downward trend.

Actions to reduce or mitigate impacts

- Identify specific habitat in high, medium, and low use areas and monitor activity levels and breeding success.
- Cacti habitat restoration or expansion through plantings.
- Disallow dogs in new areas where cactus wrens are breeding over 2+ seasons.
- Issue citations (increased targeted ranger enforcement) in accordance to existing Preserve regulations for dogs off leash, especially in identified nesting areas.
- Seasonal (breeding season) trail closures from specific nesting areas.
- Trail re-routes away from identified nesting areas.
- Permanent trail removals from key habitat areas (identify candidate trail sections).
Wildlife disturbance from after-dark recreation use

Background

- The Preserve is closed from sunset to sunrise to provide wildlife with disturbance-free periods; after-dark use also increases security and vandalism issues.
- This is a greater problem at Whittier trailheads more than Sycamore, Hacienda Hills, or Powder Canyon.
- Many people are violating these regulations out of ignorance, not willful intent, especially in winter when daylight hours are shorter. Clarity about what defines “sunset” is a frequent refrain. Strategies for addressing willful violations vs. ignorance-based violations are different (see discussion on types of depreciative behavior later in the document).
- Intentional violations among repeat users or after-hour partying on the trails is a larger problem and likely to have greater impacts on wildlife disturbance (and are a more challenging enforcement problem).
- Ranger contact information suggests after-hours use is by far the most frequent ranger-user interaction.

Use-impact relationships

- After-hours use is probably related to overall daily use, but there has been no formal analysis of ranger contacts/citations and use levels.
- There is little specific information about impacts of after-hours use or different kinds of after-hours violations (for example, evening trail use vs. parties, vandalism).

Indicators and standards

- Rangers currently track post-sunset parking, warnings, and citations by location. However, ranger protocols appear inconsistent enough that specific statistics are best viewed as approximations for identifying trends. Future monitoring should establish a baseline estimate of average people per day that depart the Preserve after sunset, possibly distinguishing those who leave within one hour from those who leave later (which may indicate differences between ignorance-based and willful violations).
- Citations or warnings for deliberate illegal nighttime use (e.g. parties that start later in the evening) should be tracked separately.
- A zero tolerance standard is an obvious goal for all nighttime use, especially for deliberate illegal activities such as parties.
- For ignorance-based nighttime use (for example, people who are tardy exiting the Preserve, typically departing within an hour of sunset), monitoring should establish a current baseline and standards could attempt to reduce the number by 50% within five years.
**Actions to reduce or mitigate impacts**

- Directed education program – go beyond kiosk signs.
- Focus on more clear timing instructions – the variable sunset/sunrise times through the year is a constant source of confusion for some users.
- Develop firm park opening and closing hours to eliminate sunrise/sunset confusion for some users, and encourage more consistent enforcement. The hours should vary by season (e.g., 7 am to 5 pm from Oct to Mar and 7 am to 7:30 pm from April to September).
- Better defined consequences of violations may reduce infractions (e.g., define fine amounts for vehicles parked behind gated parking after hours or for people departing the Preserve after sunset).
- Reduce variable ranger discretion over which violations deserve tickets could be reduced (more consistency would help establish social norms and encourage better compliance).
- Reduce some maintenance duties among existing rangers (and reassign to maintenance positions) to increase ranger effort for after-dark education and enforcement.
- Reduce ranger duties associated with locking gates; spend more on education and enforcement at key locations (especially Whittier access areas).
- Create “education-focused” or “Tier 2 Ranger” position(s) to address ignorance-based violations. These rangers would hike and bike trails shortly before Preserve closing time and help “sweep” users out of the Preserve by closing. Their focus would not be on enforcement (they may not even need ticket-writing authority), but as a way to spread the word on timing and the threat of enforcement from the Tier I Rangers.
- Lower fines that are levied more frequently may have greater success at limiting after-hours use. The present penalties for after-hours use are possibly too severe (rangers are reluctant to write them and magistrates are more likely to throw them out when challenged). Lower penalties in the $25 to $50 range are less likely to be challenged in court, but may help enforce the regulation.
- Increased night ranger patrols and enforcement to address willful violations (especially larger party groups and potential vandals).

![Figure 3. Preserve hours sign at Powder Canyon Trailhead.](image_url)

![Figure 4. Hacienda Hills Trailhead parking violation.](image_url)
The limits of education for solving impact problems

This sidebar was adapted from Whittaker, Vaske, and Manfredo (2002): Choosing actions – Problem definition, identifying strategies, and evaluation criteria in Wildlife Viewing – A Management Handbook.

As a way to address human-caused impact problems, educational actions are often seen as a panacea (Roggenbuck, 1992). “If people only understood what impacts they cause, we can get them to behave differently.” Compared to regulatory approaches, education is also preferred by many managers because they are less intrusive or expensive to implement.

In wildlife-protection settings, educational actions often focus on teaching recreation etiquette (toward both wildlife and other users) and minimum impact practices (e.g., dogs on leashes, stay on trails). Attempts to establish norms for these behaviors are often present in agency literature and popular media. But while highly-involved wildlife viewers usually follow such codes, general public compliance is often much lower.

While persuasion research applied to other natural resource issues suggests that some behavior change is possible with well-developed educational efforts, the kind of long-term, lasting change is often both challenging and complicated (Roggenbuck, 1992). Designing effective educational campaigns requires clear understanding of persuasion theory and practice, and is often missing from many natural resource persuasion efforts (Manfredo, 1992; Heberlein, 2012). A few findings from this research include:

- Educational efforts appear more effective for visitors with low knowledge levels (addressing unintentional or uninformed behavior).
- Among information efforts, personal (e.g., face-to-face contacts with a ranger) appear more effective than non-personal efforts.
- Among the non-personal efforts, multi-media programs (e.g., slide shows, computer programs, videos presented to interested audiences) appear to be slightly more effective than static written messages directed at casual audiences (e.g., signs at trailheads, brochures).
- Littering behavior studies show personal contact and role modeling by rangers appear to be more effective than non-personal techniques, but that environmental cues can be even more important (e.g., the lack of existing litter tends to activate norms against littering, trail barricades are often effective cues that reduce shortcuts across switchbacks).

The limitations of education programs do not relieve managers of the responsibility to develop or continue persuasion efforts, but managers should not expect them to dramatically change visitor behavior. As with many behaviors based on environmental ethics, widespread conformity depends on whether people recognize the consequences of their actions and ascribe responsibility for them (Schwartz, 1968; Heberlein, 2012). This notion suggests that widespread adoption of wildlife viewing ethics requires people to recognize wildlife as a commons property and understand how inappropriate behaviors degrade viewing for themselves or others.
General wildlife disturbance

Background
- The Preserve is home to considerable diversity of birds, mammals, amphibians, reptiles, and insects. This diversity is supported by a range of habitat types and complex relationships.
- Habitats include: walnut woodland, oak woodland, and coastal sage scrub.
- Flora species include: Plummer’s Mariposa Lily, Catalina Mariposa Lily, Southern California Black Walnut, and Robinson’s Peppergrass.
- Bird species include: coastal California Gnatcatcher, Cactus Wren, White-tailed Kite, Peregrine Falcon, Swainson’s Hawk, Northern Harrier, and Cooper’s Hawk.
- Other species include: Bobcat, Mountain lion, Monarch butterfly, Western spadefoot toad, Northern red diamond rattlesnake, and 11 species of bats (6 listed as state or federal species of concern).
- Several species benefit from areas with limited to no human use.
- Undisturbed areas can be created spatially or temporally.
- Without identifying specific habitats for specific species, issues include habitat fragmentation from trails, temporal invasions during night (discussed above), and dogs off leash (especially if they are off-trail).
- Redesigned or rerouted trails may improve connections between habitat blocks (and reduce fragmentation).
- Reduced recreation use during night (not allowed, but a perennial enforcement issue) may reduce disturbance or improve ecological function.
- Increased enforcement may reduce the proportion of dogs off-leash or off-trail.

Use-impact relationships
- George and Crooks (2006) studied large mammal activity in an urban nature preserve within 40 miles of the Preserve. Bobcats and coyotes altered their habitat use in response to recreation use, with negative associations evident between bobcats and hikers, bikers and domestic dogs. In addition, there is extensive literature on general recreation impacts, including:
  - Recreation disturbance to wildlife (Cassirer et al. 1992; Knight and Gutzwiller, 1995; Miller and Hobbes, 2001; Taylor and Knight 2003).
  - Habitat fragmentation effects from recreation use (Knight & Gutzwiller, 1995; Liddle, 1997; Lindenmayer and Fischer 2006).
  - Wildlife impacts from dog use (Miller et al., 2001; Reed & Merenlender, 2011).
**Indicators and standards**

- Identify 3 to 5 indicator species for different ecological fauna communities (e.g., deer or bobcat for large mammals, a snake or lizard species for reptiles, raptors for species richness, etc.).
- Nesting pairs per acre of cacti in higher and lower recreation use areas.
- Identify specific habitat in high, medium, and low use areas and monitor breeding success to assess use-impact relationships.
- Estimated miles of user-created trails.
- Possible standards for any of the above: no downward trend, no net change from current, reduction by 50% (or some lower amount if 50% is not realistic). Detailed choices among indicator species, specific delineation of high/medium/low recreation use areas, and possible standards is beyond the scope of this document.

**Actions to reduce or mitigate impacts**

- Remove user-created trails (can help reduce fragmentation, among other things).
- Conduct a user survey and use monitoring.
- Re-route trails to reduce fragmentation.
- Remove permanent trails from key habitat areas (identify candidate trail sections).
- Education and enforcement about night time use.
- Stronger enforcement of Preserve rules (e.g., off-trail use).

**Relationships between use and biological impacts**

Many biophysical impacts appear less directly related to use levels because low levels of use may create proportionately larger impacts (Hammitt & Cole 1987; Kuss et al., 1990). For example, the first few groups to pioneer a campsite appear to have the greatest impacts on vegetation loss; subsequent groups then camp in the same areas and typically cause little additional impact (Cole, 1987). Several wildlife disturbance impacts may fall into this pattern because some research suggests many animals adjust or habituate to human uses over time, while initial encounters may cause flight (Knight & Cole, 1995; Whittaker & Knight, 1998). Other research suggests that disturbance impacts can have cumulative effects, in which case more people over a longer time period may increase disturbance problems (Anthony et al., 1995).
Trail condition and erosion

Issues and background

- The Preserve has 22.7 miles of designated trails and an estimated 8.25 miles of user-created trails. Table 2 summarizes trail lengths by different categories. A short history of trail management in the Preserve is provided in a sidebar below.
- The conditions of trails vary, but issues include the following.
  - “Fire road” trails with expanding widths, drainage, or surface deterioration issues.
  - Single-track trails with sections of multiple-trails.
  - “High banking” erosion from mountain bikes (riding up a trail wall).
  - Hellman Park Trail (the switchback trail in the gully north of Hellman Park trailhead) has extensive erosion that was unsuccessfully addressed by stop-gap stairs and retaining wall development.
  - Some “fire road” trails have drainage structures that send water over steep terrain and may cause small slides/erosion areas in side canyons.
  - User-created trails that cut across switchbacks, offer alternative routes up or down steep slopes or along ridges, or lead to areas reserved for wildlife.
  - Multiple redundant user-created trails appear to be created to extend exercise opportunities.
  - Users appear to have strong attachments to using some user-created trails, especially when they are plainly visible and access steep slopes (a focus for exercise-oriented users). Attempts to close these types of user-created trails through signing, brushwork to cover the start of trails, and fences blocking access have been ineffective.
- During rain events, these conditions can create substantial erosion and sedimentation, which may reduce habitat or create aesthetically-challenged viewsheds.
- The User Survey in 2005 showed support for temporary trail closures (59% favor) rather than permanent trail closures (46% favor) to address wildlife impact or condition problems. There was majority support (51% favor) for educational programs to address problems.
Table 2. Summary of Preserve trail mileages.

<table>
<thead>
<tr>
<th>Type of trail</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated trails</td>
<td>22.7</td>
</tr>
<tr>
<td>Wider “fire roads”</td>
<td>16.4</td>
</tr>
<tr>
<td>Single-track or steeper trails</td>
<td>6.3</td>
</tr>
<tr>
<td>Connected non-Preserve trails</td>
<td></td>
</tr>
<tr>
<td>Schabarum Trail</td>
<td>21.0</td>
</tr>
<tr>
<td>Trails by type of use</td>
<td></td>
</tr>
<tr>
<td>Multi-use</td>
<td>13.4</td>
</tr>
<tr>
<td>Hiking only (no horses or biking)</td>
<td>4.5</td>
</tr>
<tr>
<td>Hiking/horses only (no biking)</td>
<td>3.1</td>
</tr>
<tr>
<td>Hiking/biking only (no horses)</td>
<td>0.6</td>
</tr>
<tr>
<td>Temporarily closed (due to hazards)</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Use-impact relationships

- There is considerable literature on types and amounts of use and its effects on trail conditions and ecological impacts. Reviews of major findings can be found in Weir, 2000; White et al, 2006; Yorks et al., 1997; Pickering et al, 2009. In general, this literature recognizes the complexity of impacts and ways to address them, while underlining several general findings:
  - User-created or poorly-designed trails often create greater impacts.
  - Pioneering use causes greater impacts compared to steady use after a trail has been created.
  - Trail design and routing matter more than level of use.
  - There are variable effects from different types of use, with horses and bikes typically producing substantially larger impacts than hiking.
- Trail design/construction techniques can substantially improve the ability of trails to handle higher use levels and reduce impacts, including:
  - Ditching along upslope side of trail directs water away from the trail surface or passes it perpendicular across the trail;
  - Water bars divert water to prevent trails from becoming drains or active creeks.
  - Light-penetrating boardwalks provide hardened surfaces for users but allow vegetation growth and small fauna passage;
  - Overlaid gravel on filter fabrics provides hardened surface but allows water passage across wetlands.
Indicators and standards

- Percent change in type/condition of designated trails.
- Estimated miles of user-created trails.
- Identify indicator trail segments of different types and monitor condition.
  - Trail width
  - Tread condition
  - Sedimentation in side canyon transient streams.
- Counts of existing high bank locations.
- Counts of existing “switchback cuts” on existing trails.
- Possible standards for any of the above: no downward trend, no net change from current, reduction by 50% (or some lower amount if 50% is not realistic).

Actions to reduce or mitigate trail impacts

- Education regarding user-created trails.
- Signs, brushing, and other techniques to “close” user-created trails.
- Water bars and other erosion control mechanisms on main fire roads.
- Grading to create “crown” that reduces rain-caused erosion.
- Re-vegetation of trail widths to discourage widening.
- Retaining walls and steps on steep designated trails.
- Re-design steepest trail segments.
- Make some steep trails one-way for bikes.
- Close designated trails. This could include seasonal closures (to protect sensitive species during a nesting season), temporary closures (1 to 2 year closures to allow rehabilitation or restoration efforts to stabilize, or until trail design/improvement funding can be obtained), or permanent closures (to solve a recurring trail conflict issue or address systemic sensitive habitat or erosion problems). In general, closures should be considered as progressive steps (shorter closures should be tried first to see if they address the problem; a permanent closure should only be used if no other option works).

Figure 9. Hikers on Turnbull Canyon trail.
A short history of Preserve trail management
Adapted from the 2007 RMP by Andrea Gullo, Lizette Longacre, and Doug Whittaker.

The Preserve’s primary goal is to protect habitat and natural resources, but the Habitat Authority is committed to access and recreation opportunities. The challenge is ensuring use and access consistent with habitat protection.

In 2004, the Habitat Authority embarked on a trails evaluation and planning process. The process was guided by a Trails Committee that included Habitat Authority staff, consultants, and stakeholders (led by Jim Donavan from the National Park Service’s Rivers, Trails, and Conservation Assistance program). The process included 1) a University of Southern California-conducted User Survey to assess trail use levels and users’ desires, knowledge, and attitudes; 2) a GPS-based trail inventory that identified about 60 miles of designated trails, fire and utility access roads, and user-created trails and shortcuts; and 3) an on-the-ground trails evaluation by the Trails Committee that recorded trail widths, clearances, slopes, surfaces, settings, trail conditions, estimated use levels, existing improvements, barriers, and scenic qualities. All the information was entered into a comprehensive Geographic Information System (GIS) to identify issues and develop recommendations. Several studies from 2004-07 assessed natural and cultural resource values of the Preserve, including soils, small mammals, bats, birds, plant communities, and archeological resources (also entered into the GIS).

In 2007, a Draft Trail Plan recognized a 44-mile trail network in and around the Preserve, while closing and restoring about 16 miles to protect natural resources. It restricted access in a few areas that were unsafe or inappropriate for users, including steep slopes where conditions were already degraded and sensitive habitat identified for protection or restoration. The Plan also authorized temporary closures to reduce hazards or impacts. Of the 44 designated trail miles, about 23 miles are in the Preserve, and 21 miles are part of the County’s linked Schabarum Trail. Of the 6 miles of user-created trails identified in the Preserve, about 5 miles were slated for closure and restoration. These user-created trails contribute to erosion, habitat fragmentation, alteration of natural drainage patterns, introduction of exotic vegetation, degradation of native vegetation, and increased human-wildlife conflicts. A handful of short user-created trails (totaling about one mile) were converted to designated trails to provide loop opportunities.

After public meetings and a California Environmental Quality Act (CEQA) review, the Final Trail Plan was adopted as a sub-element of the Habitat Authority’s RMP in 2007. Trails were named through a public process, leading to public maps and in-the-field signs.

The adopted Trail Plan included:
- Prioritizing resource protection and locating new trails away from sensitive habitat areas
- Relocating or decommissioning trails with impacts on native habitat or other resources
- Providing diverse and interesting trail experiences to minimize unauthorized trail use
- Using best management practices in the design, construction, and maintenance of trails
- Formulating seasonal trail guidelines (if necessary), including rotation of access points during nesting seasons or other sensitive periods

The Habitat Authority’s existing practice is to allow pedestrian and equestrian access to most trails and fire roads, while allowing bicycle access to most fire roads but a smaller proportion of designated single-track trails. The Habitat Authority continues to evaluate the trail/road network, seeking opportunities to minimize user impacts on soils, water quality, native habitat, and wildlife while improving current trail opportunities. The plan also allows limited consideration of new trails. Specific goals and objectives relating to public use of the trail network can be found in section 5.3.3 of the RMP.
Vehicle-wildlife collisions

Issues and background
- The Preserve has roadway underpasses at Colima Road and Harbor Blvd; the latter was purposefully built as a wildlife underpass.
- Although the underpass built on Harbor Boulevard is actively used by deer, bobcats, coyotes, skunks, raccoons, and other animals, many cross at surface level along Harbor Boulevard and are killed by vehicles (Stapp and Elliott 2008; Stapp and Cashin 2009). Wildlife-vehicle collisions also occur along Workman Mill, Colima, and Hacienda roads.

Use-impact relationships
- Literature on wildlife-crossings and roadways does not identify human use as a major factor (Huijser et al, 2007).
- The number of collisions appears to be more closely correlated with other variables that improve efficacy of crossings: fencing, speed limit changes, location of underpasses, and escape ramps from fencing. There are also trade-offs of fencing that directs wildlife to crossings and providing broader connectivity between habitats that may be split by roads.

Indicators and standards
- Number and type of species using underpasses (remote cameras)
- Number and type of road kill per survey – compare with Elliott study protocols.
- Standards should be tied to no increases or reductions to some lower level.

Actions to reduce or mitigate impacts
- Education to reduce human use of underpasses (human use may discourage wildlife use).
- Build additional wildlife underpass on Colima Road (may be able to build small and medium mammal culvert-style access).
- Traffic calming options (e.g., reduce road widths, reduce speed limits, increase enforcement, or add warning signs).
- Fencing near heavily-used wildlife crossings (may also direct wildlife to use underpasses).
- Increase ranger enforcement effort along roads a key crossing periods (e.g., tickets for excessive speed at dusk).
Human-caused fire hazards

Issues and background

• There are some known party sites where smoking may produce fire hazards – some are used during the day, while others are more likely to be used at night.
• Smoking may occur among some recreation users along trails, and may also present some fire risk dispersed through the entire Preserve.
• Fire prevention was the most strongly favored management option in the 2005 user survey (73% favor). Wildfires were also the most commonly noted “thing that makes you feel unsafe about being in the park or in the park proximity” (23%), although the highest response to this question was “nothing” at 41%.

Use-impact relationships

• Information on historical fires suggests there have been 28 fires in the Preserve since 1967, with three fires exceeding 800 acres. Since 2010, there have been five fires but one was about 10 acres (Sept 2010), with the remainder being “patch fires” less than an acre each. At least one may have been associated with a nighttime party, although others appear to have started from private property (unclear cause).
• Literature on fire education suggests there may be differences in fire hazards associated with unintentional (e.g., improper cigarette disposal) and intentional behaviors (arson). In both cases, higher recreation use does not appear to exacerbate the risk.

Indicators and standards

• Number and location of citations for smoking; no increase.
• Number and location of fire rings/party sites; decrease to zero.
• Number of arson incidents; zero tolerance.

Actions to reduce or mitigate impacts

• Education hang tag
• Education at kiosks perhaps with periodic message, in brochures
• Enforcement – party-site shutdown strategies and work with local law enforcement
• Enforcement – after hour fine changes
Recreation quality

These issues focus on recreation resources or experiences affected by recreation use itself. Recreation use is an important secondary use of the Preserve, but is a lower priority than wildlife and habitat conservation. The issues are generally organized from highest to lowest priority. Actions are ordered from easiest to progressively more challenging to implement (the latter are used only if easier actions are unsuccessful). Indicators, standards, and actions are summarized in Table 3.

Table 3. Summary of indicators, standards, and major actions addressing recreation issues.

<table>
<thead>
<tr>
<th>Issue / Indicators</th>
<th>Standards</th>
<th>Actions to meet standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hiker-biker-horse rider conflicts</strong></td>
<td>TBD based on monitoring; stabilize or reduce.</td>
<td>• Increased education efforts (trailheads and on trails).</td>
</tr>
<tr>
<td>“Close passes per hour” between bikers and hikers on trail segments.</td>
<td></td>
<td>• Trail widening to create pass zones in key areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Redesign or reroute trails to be less steep, reducing cyclist speeds.</td>
</tr>
<tr>
<td>Average speed of bikers on downhill segments</td>
<td>TBD – monitor to establish baseline. Standard: no increase.</td>
<td>• One way trails for bikers (no bikes on steep downhill).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Close some single track trails to bikes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Temporal zoning (no bikes on some trails after X am). Bicycle calming features.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Separate trails in conflict areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Targeted ranger enforcement to help establish norms for speed and minimizing reckless riding behaviors.</td>
</tr>
<tr>
<td>Survey: tolerances for close calls, average speeds.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parking/traffic congestion in neighborhoods near trailheads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of trailhead parking occupied by location and time.</td>
<td>Less than 90% occupied is below capacity.</td>
<td>• Improved organization / delineation of spaces.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop non-roadside parking at locations aside from trailheads (but not in conflict with residents).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase permit-only parking as needed.</td>
</tr>
<tr>
<td>Number of vehicles violating permit parking regulations per week/month based on Whittier parking tickets.</td>
<td>TBD – monitor to establish baseline. Standard: no increase.</td>
<td>• Conduct user survey and use monitoring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Work to develop a transit option from Uptown Whittier.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop capacity for Whittier trailhead or overall Preserve use which would require a daily permit.</td>
</tr>
<tr>
<td><strong>Trail crowding and encounters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nine-point crowding scale – percent reporting some degree of crowding (3+ on scale).</td>
<td>&lt; 80% weekends</td>
<td>• Conduct user survey and use monitoring.</td>
</tr>
<tr>
<td></td>
<td>&lt; 65% weekdays</td>
<td>• Increase roadside areas where permitted parking is required (this is likely to be more effective near the Whittier trailheads).</td>
</tr>
<tr>
<td>People per trail segments (300 feet) from photo evaluations (requires on-site survey research).</td>
<td>TBD</td>
<td>• Develop education materials about crowding to help redistribute use (encouraging crowding-sensitive users to shift to lower use times or trails).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop a permit system and manage to established capacity.</td>
</tr>
</tbody>
</table>
Table 3 (continued). Indicators, standards, and major actions addressing recreation issues.

<table>
<thead>
<tr>
<th>Issue / Indicators</th>
<th>Standards</th>
<th>Actions to meet standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail conditions (potential hazards and aesthetics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average widths of fire roads and single-track trails</td>
<td>Reduce wider areas to average widths</td>
<td>• Education regarding user-created trails.</td>
</tr>
<tr>
<td>Number of “high marking” areas.</td>
<td>Reduce to zero or at least no net increase.</td>
<td>• Signs, brushing, to “close” user-created trails.</td>
</tr>
<tr>
<td>Number and miles of user-created trails.</td>
<td>No redundant trails; reduce mileage by 50%.</td>
<td>• Water bars/erosion control facilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Grading to create trail crown -- reduce erosion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Re-vegetation to reduce trail widths.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Retaining walls and steps on steep designated trails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Re-design steepest trail segments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make some steep trails one-way for bikes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Close poor condition designated trails.</td>
</tr>
</tbody>
</table>

Hiker-biker-horse rider conflicts

**Issues and background**

- A few single track trails have both biking and hiking use – and may not have enough room for easy passage (especially if bikes travel in both directions).
- Other trails have steep grades that may encourage bikes to travel too fast, endangering themselves or hikers.
- Bikes and horses may have conflicts on other trail segments.
- There have been a few reports of injuries and collisions, but this is not formally tracked.
- A website that allows bikers to upload GPS information from their exercise routes suggests that some Preserve cyclists average more than 15 mph on downhill segments (including some single-track trails), with 25 mph peak speeds (usually on the wider fire roads). The Preserve bicycle speed limit is 15 mph. If there is moderate hiker use on the same trails, these speeds could represent a substantial safety concern.
- A review of literature on trail conflicts is available from the Federal Highway Administration and National Trails Recreational Advisory Committee (Moore, 1994).

**Use-impact relationships**

- Levels of use are not usually correlated with conflicts, but can exacerbate them.
- Literature on hiker-biker conflicts is available in Moore (1994) and Alleyne (2008). The International Mountain Biking Association (IMBA; 2007) has developed standards for trail widths, grades, and speeds and discussed approaches to risk management and trail design.

Figure 11. Bikers and hikers on trail in Hacienda Heights.
**Indicators and standards**

- Number of “close passes per hour” between bikers and hikers on different trail segments. May be calculable from positioning a camera to focus on a section of trail over a period of time (e.g., high bike use times in morning from 8 to 10) on high use days (weekends). The camera should probably trigger every 15 seconds or so (480 images per 2 hours) to ensure coverage. Photos do not allow observations of avoidance behavior by cyclists or hikers, but they may allow measurement of distances between users during passes, or whether hikers stepped off trail.

- Average speed of bikers on downhill segments (radar gun, data from Strava website where users upload their own GPS data from rides).

- Survey of users to ask about number of close calls they have experienced ever, per hour, etc. This could also be used to estimate tolerances.

**Actions to reduce or mitigate impacts**

- Education of bikers, hikers and equestrians on conflict segments (e.g., presentations at La Habra Heights equestrian meetings).

- Trail widening to create passing zones in key areas (e.g., in non-sensitive wildlife habitat, and where widening would substantially reduce collision risks).

- Redesign or reroute trails to be less steep, reducing cyclist speeds.

- One-way trails for bikers (no bikes on steep downhills).

- Close some single track trails to bikes.

- Temporal zoning – for example, no bikes allowed on some segments after a certain time in the morning. These types of actions may be challenging to enforce, but could allow short windows without a full closure if hikers and cyclists showed consensus support. These kinds of solutions typically require extensive stakeholder involvement.

- Create terrain changes on the trail to slow down bikers (these may actually attract some riders who enjoy such obstacles, while others consider them hazards).

- Separate recreationists by making certain trails available only to one type of recreation (e.g., adding bikers only trails so they do not have to use certain multi-use routes). This is probably a best solution from a user perspective, but adding miles of trail would substantially reduce wildlife habitat and may not be a realistic ecological option.

- Targeted enforcement to help establish norms for speed and minimize reckless riding.
Parking/traffic congestion in neighborhoods near trailheads

Issues and background
- Crowded parking in residential areas is a recent problem as use has increased.
- The problem is greater in Whittier, where residents have successfully petitioned the City to close several side streets to unpermitted vehicles.
- This appears to have pushed visitor parking to side streets without the restrictions (but which are farther from trailheads).
- Recent complaints from Hacienda residents suggest the problem may appear on that side.
- There is little systematic tracking of violations of the parking permit program.
- Interaction between visitors and residents after using the preserve has been an issue (e.g., visitors picnicking in residents’ yards etc.)

Use-impact relationships
- Parking is probably related to use, because 83% of Hellman Park and 79% of Turnbull Canyon users travel to the Preserve via a private vehicle (2012 Visitor use survey). However, many users can walk to the trailheads from residences or downtown roadside parking where permits are not necessary, which may complicate the relationship.

Indicators and standards
- Percent of trailhead parking occupied by location and time. Less than 90% occupied is considered below capacity.
- Number of vehicles violating permit parking regulations per week/month based on Whittier parking tickets.
- Miles of side roads in permit-only zones.

Actions to reduce or mitigate impacts
- Increase parking at trailheads, although there is little space available at existing access points (especially Hellman and Turnbull). Improved organization and delineation of parking spaces, however, might ensure that available spaces are used efficiently).
- Develop non-roadside parking at locations aside from trailheads (but not in conflict with residents).
- Increase permit-only parking as needed.
- Conduct a user survey and use monitoring.
- Work to develop a transit option from Uptown Whittier.
- Develop capacity for Whittier trailhead or overall Preserve use which would require a daily permit (see side bar on permit system considerations above).
Density and perceived crowding

Most researchers recognize a difference between use density and crowding (Shelby et al., 1989). Density is a descriptive term that refers to the number of people per unit area (and it can be determined objectively). Crowding is a negative evaluation of density; it involves a value judgment that the specified number is too many. The term perceived crowding is used to emphasize the subjective or evaluative nature of the concept. Researchers have developed a simple measure that asks how crowded they feel during their visit (first developed by Heberlein & Vaske, 1977). Responses are given on a 9-point scale:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Extremely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowded</td>
<td>Crowded</td>
<td>Crowded</td>
<td>Crowded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results can be analyzed in several ways. The traditional analysis collapses the scale into a dichotomous variable. This provides a conceptually meaningful break point between those who labeled the situation as “not at all crowded” (scale points 1 and 2, a positive evaluation), and those who labeled the situation as slightly, moderately, or extremely crowded (scale points 3 through 9, a negative evaluation). While other analyses of central tendency have been proposed, a comparison showed correlations of .90 to .95 with the traditional scale (Vaske and Shelby, 2011), suggesting few differences among these choices.

Since 1975, this single item indicator has been used in over 200 studies conducted across the United States, Canada, New Zealand, Australia, and Korea resulting in crowding ratings for over 600 different settings/activities (Vaske & Shelby, 2008). The activities included hiking, backpacking, wildlife viewing, wildlife photography, hunting of many types, fishing of many types, rafting, canoeing, tubing, motor boating, rock climbing, sailing, and driving for pleasure. The areas represented considerable diversity, with some showing extremely high density and use impact problems, others illustrating low densities and no problems, and still others actively utilizing management strategies to control densities and use impacts.

A meta-analysis of 35 studies (Shelby, et al., 1989) identified five “rule of thumb” categories when the scale was collapsed in the manner described above. The most relevant ones distinguish normal conditions (less than 65% report some degree of crowding) from over capacity conditions (66 to 80%) and greatly over capacity conditions (over 80%), with these thresholds options for possible standards.

This indicator would be helpful for assessing the quality of recreation experiences in the Preserve. The 2005 user survey for the Preserve did not include the standard perceived crowding measure, but future replications could and should. It offers a quick, reliable indicator of overall crowding and can suggest if the area needs additional attention to address these important social impacts. It allows comparisons between Puente Hills and other locations, and within different areas in Puente Hills to identify “crowding hot spots.”
Use limits and permit systems

Use limits (e.g., a permit system) are the most direct mechanism that can be used to maintain a capacity for a recreation use area such as the Preserve. These are common in many backcountry areas, but usually for overnight users on longer river or wilderness trips. A few exceptions include limits to climb popular peaks (e.g., Mount Whitney, Half Dome) and the recently adopted day use (traffic) limits in Yosemite Valley. In most higher use settings like the Preserve, use is typically controlled through parking facilities rather than permits. But if use continues to increase, and Preserve agencies want to keep it from exceeding capacities defined by the standards above, it is possible to design a system to achieve this.

If a permit system were contemplated for the Preserve, considerations include the following:

- A capacity needs to be defined first, based on indicators and standards examined in these guidelines.
- Capacities could be established for the entire Preserve or for a subset of access points (e.g., for Hellman and Turnbull only).
- The capacities and permit system could be applied to a subset of days (e.g., weekends only, or for a defined higher use seasons such as spring and fall).
- The system could be modified to limit use only at peak times.
- The permit system would be operated through an online website.
- Users would register online before entering the Preserve on a given day (or for a specified time period such as mornings from 7:30 to 9:30). They would identify a name, number in their party, and trailhead(s) they will use.
- The website would keep a running tally of registrations; once it reaches the defined capacity, no more users would be allowed to register. The running tally lets prospective users know likely levels of use — as the number approaches capacity, users may plan to come on another day. On Oregon’s Deschutes River, a similar system re-distributed use from higher to lower use days so effectively that the capacity limits were formally lifted within a few years.
- Users can print out their number (or store it on their phones) to prove they have registered.
- Rangers can access the database to check if a person has registered.
- Any user without a registration can be fined.
- Decisions are needed about how far in advance people would be able to make a registration. On the Deschutes, different proportions of the capacity were available at different periods (e.g., 6 months, 2 months, 2 weeks, 2 days). For the Preserve, where shorter trips are the norm, some registrations could be available about a week in advance, but most might be released daily to allow spontaneous use.
Trail crowding and encounters

Issues and background

- Use has been increasing dramatically in the Preserve. Between the 2005 and 2012 surveys, use increased as much as 800 percent at one location. On high use days, as many as 500 people may enter the Preserve.
- The sheer volume of use has created higher densities on trails and at resting areas that probably detract from user experiences.
- The highest use increases have occurred from the Whittier access points (including attractions such as the water tower just off the Preserve on Rose Hills Memorial Park property). However, increases are also evident at the Hacienda Heights access areas.
- Managing for low numbers of trail encounters or to reduce crowding has long been a traditional concern in backcountry and wilderness settings, where extensive research suggests people prefer less than a handful of encounters with other groups per day.
- In higher use settings like the Preserve, there is less research defining high quality experiences. Recent research and planning on hiking trails in Yosemite Valley suggests that users prefer trail densities less than 25 people per 100 yards of trail, would accept about 60 people, but would leave at 90.
- With about 86% of Preserve users reporting that they use the area for exercise, while another 25% report interest in “adventure sports,” users may be even less sensitive to densities and crowding (2005 survey). However, about 31% of 2005 users reported they were interested in seeing fewer users, and many reported interest in “being outdoors” (71%), “experiencing nature” (60%), “escaping the city” (42%), and “seeing wildlife” (42%).
- There is a difference between use density and crowding (see sidebar below), but both can be evaluated by users to help estimate acceptable use levels in recreation settings.

Use-impact relationships

- Social interaction impacts such as encounters or perceived crowding are highly correlated with use levels (Manning, 2007).
- There is extensive literature on encounters in backcountry settings, and perceived crowding in many settings (see sidebar below). Trail density and crowding information from Yosemite, Arches, and Acadia National Parks may be able to help frame density information for the Preserve, but more precise standards for this place probably requires targeted research.
**Indicators and standards**

- Nine-point crowding scale. Potential standards: < 80% feel some degree of crowding (weekends) and < 65% weekdays.
- People per trail segments (300 feet) from photo evaluations (requires on-site use-condition and survey research).

**Actions to reduce or mitigate impacts**

- Conduct a user survey and use monitoring.
- Increase roadside areas where permitted parking is required (this is likely to be more effective near the Whittier trailheads.
- Develop education materials about trail crowding organized by time and space. This information may re-distribute some use (encouraging crowding-sensitive users to shift to lower use times or trails). A potential unwanted consequence of this action is that it may sufficiently increase use on those lower use trails or periods (and thus detract from those relatively unique lower density experiences, or increase levels of wildlife-disturbance on those previously low use trails).
- Develop a permit system to enforce a defined capacity (see sidebar discussion below).

**Trail conditions (hazards and aesthetics)**

This issue is closely related to ecological impacts from trails and trail use as discussed earlier; however, this focuses on users’ perceived impacts (hazards and aesthetics).

**Issues and background**

- Some trails and use areas have a “beat-out” appearance; this is related to poor tread, erosion, expanding widths, or multiple trailing.
- Some areas have user-created trails on nearly every ridge, suggesting a “go anywhere” cluster of trails.
- Some of these conditions (especially ruts and uneven tread) may create hazards for horses and bikes, which may affect interactions between hikers and these other users.
- Impacts and the sheer number of trails may reduce a sense of naturalness and detract from recreation experiences.
- Impacts may encourage depreciative behavior because they suggest the area is not being well-tended or managed. This is related to the Wilson and Kelling (1983) “broken windows” theory that suggests poor environmental conditions may encourage higher occurrences of vandalism and crime.
Use-impact relationships
- Many of these conditions are not related to use per se, but to trail design and maintenance (see earlier discussion on ecological impacts from trail use).
- Literature on hiker-biker conflicts may help explain the link between trail design and conflicts, identifying appropriate trail width standards for shared paths of different grades.

Indicators and standards
- Average widths of fire roads and single-track trails.
- Number of “high marking” areas.
- Number of user-created trails along main trail routes.
- Possible standards: No net increase of wider areas or high marking areas. No redundant designated trails. Limit or reduce number of user-created trails.

Actions to reduce or mitigate impacts
- Education regarding user-created trails (hang tags, kiosks, outreach).
- Signs, brushing, and other techniques to “close” user-created trails (although this has had limited success despite concerted efforts on several trails over the past seven years).
- Water bars and other erosion control mechanisms on main fire roads.
- Grading to create “crown” that reduces rain-caused erosion.
- Re-vegetation to discourage widening.
- Retaining walls and steps on steep designated trails.
- Re-design steepest trail segments, which may include adding steps, water bars, or other erosion control features or more radical re-designs that alter routes and reduce grades.
- Make some steep trails one-way for bikes and coordinate with Los Angeles County Department of Parks and Recreation regarding their adjoining trails (e.g., Mariposa, Ahwingna, and Native Oak trails).
- Close redundant designated trails.
**Depreciative behavior**

These issues focus on impacts from deprecative behavior. The issues are generally organized from highest to lowest priority. Actions are ordered from easiest to progressively more challenging to implement (the latter are used only if easier actions are unsuccessful). Indicators, standards, and actions are summarized in Table 4.

**Table 4.** Indicators, standards, and major actions addressing deprecative behavior issues.

<table>
<thead>
<tr>
<th>Issue / Indicators</th>
<th>Standards</th>
<th>Actions to meet standards</th>
</tr>
</thead>
</table>
| **Graffiti and vandalism of trailhead facilities / natural features** | Zero tolerance goal; establish baseline level and then reduce by half as standard. | • Reduce signs at trailheads that attract graffiti.  
• Develop signs closer to the ground.  
• Improve “sense of arrival” at Whittier trailheads.  
• Increased nighttime enforcement (near party sites).  
• Cameras pointed at common graffiti locations.  
• Expanded abatement efforts.  
• Targeted increased enforcement.  
• Create graffiti abatement crew that tracks and abates graffiti along transects (separate from routine abatement conducted by law enforcement rangers). |
| Number of graffiti tags painted over or removed per day/week by location | | |
| **Trailside litter and dog waste** | Zero tolerance goal; establish baseline and reduce by half. | • Increased clean-up efforts.  
• Offer dog waste clean-up bags at trailheads (experiment).  
• Increase educational efforts.  
• Focus education on water bottle litter.  
• Limit the days dogs are allowed in the Preserve or prohibit dogs part or all of the Preserve.  
• Increased targeted ranger enforcement. |
| Volume of litter during specified clean-ups. | | |
| **Dumping (non-recreation users)** | Zero tolerance goal; establish baseline per year and reduce by half. | • Roadside barriers to discourage stopping at common dumping sites.  
• Road signs announcing rewards for whistleblowing.  
• Clean-up efforts coordinated with local authorities.  
• Work with local jurisdictions to restrict vehicle parking or stopping along curbside near common dumping sites. |
| Number of dumping incidents by location and type. | | |
| **Crime and personal safety** | Zero tolerance goal; establish baseline level and then reduce by half. | • Increased enforcement directed by timing and locations of documented problems. |
| Reported personal crimes. | | |
Graffiti and vandalism of facilities / natural features

Issues and background

- Graffiti and related vandalism of signs, kiosks, gates, walls, trees, etc. are continuing problems in the Preserve.
- Tagging appears most common close to trailheads and along popular trails, as well as at the water tower (a common destination, just outside the Preserve).
- Rangers are split on whether tagging most commonly occurs during the day or at night (may be both).
- There is general consensus that tagging is associated with adolescent males, but there is uncertainty about the proportion of graffiti associated with gangs or territorial markings (sometimes identified separately from tagging).
- Rangers consistently remove graffiti when possible, usually by painting it over. Literature suggests that removal within 24 hours reduces repeated tagging by the instigators (Sandag, 2012).
- There is a $500 reward for information that leads to successful prosecution of graffiti vandals (started in 2014). The program is too new to evaluate success.
- Some suggest that tagging may be reduced in some environments by “legal walls” (where graffiti is allowed) or by purposeful murals on walls that see frequent tagging (Crew 2006).

Use-impact relationships

- This impact does not appear to be related to level of use; it is produced by a small number vandals.
- This type of depreciative behavior is best reduced through immediate abatement. Following from “broken window” theory, environmental cues (“early disorder”) lead to or at least correlate with additional vandalism and weaken other norms (Wilson and Kellen, 1982; Skogen, 1990; Cialdini, 2006).

Indicators and standards

- Rangers currently do not systematically track the number of graffiti tags they paint over or remove. A simple system that identified location and extent of graffiti might identify patterns and help direct enforcement. Because there is a substantial reporting burden, it might make sense to do this only for short periods (e.g., some nights of the week, a few days every month, etc.) or to organize efforts through Habitat Authority volunteers.
program should be conducted systematically by location or time (e.g., Hacienda Heights for one time period, Whittier for another) so we have comparable data.

- While a zero tolerance standard is an obvious goal; establishing a baseline and trying to reduce it by half might be reasonable targets.

**Actions to reduce or mitigate impacts**
- Reduce kiosks and signs at trailheads that attract graffiti.
- Develop signs closer to the ground that might not attract graffiti (and located off-trail so they are not tripping hazards).
- Improve “sense of arrival” and standard of care at Whittier trailheads (Hellman and Turnbull). Both have an undeveloped recreation setting that does not connote a Preserve / natural setting that deserves more protection. In contrast, the wrought iron fences and design features at Hacienda are good examples and may account for less graffiti at those locations.
- Nighttime closure enforcement (especially near party sites).
- Cameras pointed at graffiti locations in an attempt to identify vandals (although cameras must be hidden or protected or they will be vandalized or stolen).
- Expanded abatement efforts (e.g. coordinate further with local law enforcement).
- Directed enforcement – identify likely times and try to identify taggers.
- Create a graffiti abatement crew that tracks and abates graffiti along transects. This program would be separate from routine graffiti abatement conducted by law enforcement rangers.

**Trailside litter and dog waste (distinct from party-site litter)**

**Issues and background**
- Litter is a perennial problem along heavily used trails.
- Water bottles are probably most common, but paper and dog waste bags are also common.
- Present litter may cue additional litter, so prompt clean-up is the most effective management response (Cialdini, 1990).
- Dog waste not in bags is particularly common in the first few hundred yards of trailheads.
- Rangers track contacts with dog owners who have dogs off leash and ask whether they are carrying waste bags (which can result in warnings or citations).

**Use-impact relationships**
- Littering is probably less-related to use level because it is produced by a few users. However, only 1% of a population litterers, 1,000 visitors per week will produce more litter than 100 visitors per week.
• Research suggests that norms (presence of other litter or observations of others littering) are a larger contributing factor than total level of use.

• Other mediating variables include users’ ascription of responsibility (the extent to which users believe they are personally responsible for maintaining a litter-free environment) and their awareness of consequences (knowledge of the negative consequences of litter on wildlife or aesthetics).

**Indicators and standards**

• Rangers currently do not track the amount of litter they collect during routine patrols, and similar information is not collected during clean-up events. Both could be helpful for assessing the current state of the problem and whether education efforts are working.

• A simple system that identified location and extent of litter removed might help identify patterns and direct clean-up efforts. Because there is a substantial reporting burden, it might make sense to do this only for short periods (e.g., for a week after a clean-up effort to identify rates of new litter accumulations).

• While a zero tolerance standard is an obvious goal; establishing a baseline level and then trying to reduce it by half might be acceptable.

**Actions to reduce or mitigate impacts**

• Clean-up efforts.

• Experiment with trailheads providing dog waste bags. There is some evidence from dog parks that availability of bags increases compliance.

• Increase educational and interpretational efforts.

• Although a ban on disposable water bottles might help solve the litter problem (bottles are by far the most common type of litter), many users bring bottles but don’t manage to pack them back out. There are health and safety needs to bring water while hiking or biking in the Preserve (where temperatures frequently exceed 80 degree and there is little shade).

• Limit the times or locations dogs are allowed in the Preserve or prohibit dogs in part or all of the Preserve. Implementing a demonstration “no dog week” (an idea originated by Bridget-Teton National Forest officials in a popular wildlife use area near Jackson, Wyoming) may send a strong wake-up message to highlight the problem and encourage better dog-owner behavior.

• Increased targeted enforcement.
Dumping (non-recreation users)

Issues and background

- This issue is most prominent along Turnbull Canyon Road, where non-recreation users occasionally dump large items or trash bags.

Use-impact relationships

- This activity is not related to the level of recreation use.

Indicators and standards

- Rangers should record all dumping locations so these can be tracked over the long term.
- While a zero tolerance standard is an obvious goal, establishing a baseline per year and then trying to reduce it by half might be moderately challenging target.

Actions to reduce or mitigate impacts

- Dumping is notoriously difficult to catch because it usually occurs at night in deserted locations. If dumping happens at specific locations with turnouts, roadside barriers that closing such sites may be helpful.
- Install roadside signs or implement joint reward program with local jurisdictions. Announced penalties at least announce interest in reducing this depreciative behavior, and possibly ramping up public awareness of consequences and personal responsibility.
- Clean-up efforts coordinated with local authorities are probably the best way to directly address the impacts, but funding sources for this work can be scarce.
- Work with local jurisdictions to implement restrictions in vehicle parking or stopping along curbside.

Figure 19. Dumping along a rural California Highway (not in Preserve).
Crime and personal safety

Issues and background
- Rangers keep track of arrests and citations for criminal activity. Most focus on violations of Preserve rules (e.g., dogs off leash, after hours use, prohibited bike use, drugs and alcohol use, weapons, etc.)
- Vehicle code violations are also tracked.

Use-impact relationships
- This activity does not appear to be related to the level of use – it is produced by a small minority of users.

Indicators and standards
- While a zero tolerance standard is an obvious goal, establishing a baseline level and trying to reduce it by half might be acceptable.

Actions to reduce or mitigate impacts
- Increased enforcement directed by timing and location.

Other recreation management issues and options
In addition to impacts of recreation use, visitor management plans often consider facilities and related improvements. Opportunities in the Preserve include the following.
- Provide a diversity of trail opportunities, including ADA-accessible parking and short interpretive trails. At present, there are accessible trails at Hacienda Hills, Arroyo Pescadero, and Powder Canyon, but there are few miles of trail. Steep slopes may preclude additional ADA-accessible trail development.
- All five trailheads and the Turnbull Canyon access point have kiosks with a diversity of interpretive information, in addition to the Preserve website and school- and community-based educational programs. Interpretive topics are rotated at the kiosks to keep messages fresh. Continued coordination among these programs is likely to enhance their quality.
- There are portable toilets at Arroyo Pescadero, Powder Canyon, Sycamore Canyon and Hacienda Heights, but none at the highest use trailhead (Hellman Park). The development of a toilet at Hellman, or improvements of other toilets (from portables to vault toilets), are options if funding becomes available. More frequent toilet pumping/cleaning of existing portable toilets may improve these facilities as an incremental step.
- The Preserve currently does not provide dog waste bags at trailheads even though it requires dog owners to have them. Many parks in dog walking areas have found these
programs reduce dog waste and eliminate an excuse for dog owners without bags. An experimental period with free dog waste bags should be considered; monitoring can determine cost effectiveness.

- There are garbage facilities at several trailheads and pick-up services. Users sometimes leave their trash next to full cans (which may be knocked over or spread by wildlife). The Preserve might consider removing the trash service altogether at some sites, at least as an experiment. Several Forest Service recreation areas have removed garbage services to reduce costs and found that the amount of litter also decreased. This idea stems from littering studies that highlight the importance of a “no garbage” place (Cialdini, Reno, and Kallgren, 1990; Cialdini, 2006).

- There are water fountains at three trailheads in the Preserve, but most users appear to carry their own water (with empty bottles creating one source of litter). Water fountains at the remaining trailheads with access to city water may be considered in the future, contingent on funding. These could be valuable for people and their pets.

- An ice water concession that operated during high use periods in the warmer months at Hellman Park or the Water Tower (Rose Memorial property just off the Preserve) could provide a funding source for Preserve programs as well as interpretive and trail education opportunities. Although there are some impacts from such a program (at least one vehicle on Preserve fire roads if it is located within the Preserve; loss of naturalness), it could provide water to thirsty users, reduce bottle use and litter, and offer contact between the Preserve and visitors for educational messages. Even if there is not a concession, free ice water on a few select weekend days might invoke a “reciprocity norm” that will encourage greater attention and goodwill toward the Preserve’s messages and goals.
References


Taylor, M., (2012). Addicted to the risk, recognition and respect that the graffiti lifestyle provides: Towards an understanding of the reasons for graffiti engagement. International Journal of Mental Health & Addiction, 10(1), 54-68.


# Appendix A. Trail Inventory and Evaluation Form
From 2004-07 trail planning process.

## Puente Hills Landfill Habitat Preservation Authority Trails Inventory

<table>
<thead>
<tr>
<th>Trail Number:</th>
<th>Trail Segment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nearest Existing Trail:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trail Classification:</th>
<th>Potential Barrier/Obstacles (check all that apply):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Track Trail (1 to 4 ft</td>
<td>Steep Grade (&gt; 10%)</td>
</tr>
<tr>
<td>Dual-Track Trail (&gt; 8 ft)</td>
<td>Overgrown/Needs Maintenance</td>
</tr>
<tr>
<td>Fire Road/Utility Easement</td>
<td>Eroded</td>
</tr>
<tr>
<td>Voluntary Trail</td>
<td>Uncontrolled Access</td>
</tr>
<tr>
<td>Other:</td>
<td>Fencing</td>
</tr>
<tr>
<td>Trail Width:</td>
<td>Steps</td>
</tr>
<tr>
<td>Slope:</td>
<td>Difficult Access</td>
</tr>
<tr>
<td>ADA Access? (check if yes)</td>
<td>Impaired Vertical Clearance (&lt; 10 ft)</td>
</tr>
<tr>
<td>Easy (&lt; 5% sustained slope)</td>
<td>Other:</td>
</tr>
<tr>
<td>Moderate (&lt; 8.3% sustained slope)</td>
<td></td>
</tr>
<tr>
<td>Difficult (&lt; 12.5% sustained slope)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trail Setting (check all that apply):</th>
<th>Existing Improvements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush</td>
<td>Gate</td>
</tr>
<tr>
<td>Grassland</td>
<td>Horse stepover</td>
</tr>
<tr>
<td>Riparian</td>
<td>Trailhead (Parking)</td>
</tr>
<tr>
<td>Woodland</td>
<td>Equestrian Staging</td>
</tr>
<tr>
<td>Wetland</td>
<td>Water</td>
</tr>
<tr>
<td>Other:</td>
<td>Other:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trail Condition (check all that apply):</th>
<th>Is there a trailhead opportunity (check if yes)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintained</td>
<td>Describe:</td>
</tr>
<tr>
<td>Eroded/Rutted</td>
<td></td>
</tr>
<tr>
<td>Lacking Needed Facilities</td>
<td></td>
</tr>
<tr>
<td>Short Cuts Present</td>
<td></td>
</tr>
</tbody>
</table>

| Comments: | |

<table>
<thead>
<tr>
<th>Scenic or Unique Qualities (check if yes)?</th>
<th>Number of People Encountered While Surviving:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surveyed By:</th>
<th>Date/Time Surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

Trail Rating: | |
Appendix B:  
Recreation Use Objectives from Resource Management Plan (2007)

Goal 1

USE-1: Provide a trail system that protects natural resources of the Preserve.

Objectives

USE-1.1 Consistent with the Habitat Authority’s purpose, abandon roads and trails if impacts on native habitat or other resources are discovered.

USE-1.2 Locate new trails away from sensitive habitat areas.

USE-1.3 Minimize riparian crossings to decrease disturbance of sensitive natural areas.

USE-1.4 Consistent with the Habitat Authority’s purpose, make decisions to reconstruct or reroute existing trails and emphasize minimizing ground disturbance.

USE-1.5 Consistent with the Habitat Authority’s purpose, provide diverse and interesting trail experiences to minimize unauthorized trails.

USE-1.6 Use best management practices in the design, construction, and maintenance of trails, including temporarily closing trails when needed.

USE-1.7 Implement trails in partnership with other public agencies, nongovernmental organizations and private landowners when feasible.

USE-1.8 Implement a trail system that is considerate of adjacent landowner interests as much as possible and consistent with protecting natural, visual, and cultural resources.

USE-1.9 Consistent with the Habitat Authority’s purpose, continue efforts to close key gaps in the trail system and to create an interconnected system of public open spaces along the Schabarum Trail and from nearby communities of Whittier, Hacienda Heights, La Habra Heights, and Rowland Heights.

USE-1.10 Seek methods to establish partnerships among trail interest groups to improve cooperation on trail use, volunteer maintenance opportunities, and preservation of habitat consistent with the purpose of the Habitat Authority.

USE-1.11 Maintain trails in an environmentally sustainable manner by:

- Using natural materials
- Restoring damaged areas
- Reducing or avoiding the use of chemicals
- Minimizing disturbance of habitat
- Limiting runoff and grading
Goal 2

USE-2: Enforce protection of the varied resources and promote an enjoyable and safe environment for visitors.

Objective

USE-2.1 Consistent with the purpose of the Habitat Authority, encourage uses that acknowledge the natural and scenic beauty of the Preserve and facilitate enjoyment of the outdoor experience, as well as those that promote the safety of visitors. The Preserve rules outline appropriate uses and restrictions on the use of the Preserve.

Goal 3

USE-3: Create a trail system that provides a broad public benefit by accommodating diverse uses and user abilities, consistent with the purposes of the Habitat Authority.

Objectives

USE-3.1 Consistent with its primary purpose, allow trail use on Preserve property.

USE-3.2 Permit use of fire protection roads by visitors on foot, on a bicycle, and with a horse, but limit any or all uses where the use is inconsistent with the Habitat Authority purpose.

USE-3.3 Discourage the use of trails that are not part of the system of maintained trails.

USE-3.4 Prohibit the use of motorized vehicles in open space, with authorized exceptions.

USE-3.5 Where reasonably feasible, provide access for people with disabilities within the context of the agency’s purpose, policies, and legal requirements.

USE-3.6 Connect Preserve trails to regional trails where appropriate.

Goal 4

USE-4: Accommodate parking, access points, and trail amenities that maintain the natural character of the land, enhance resource protection and contribute to the enjoyment of open space.

Objectives

USE-4.1 Rely primarily on public rights of way to provide parking capacity to serve trail users arriving by motorized vehicles.

USE-4.2 Seek to provide reasonable access points to eliminate excessive parking and avoid or minimize traffic to the surrounding community.
USE-4.3 Allow trail amenities such as, but not limited to:
• Informational displays and signs;
• Portable restrooms in areas with group use;
• Facilities to provide water and tie horses;
• Trash cans;
• Facilities to encourage the pickup and disposal of pet waste; and
• Potable water.