

**G. Monitoring**

Monitoring of the performance of the preserve system is important in determining whether management activities are meeting their objectives. It includes methods for assessing the habitat quality of conserved lands, estimating populations of species, and coordinating local data with region-wide data. As with other aspects of the overall management program, there is a need for both interim arrangements and long-term arrangements. Interim monitoring, during the first three years after approval of the HMP, will be limited to annual reporting as described in section E.5. A long-term monitoring component of the Management Plan will be coordinated with other regional monitoring efforts, and will be designed to function as either a stand alone Carlsbad program or a component of the North County MHCP.

**3. Adjacency Standards**

The HMP will result in an urban wildlife preserve system in which conserved habitat areas are adjacent to development of various types. In order to prevent negative effects of either area on the other, these adjacency standards must be addressed in the planning of any development/habitat interface:

- Fire management
- Erosion control
- Landscaping restrictions
- Fencing, signs and lighting
- Predator and exotic species control

**A. Fire Management**

**Management Issues**

Fire management must accomplish two potentially different objectives: (1) achievement of biological resources goals, and (2) hazard reduction for humans and their property. Biological resources goals recognize that fire is a natural process in ecosystems. Many vegetation communities in the study area depend on a regular cycle of burning for maintaining a balance of species, seed viability, and reproduction. The natural fire cycle is affected by human activities, both by increasing fire frequency in some locations and decreasing it in others through fire prevention measures.

Fire management for human safety is one of the City's highest priorities. With proper planning, this can be accomplished in a manner that is compatible with conservation of biological resources. Fire management for human hazard reduction involves providing adequate setbacks for new development from conserved habitat areas, educating the public regarding effective fire prevention methods, reducing fuel loads in areas where fire may threaten human safety or existing development, suppressing fires once they have started, and providing access of fire suppression equipment and personnel.

**Management Recommendations**

A detailed fire management plan should be prepared by the City so that both biological and safety goals are met. Brush management to reduce fuel and protect urban uses will occur where existing development is adjacent to the preserve. The fire management plan should, to the degree feasible, be

consistent with the recommendations of the Wildland/Urban Interface Task Force. It should:

- 1) Identify potential fuel reduction zones or firebreak locations as well as access routes for fire equipment in the event of wildland fires that pose safety concerns.
- 2) To the degree feasible, site fuel reduction zones, firebreaks, and access routes to avoid sensitive biological resources, preferably at the top or bottom of a slope rather than across a slope. Use existing firebreaks (e.g., natural ridge lines, roads, fire roads) where available.
- 3) In smaller fragmented preserve areas, manage fuel loads primarily for human safety, using mechanical fuel control measures such as chopping, crushing, disking and chaining, removal, and herbicides. Additional methods of value in smaller areas include mowing, trimming, and hand clearing. In general, chopping and crushing are the recommended methods based on biological and fuel reduction values and safety concerns. Crushing with a device called a "sheep's foot" may be an alternative form of fuel control in some situations.
- 4) In larger preserve areas, such as in northeast and southeast Carlsbad (Core Areas 5 and 7), manage both for biological resources needs and for safety considerations. Use prescribed burning, where practical, given safety and cost considerations. Fire management practices should be based primarily on the risks of uncontrolled wild fire in proximity to developed areas.

Where preserve areas are planned adjacent to existing developed areas, the fuel management zone may encroach into the preserve. Where new development is planned, brush management will be incorporated within the development boundaries and will not encroach into the preserve.

## **B. Erosion Control**

### **Management Issues**

Erosion is promoted by the combination of erodible soils, steep slopes, soils with low water-holding capacity, sparse to no vegetation, and hydrologic condition of the soils. Erosion can be aggravated by human disturbance and fire-control activities. Erosion hazards to biological resources include pollution and sedimentation of important water sources and the loss of vegetative cover from landslides.

### **Management Recommendations**

- 1) Identify and Prioritize Areas for Erosion Control
  - Identify areas of moderate to severe erosion within and adjacent to the preserve;
  - Determine causes of erosion; and
  - Rank identified erosion areas according to threats to biological resources. Include an assessment of cost for erosion control measures.

- 2) **Develop Erosion Control Plans**
  - Develop and implement an erosion control plan for high priority erosion control areas. In general, this will include establishing physical features to slow surface flow and dampen initial precipitation impact, and revegetation of eroded surfaces for long-term protection. In steep areas, rock areas, and areas of high storm flow, permanent rock or concrete revetments may be required to stabilize undesirable erosive forces.
- 3) **Address Slope Stabilization and Surface Drainage**
  - Prepare contingency native seeding plans for highly erosive areas temporarily disturbed by fire.
  - Prohibit bare surface grading for fire control on slopes. Ensure that all techniques implemented for fire control leave (or replace) adequate vegetation cover to prevent surface erosion.
  - Ensure that all areas identified for revegetation are adequately stabilized by either a binder or straw cover after planting to minimize surface erosion.
  - Ensure that no new surface drainage is directed into the preserve.

### **C. Landscaping Restrictions**

#### **Management Issues**

Landscaping (i.e., the introduction of native or nonnative plant species around developed areas) is often in direct conflict with biological objectives. Of particular concern are (1) the introduction of nonnative, invasive plant species that can displace native species in natural communities; (2) horticultural regimes (irrigation, fertilization, pest control, and pruning) that alter site conditions in natural areas, thereby promoting shifts in species composition from a native to a nonnative flora; and (3) genetic contamination from the introduction of native cultivars not collected onsite or in proximity to the site.

#### **Management Recommendations**

Because preserve lands are designated as biological open space, active landscaping should be absent or minimal. However, where problems are anticipated in preserve areas due to landscaping in nearby developed areas, the following guidelines should be followed:

- 1) **Control Exotic Plant Species**
  - Prohibit the use of nonnative, invasive plant species in landscaping palettes in preserve areas or for new public projects immediately adjacent to the preserve. This includes container stock and hydroseeded material.
  - Revegetate areas of exotic species removal with species appropriate to the biological goals of the specific preserve area.

- In the Coastal Zone, the use of invasive plant species in the landscaping for developments, such as those identified in Table 12 of the HMP, shall be prohibited.

2) Monitor Horticultural Regimes

- Control irrigation of landscaping material adjacent to the preserve to prevent runoff into the preserve. Irrigation runoff alters conditions in natural areas that are adapted to xeric (dry) conditions, thereby promoting establishment of nonnative plants and displacement of native species. In addition, irrigation runoff can carry pesticides into natural areas, adversely affecting both plants and wildlife.
- Monitor and limit, to the degree feasible, fertilization of ornamental plants on areas draining into the preserve, to reduce excess nitrogen runoff to areas of native vegetation. Excess nitrogen is detrimental to plant mycorrhizal growth and fosters exotic weed invasion. Initiate fertilizer management programs that apply the minimal amount of fertilization required for all public horticultural areas adjoining the preserve.
- Limit ornamental pest control activities adjacent to the preserve, to the degree feasible.

3) Avoid Genetic Contamination

Avoid genetic contamination of native plant species by prohibiting the introduction of cultivars of native species from different geographic regions. If these introductions are similar enough genetically to native species in the preserve, then cross-breeding or hybridization could occur. All stock introduced into the preserve that has the potential for breeding with native species already present onsite should be propagated from material collected in the vicinity. Special attention should be given to the elimination of native plant landscaping cultivars of coastal sage scrub and chaparral species taken from central or northern California locations, or from islands off the coast of southern California.

**D. Fencing, Signs and Lighting**

**Management Issues**

Fencing plays an important role in the use of the landscape by humans, domestic animals, and wildlife. Fencing can control human access, particularly off-highway vehicles. Fencing can direct wildlife to road undercrossings and prevent road kills. However, fencing also can restrict normal wildlife movement, restrict access to food and water, and guide wildlife onto roads.

Signs educate, provide direction, and promote the sensitive use and enjoyment of natural areas, but they can also inadvertently invite vandalism and other destructive behavior. Signs that explain the rules of the preserve (campfires, firearms usage, camping, etc.) are most effective at public entrance points. Signs for educational nature trails and on roads near wildlife corridors (to reduce road kills) also should be posted at appropriate locations.

Artificial lighting adversely impacts habitat value of the preserve, particularly for nocturnal species. Therefore, lighting should not be permitted in the preserve

except where essential for roadways, facility use, and safety. Along preserve edges, major highway lighting should be limited to low pressure sodium sources directed away from preserve areas.

### **Management Recommendations**

#### 1) Fencing

- Dismantle existing fencing inside the preserve, except where needed to:
  - ◊ Limit road kills; fencing should be used to funnel wildlife away from at-grade road crossings and toward undercrossings; fencing at wildlife undercrossings should be 10 feet high.
  - ◊ Protect particularly sensitive species or habitats; use perimeter fencing in linkage areas where preserve widths are narrower and there is greater exposure to adverse effects.
  - ◊ Direct human access; limit human access to designated trails using natural vegetation, topography, signs, and limited fencing.
- Design and locate fences within the preserve so they do not impede wildlife movement.

#### 2) Signs

- Provide educational brochures, interpretive centers, and signs to educate the public about the resources and goals of the HMP and preserve.
- Establish signs for access control and education at the periphery of the preserve that are open to human access. Post signs to prohibit firearms and pets.
- Use signs for educational nature trails.
- Limit the use of signs to attract attention to sensitive species, since such designation may invite disturbance of their habitat.
- Use temporary signs to indicate habitat restoration or erosion control areas.
- Use barriers and informational signs to discourage shortcuts.

#### 3) Lighting

- Eliminate lighting in or adjacent to the preserve except where essential for roadway, facility use, and safety and security purposes.
- Use low pressure sodium illumination sources. Do not use low voltage outdoor or trail lighting, spot lights, or bug lights. Shield light sources adjacent to the preserve so that the lighting is focused downward.
- Avoid excessive lighting in developments adjacent to linkages through appropriate placement and shielding of light sources.

## **E. Predator and Exotic Species Control**

### **Management Issues**

Native species are often at a disadvantage after exotic species or nonnative predators are introduced, so special management measures to control exotic species and nonnative predators are recommended. Nonnative plant and animal species have few natural predators or other ecological controls on their population sizes, and they thrive under conditions created by humans. These species may aggressively outcompete native species or otherwise harm sensitive species. When top predators are absent, intermediate predators multiply and increase predation on native bird species and their nests. Feral and domestic animals also prey on small native wildlife species. Agricultural areas, livestock holding areas, and golf courses provide resources for increased populations of parasitic cowbirds, which adversely affect native songbird populations. Litter and food waste from migrant worker camps and picnickers can contribute to an increase in Argentinean ant populations which outcompete native ants, the primary food resource of San Diego horned lizards.

### **Management Recommendations**

#### **1) Feral and Domestic Animal Control**

- Document evidence of feral or domestic animal use in the preserve.
- Establish an education program for homeowners regarding responsible pet ownership. The program should encourage (a) keeping pets indoors, especially at night; (b) having pets neutered or spayed to reduce unwanted reproduction and long-range wanderings; (c) bellling of cats to reduce their effectiveness as predators; (d) discouraging release of unwanted pets into the wild; and (e) keeping dogs on leashes when walking them on trails in preserve areas.
- Fence areas between selected areas of the preserve and adjacent housing to keep pets out of particularly sensitive areas.
- Establish a feral animal removal program.

#### **2) Cowbird Trapping Program**

- Document and monitor the extent of cowbird parasitism on target species nests in the preserve.
- If necessary, establish a cowbird trapping program to increase nesting success of target species affected by cowbird parasitism.

#### **3) Native Predator Control**

- Monitor population levels of selected native predators (bobcat, coyote).
- Institute an educational program to explain the role and necessity of large native predators within the ecosystem and the need to protect them from disturbance.
- If key native predator species (coyote, bobcat) are extirpated from the preserve, initiate a program to control mesopredators (gray fox, skunks, raccoon, and opossum).

4) Exotic Plant Control

Prioritize areas for exotic species control based on aggressiveness of invasive species and degree of threat to the native vegetation.

- Eradicate species based on biological desirability and feasibility.
- Use an integrated pest management approach, (i.e., use the least biologically intrusive control methods, at the most appropriate period of the growth cycle, to achieve the desired goals).
- Consider both mechanical and chemical methods of control. Only herbicides compatible with biological goals should be used. Only licensed pest control advisers are permitted to make specific pest control recommendations.
- Properly dispose of all exotic plant materials that are removed from preserve lands (e.g., in offsite facilities).
- Revegetate exotic weed removal areas with species appropriate to biological goals.

5) List of Invasive Exotic Plants

The following is a list of invasive exotic plants occurring or potentially occurring in the City of Carlsbad.

Table 12

**INVASIVE EXOTIC PLANTS**  
**Occurring or Potentially Occurring in the City of Carlsbad**

Scientific Name	Common Name	Comments
<i>Acacia</i> spp.	Wattle, acacia	Invades wetlands
<i>Ageratina adenophora</i>	eupatory	Invades coastal canyons
<i>Agrostis avenacea</i>	Pacific bent grass	Invades vernal pools
<i>Agrostis stolonifera</i>	creeping bentgrass	Invades wetlands
<i>Ailanthus altissima</i>	tree of heaven	Invades wetlands
<i>Ammophila arenaria</i>	European beachgrass	Invades coastal dunes
<i>Anagallis arvensis</i>	scarlet pimpernel	Invades wetlands and uplands
<i>Aptenia cordifolia</i>	red apple iceplant	Invades uplands and wetlands
<i>Atriplex semibaccata</i>	Australian saltbush	Invades coastal grasslands, scrub, and marsh
<i>Atriplex glauca</i>	saltbush	Invades uplands
<i>Arcototheca calendula</i>	Capeweed	Invades uplands and wetlands
<i>Arundo donax</i>	giant reed	Invades riparian areas
<i>Asclipias</i> sp.	Milkweed	Common weed
<i>Avena barbata</i>	slender wild oat	Non-native grass; invades grasslands
<i>Avena fatua</i>	wild oat	Non-native grass; invades grasslands
<i>Bassia hyssopifolia</i>	bassia	Invades alkaline habitats
<i>Brassica nigra</i>	black mustard	Common weed in uplands
<i>Bromus</i> spp.	Brome grasses	Non-native grass; invades grasslands
<i>Carpobrotus edulis</i>	ice plant	Invades coastal communities
<i>Centaurea melitensis</i>	toçalote	Invades grasslands
<i>Chenopodium ambrosioides</i>	Mexican tea, goosefoot	Common wetland weed
<i>Chrysanthemum</i> sp.	Daisy	Commonly invades uplands and wetland edges
<i>Cirsium arvense</i>	Canada thistle	Invades riparian areas
<i>Cirsium vulgare</i>	bull thistle	Invades riparian areas, marshes, meadows
<i>Conium maculatum</i>	poison hemlock	Mainly in disturbed areas
<i>Conyza canadensis</i>	horseweed	Invades uplands
<i>Cortaderia jubata</i>	Andean Pampas grass	Invades coastal habitats
<i>Cortaderia selloana</i>	Pampas grass	Invades coastal habitats/wetlands
<i>Cotula coronopifolia</i>	brass buttons	Invades wetlands
<i>Cynara cardunculus</i>	artichoke thistle	Invades grasslands and uplands
<i>Cynodon dactylon</i>	Bermuda grass	Invades wetlands and uplands
<i>Cyperus involucreatus</i>	African umbrella-plant	Invades wetlands
<i>Cytisus scoparius</i>	Scotch broom	Invades coastal scrub, oak woodlands
<i>Delairia odorata</i>	Cape ivy	Invades coastal and riparian areas
<i>Eucalyptus globulus</i> & other species	Tasmanian blue gum / eucalyptus	Spreads in riparian areas, grasslands, moist slopes
<i>Erodium</i> spp.	Filaree	Common weed
<i>Ficus carica</i>	edible fig	Invades riparian woodlands
<i>Foeniculum vulgare</i>	fennel	Invades grasslands, roadsides



CARLSBAD HMP

Scientific Name	Common Name	Comments
<i>Gastrium ventricosum</i>	nit grass	Invades vernal pools
<i>Hedera canariensis</i>	Algerian ivy	Invades wetlands
<i>Hedera helix</i>	English ivy	Spreads in riparian areas
<i>Hordeum spp.</i>	Barley	Non-native grass; invades grasslands
<i>Hydrilla verticillata</i>	hydrilla	Invades wetlands
<i>Hypochaeris glabra</i>	smooth cat's ear	Common weed
<i>Lactuca serriola</i>	prickly or wild lettuce	Invades wetlands
<i>Lepidium latifolium</i>	perennial pepperweed	Invades marshes
<i>Lolium spp.</i>	Rye	Non-native grass; invades grasslands
<i>Lonicera japonica</i>	Hall's honeysuckle	Invades wetlands
<i>Medicago sp.</i>	Black medic	Invades uplands
<i>Melilotus spp.</i>	Sweet-clover	Invades wetlands and uplands
<i>Mesembryanthemum crystallinum</i>	crystalline ice plant	Invades coastal bluffs, scrub and grasslands
<i>Myoporum laetum</i>	myoporum	Invades wetlands
<i>Myriophyllum aquaticum</i>	parrot's feather	Invades streams, lakes, ponds
<i>Nicotiana glauca</i>	tree tobacco	Invades wetlands
<i>Pennisetum clandestinum</i>	Kikuyo grass	Non-native grass; invades grasslands
<i>Pennisetum setaceum</i>	fountain grass	Invades grasslands, roadsides
<i>Phalaris aquatica</i>	Harding grass	Invades coastal sites
<i>Phragmites communis</i>	Reed	Invades brackish wetlands
<i>Piptatherum miliaceum</i>	smilo grass	Invades wetlands
<i>Plantago sp.</i>	Plantain	Invades wetlands and uplands
<i>Polypogon monspeliensis</i>	annual beard grass/rabbit's foot	Invades vernal pools
<i>Reama monsperma</i>	bridal broom	Invades coastal scrub, oak woodland
<i>Ricinus communis</i>	castor-bean	Invades coastal riparian and upland habitats
<i>Rorippa nasturtium-acuaticum</i>	water cress	Invades wetlands
<i>Rubus discolor</i>	Himalayan blackberry	Invades riparian areas, marshes, oak woodlands
<i>Salsola iberica</i>	Russian thistle	Invades wetlands and uplands
<i>Senecio mikanioides</i>	German ivy	Invades wetlands
<i>Schinus molle</i>	Peruvian peppertree	Invades wetlands
<i>Schinus terebinthifolius</i>	Brazilian pepper	Invades riparian areas
<i>Sonchus spp.</i>	Sow thistles	common weed
<i>Spartium junceum</i>	Spanish broom	Invades coastal scrub, oak woodland; roadcuts
<i>Tamarix spp.</i>	Tamarish, salt cedar	Invades riparian areas
<i>Tropaeolum majus</i>	garden nasturtium	Invades wetlands
<i>Vivia villosa</i>	hairy vetch	Invades wetlands and uplands
<i>Vinca major</i>	periwinkle	Invades riparian areas, oak woodlands
<i>Washington filifera</i>	fan palm	Invades wetlands
<i>Xanthium strumarium</i>	cocklebur	Invades wetlands