Eugene O'Neill and John Muir National Historic Site

Background information for Eugene O'Neill National Historic Site

Location

The Eugene O'Neill National Historic Site (NHS) is located 26 miles east of San Francisco adjacent to the west side of the incorporated town of Danville, Contra Costa County, California. Las Trampas Regional Wilderness Area administered by East Bay Regional Park District surrounds it on three sides. Access to the site is through a residential area on the fourth, downslope side.

Management Objectives

The significance of the park begins with the contribution of Eugene O'Neill to American drama. He was awarded the Nobel Prize for Literature in 1936 and four of his plays are Pulitzer Prize winners. Congress established the park in 1976 preserving 13.19 acres containing the Tao House, Eugene O'Neill's last residence.

A major park goal is to preserve the Tao House, courtyard and historic landscape in a representative scene of his home during 1941. The primary objective is to interpret and emphasize Eugene O'Neill's influence on American drama and society during his lifetime and since.

Objectives for or affecting natural resources include:

- To maintain and interpret the grounds, gardens, courtyard and orchards as nearly as possible as they were in 1941.
- To achieve an understanding of the natural ecosystem existing on the site prior to the O'Neill's arrival, the remnants of that ecosystem today, and to preserve and interpret those natural features that were important to the overall quality of life on the estate during O'Neill's tenure.
- To contain or eliminate non-native plants.

Under the MOU, present maximum visitation is 29,375. Actual average annual visitation to the site is approximately 3,360 (Shaver 2002).

Cultural Landscape

1. There is a small grove of coast redwood trees on the embankment behind the swimming pool area that was planted by the O'Neill's.
2. Various remnants of the orchards and original ornamental landscaping remain. Most of the original orchards are in the adjacent regional park. Walnut, almond and fruit orchards flanked the house and occupied much of the estate on the south and east sides. A Cultural Landscape Report will be completed in 2003.

Adjacent Land Uses

1. Las Trampas Regional Wilderness Area incorporates 3,458 acres of relatively natural landscape. Grazing is permitted and a number of developments (fences, dams and resulting ponds, water tanks) exist within the viewshed of the historic site and on land which once was part of the original O'Neill estate. Primarily because of grazing, but also to delineate the site boundary, a barbed wire fence separates the site from the regional park (NPS 1992). Visitors are able to hike between the two parks.
2. An agreement between East Bay Regional Park District and the NPS conveys the water rights of springs located above the O'Neill house within Las Trampas to the NPS. The agreement outlines the right-of-way width, facilities including drain line, spring box, 3 storage tanks, maintenance access and amount of water use (E.Bay Reg'l Pks 1991).
3. Immediately to the west of the site is a small (200 by 300 foot) pond, previously used for stock watering and irrigation. A small earth-filled dam on a perennial stream impounds it. The dam was built after the O'Neill's. The NPS has planted native trees around the pond to attempt to screen it from view. Plantings include the valley oak, willows, alders and cottonwood. The pond is not within the NPS boundary.

Natural Resources and Scientific Studies

The environment at the estate was carefully crafted by O'Neill to provide the quiet serenity and inspiration he desired to be creative. As a result of the modification made by the O'Neill's and others, very little remains of any natural landscape or ecosystem on the historic site. Some native oaks were retained in the landscape design. Other native trees were planted as part of the estate plan (the sycamores around the drive and the coast redwoods near the pool). The orchards are still managed. The trees are routinely pruned and as the older trees die, are replaced by younger ones of the same species. The ground surface is disked to maintain the historic appearance. Plant cover is predominantly non-native grasses and weeds. The remnant orchards on Las Trampas are not maintained.

Air resources/ meteorology. The historic site is classified as a Class II area. No specific studies have been done to determine the air quality existing on the site. The Highway I-680 corridor presents a potential pollution source that could affect the historic site. Generally, visibility into the San Ramon Valley and to adjacent landscapes is excellent. However, there are days when a dense haze obscures Mt. Diablo, the delta and San Pablo Bay.

The Las Trampas area is located sufficiently east of the Pacific Ocean and San Francisco Bay that the climate tends to be more continental than maritime, however, no formal statistical data has been collected to document this fact. Ridges to the west generally block summer fogs. Summer temperatures exceed 100 degrees F about 14 to 21 days per year. The mean annual precipitation is estimated at 26 inches (E.Bay Reg'l Pks 1991).

Geologic resources. Small fossils and sedimentary layers along road cuts and exposures in Las Trampas display uplift and folding of marine formations. The area was at the bottom of the Pacific Ocean until 20 million years ago. Soils around the historic site are probably the Osos-Millsholm-Los Gatos association. These soils are broadly described as "moderately steep to very steep, well-drained clay loams and loams that formed in material weathered from interbedded sedimentary rock on uplands." The higher moisture retention supports heavier and more diverse vegetation, which in turn promotes soil development. On steep slopes, these soils represent a severe erosion hazard. When cut banks approach vertical, they collapse and contribute major volumes of loose material to water flow (E.Bay Reg'l Pks 1991).

Water resources. No studies of the water quality have been done in either the pond or in the perennial stream. The historic site is within the Walnut Creek Watershed that drains about 150 square miles of central Contra Costa County and empties into Carquinez Strait. Sulphur Springs Canyon, Vail Peak and Eagle Peak drain into an unnamed creek that flows past the site. The streams or creeks produce high flows in winter and spring after heavy rains and little to no flow in the summer. Gully erosion has occurred over the years below the swimming pool and visitor center (E.Bay Reg'l Pks 1991).

The spring-fed livestock watering pond is less than 2-acres in size and was formed by damming a small north-facing canyon. Water levels fluctuate from 5-feet to almost 20-feet (E.Bay Reg'l Pks 1991).

Major aquifers beneath the eastern sides of the Las Trampas Ridge provide spring water. Sandstone rocks absorb water that is able to flow to the surface through cracks created by fault movement from two faults, the Bollinger and the Las Trampas. Eugene O'Neill NHS uses spring water for drinking and irrigation uses. The springs are known to stop flowing in drought conditions.

Vegetation resources. The historic site was probably carved out of grassland and oak woodland. Prior to cultivation and grazing, the most dominant trees occurring on the site were probably the coast live oak, bay laurel, buckeye, big leaf maple, canyon live oak, black oak and scrub oak. Native California bunchgrasses including the once dominant purple needlegrass likely dominated the understory along with several shrubs such as poison oak, toyon, elderberry and coffee berry. Most of the common wildflowers in the area are still native plants.

Currently, there are three natural habitats on the site: grassland, wet meadow and riparian. The riparian habitats occur along intermittent streams or wet meadows associated with springs and seeps. These areas increase the value of the surrounding area as habitat for wildlife and represent an essential element for plant and animal species that require water for all or part of their life stages. Riparian woodland occupies a narrow band along streams. Trees found in this plant association include

oaks, bays, willows, and white alder. Wet meadows support plants such as rabbitfoot grass, rushes, tules, sedges, horsetails, buttercups, watercress, stinging nettle and monkey flower. The cattle pond adjacent to the historic site may have been a wet meadow associated with springs. An unnamed intermittent creek below the visitor center has two upslope tributaries.

Oak woodland can be found upslope of the Eugene O' site. Stands of dense chaparral dominated by chamise occur southwest of the site. No threatened or endangered plants are known to grow on the historic site, however on adjacent land there are some rare plants. An inventory will be completed in 2002.

Wildlife resources. Several species of raptors, numerous songbirds as well as deer, raccoon, fox, opossum, bobcat, skunk and squirrels probably utilized the area historically. Eagles, hawks and owls nest in the woodlands adjacent to the grassland where they hunt. Black-tailed deer browse the grass. Hummingbirds of several species forage on the abundant wildflowers.

Three inventory procedures were initiated in early 2001 to document terrestrial vertebrates (Fellers 2001). The procedures include 1) continuous surveillance along animal trails with automatic cameras for large and medium-sized mammals, 2) periodic live trapping for small mammals, and 3) periodic checks under artificial cover boards for reptiles and amphibians. As of November 2001, nine mammals, five reptiles and one amphibian have been detected and documented.

The pond currently supports western pond turtles and California newts. No threatened or endangered animal species are known to utilize the site. The rare Alameda whipsnake is found on Las Trampas Ridge and may migrate into the Eugene O'Neill NHS.

Threats and stresses to natural resources

1. **Non-native plants.** A number of noxious weeds have been identified and are being controlled or eliminated. Mistletoe and yellow starthistle have been mechanically removed and/or treated. The treatment areas will be monitored and maintained free of those invasive species. Eucalyptus groves are present near the pond just outside the west boundary of the site. Landowners abutting the entrance road are maintaining residences with non-native grass and ornamental plantings, which may be potential sources for non-native plant invasions onto the site.

   Non-native grasses and forbs represent about 30% of the total number of plant species found in Las Trampas Regional Park (E.Bay Reg'l Pks 1991). A vascular plant species inventory completed in 2002 will provide better information on the extent of invasive species on Eugene O'Neill NHS. Population mapping of the particularly noxious species is underway.

2. **Non-Native Animals.** Domestic and feral cats are present in the vicinity and are known to hunt small birds and rodents.

3. **Fire.** No fire history has been described for the site. Remnant grassland material left standing during the summer months can pose extreme fire hazard. Fuel hazards have historically been reduced by use of fuel breaks, by grazing, disking or mowing.

4. **Grazing.** Grazing does occur on adjacent regional parklands to reduce mulch thus reducing fire hazard. Grazing is historic to O'Neill's time. Las Trampas has fenced cattle out of the riparian corridor of Bollinger Creek to protect vegetation, reduce erosion and degradation of water quality.

5. **Landslides and erosion.** The areas around the riparian habitat and streams have a steeper slope. Soils in the historic site are prone to erosion. Some of the creek channel has already developed deep gullies.

Current and Previous Natural Resource Monitoring
There is no historical or current monitoring being done in the park.

Background Information for John Muir National Historic Site

Location
The John Muir National Historic Site (NHS) is located in Martinez, Contra Costa County, California. It is approximately 20 miles northeast of San Francisco.

Significance
The original 1964 enabling legislation preserved the 8.8 acre area containing the residence of John Muir. The remainder of the property is managed to provide a historically appropriate setting for the house containing vineyards and orchards typical of those during the Muir lifetime. In 1988, an additional 326 acres incorporated Mount Wanda, an undeveloped area of grassland and woodland (Public Law 100-563). John and his daughters used to go for evening walks there. The Mt. Wanda land is maintained to represent a pastoral setting. The area surrounding it is now primarily residential in character.

Management Objectives
The primary objective of the site is to interpret and emphasize John Muir's influence on the American conservation and environmental movement during his lifetime and since, his role in the creation of National Parks and his contribution to American literature.

Objectives for natural resources include:

- To identify, monitor and manage the flora and fauna of the Mt. Wanda area
- To protect sensitive species when identified
- To protect the natural scene associated with John Muir's days at the ranch
- To manage human and animal impacts on park resources
- To evaluate the role of fire in the maintenance of the native vegetation patterns

The park averages 31,500 visitors per year (range from 26,400 to 39,700). Monthly visitation ranges from 1,300 to 3,500.

Cultural Resources

The principal physical cultural resource is the 17-room wood-frame Strentzel home. John Muir's father-in-law built it in 1882. The two-story Martinez Adobe House, a ranch outbuilding, was built in 1849. It is one of the older structures in the San Francisco Bay area and is representative of the California adobe homes of the mid-nineteenth century. A remnant portion of a fruit orchard surrounds the John Muir gravesite along the Alhambra River. The home site is managed as an historic area with emphasis on preservation of the existing scene. Orchards and a vineyard have been planted by the National Park Service to represent the 2600 acres of the former fruit ranch. There are a few scattered, planted, old individual olives, almond and apricot trees. Research for the cultural landscape plan is underway.

Adjacent land uses

1. Southern Pacific Pipelines, Inc. and Union Oil have underground pipelines, surface valves and other appurtenances. Valves occupy the extreme southwest corner of the Site. There are three capped gas wells. There have been no gas leaks from these wells.
2. Pacific Gas and Electric has been granted a special use permit for existing pipelines which run diagonally under the southwest corner of the Site.
3. The Strain property includes a ranch complex consisting of 2 residences, a barn, corrals and several outbuildings. None of the buildings date from the Muir era.

Natural Resources

The 338 acre site is representative of the Alhambra Valley during the period when it was a rural fruit growing area.

Air resources/ meteorology. A Mediterranean climate prevails with the average annual rainfall between 16 and 20 inches per year. Over 90% of the rainfall occurs during a six-month period, from November to April. The area has a 365-day growing season with temperatures greater than 28 degrees F.

Under the terms of the Clean Air Act, the Site was designated as a Class II area. The small size of the area makes it impossible to separate the Site's air quality from that of the surrounding area. The elevated freeway produce both air and noise pollution which intrudes on the Site 24-hours a day. Nearby refineries and other industrial sources also contribute to reduced air quality. The John Muir NHS is located in a

county that is designated as non-attainment for the California particulate matter and ozone standards.

An inventory conducted in 1998 to identify sources of emissions within John Muir was a first step in minimizing the impacts of air emissions from NPS activities upon environmental resources under its care. This Historic Site barely registers except in the volatile organic carbon category (0.14 tons/yr), but it is still negligible to the emissions generated in Contra Costa County (130 tons/yr).

Geologic resources. Mt. Wanda rises to over 660 feet. Near the bottom of Mt. Wanda the bedrock is sandstone, a sedimentary rock formed as sand was slowly deposited on the ocean floor. As we move up Mt. Wanda, we encounter sandstone, siltstone and shale, the "Great Valley Sequence. These rock layers are older than the sandstone, with the oldest rock on the top of Mt. Wanda. It is unusual for the oldest rocks to be on top of the youngest. Twenty to thirty million years ago, the San Andreas Fault tilted up and overturned the rocks in this area.

There are two predominant soils in the park, Los Gatos loam on 30-50% slopes and Los Osos clay loam on 15-30% slopes. Botella clay loam can be found in the creek floodplains. Most of the soils have a medium to high erosion potential.

John Muir NHS incorporates two watersheds, the Alhambra Creek watershed to the southeast and the Franklin to the northwest. The watershed basins have subparallel ridges, deeply entrenched canyons, and small valleys that trend northwestward. This regional trend is caused by geologic structure. All of the streams are classified as intermittent. The stream channels have sinuous alignments, and the relatively steep channel slopes cause rapid rises in flood flows. Flood peaks occur near the mouth of the drainage in about 3-hours after critical rainfall.

Several faults traverse the area, generally from a southeasterly to northwesterly direction. The faults have had activity in historic time.

Water Resources. The NPS Water Resources Division developed a water quality baseline for the park in 1998. The study area included surface water resources in the park and all lands and waters within at least 3 miles upstream and 1 mile downstream of the park. Six of the US Environmental Protection Agency's (EPA) national databases were used to develop this baseline of water resources information. No monitoring stations were located within the park boundary. Two groups of parameters exceeded screening criteria - dissolved oxygen and sulfate concentrations. Very limited data exist for 11 of the 13 Level I parameter groups in the study area. No data exist for chlorophyll and bacteria. This data inventory indicates a lack of relatively recent observations for all parameters measured in the study area and a complete lack of any data collected within the park. Therefore, in 2003, park surface water resources will be sampled and characterized for the Level I parameter groups by the network water resources group of technical specialists.

Franklin Creek is spring-fed and has some of the coolest water in the Alhambra Watershed. It flows between the Strentzel House and the Adobe House. It may have temperatures low enough in the summer (below 65 degrees F) to support salmonid fish. It also has significant gravel beds, which are also needed by spawning salmonids.

Vegetation Resources. In 1992, at least 253 species of vascular plants were growing on Mt. Wanda (Hunter 1993). Since Mt. Wanda is in the inner coast range, its flora includes species found primarily within the Central Valley. Species with coastal distributions and a number of species at their northern range limits are also found. Annual grassland and blue oak woodland dominate the vegetation of the Mt. Wanda area although mixed evergreen forest and chaparral communities can also be found.

Annual grassland is concentrated on upper portions of the mountain (64 acres) and is the most diverse vegetation community. Introduced annual grasses with more limited native perennial grasses and a considerable number of native forbs overwhelmingly dominate the grassland. Mulch, the dead biomass at summer's end, reduces light, increases humidity and alters soil surface. Thin mulch layers favor a variety of annual forbs while thicker mulch layers favor taller annual grasses. Heavy spring grazing favors growth of summer. Annual grassland habitats occupy what was once considered pristine native grassland. Although, in 1992, 74 species were observed in this community, seven introduced annual species accounted for 94% of the cover (Hunter *et.al*. 1993).

The blue oak woodlands cover the slopes and occupy approximately 85 acres on Mt. Wanda. In most of the blue oak woodlands, shrubs were absent and the herbaceous layer was similar in composition to the annual grassland with more forbs present. Blue oak seedlings were frequently present, but saplings were absent (Hunter 1993). Relatively closed canopy dense forests dominated by California bay and coastal live oak occupy mesic sites. In drier sites, trees are widely spaced, forming an open woodland or savanna. Seed production is variable with "mast" years of heavy seed crops at 3-year intervals (Koenig *et.al*. 1971).

Mt. Wanda's mixed evergreen forest covers 30 acres, primarily on north-facing slopes and in lower portions of drainages. The tree layer is composed of nearly equal numbers of larger coast live oak and bay trees. On Mt. Wanda, both the shrub and herb layers provide little cover. Saplings of bay and, in some locations, poison oak are the dominant shrubs. Mixed evergreen forest covers large areas in the Outer Coast ranges, but is nearly absent from the Inner Coast ranges.

Chaparral stands are limited to less than 2-acres of dry rocky exposures. The shrub layer on Mt. Wanda is discontinuous and variable in cover. Chamise dominates the chaparral's shrub layer.

Riparian corridors are composed of a mixed hardwood forest. Typically, dominant tree species are the bay, big leaf maple and California sycamore. Oak trees border riparian habitats and may intersperse them. When the riparian corridor is adjacent to annual grasslands, the canopy layers end abruptly. Most of the riparian corridor reaches are oak dominated, in climax maturity states. These habitats provide food, water, and migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife.

One rare species was found – *Helianthella castanea* (Asteracea), a bay area endemic, in two populations. One population is near the western chaparral patch and the second, adjacent to the northern chaparral patch. Each population consists of less than 25 individuals. Both populations will be monitored annually.

Wildlife resources. An inventory documenting small mammal and herpetofauna is underway. Large to medium sized mammals photographed included the mule deer, coyote, striped skunk, raccoon, and gray fox (Fellers 2001). The introduced eastern fox squirrel was also photographed. Domestic cats are also being photographed in fairly large numbers and may become an introduced animal needing control. Small mammals have only been live-trapped in the oak woodland. Herpetofauna are documented using cover boards. This study will be completed in the winter of 2002.

Threats and stresses to natural resources

1. **Non-native plants**. In 1874, the Strentzel family acquired Mt. Wanda and planted orchards and as many as 120 ornamental plants. Prior to the Strentzel's ownership, there are no records of ornamental plantings. Thirty seven percent of the species on Mt. Wanda are introduced. Several of the introduced species are invasive and could alter the landscape of Mt. Wanda. Many of these species should be controlled or eliminated. Tree of heaven occupies a considerable area along the roads. Working with adjacent landowners to control the plants on their boundaries could ensure control or eradication. Efforts by the Exotic Pest Management Team, park staff and contractors began in the summer of 2002 to manually control yellow starthistle, artichoke thistle, French broom and tree of heaven.

2. **Fire**. The 326.2 acres of grassland and oak forests on Mount Wanda represents a potential location for wildland fires. The role of wildland fire remains to be determined. Prior to fire suppression, wildland fires were a frequent occurrence in annual grasslands. There is an historic record of a fire in the chaparral in 1887 when the train trestle was constructed. Controlled burns in the chaparral could allow regeneration of some chemise and other plants. No controlled burns should take place in the grasslands or blue oak woodlands unless thatch levels are first reduced below 2500 kg/ha so that native grasses are not killed. (Hunter 1993) A fire history could be recreated by sampling existing tree stumps to infer fire history and current oak age-distribution.

3. **Grazing**. The effects of grazing by domestic livestock remains to be determined. The high density of grazing is thought to have subjected California's vegetation to a different grazing pressure than had herds of the indigenous deer, antelope and elk. Along with livestock came exotic weeds. The Martinez family grazed cattle, horses, sheep and goats. Following the drought of 1860-1, cattle and sheep essentially denuded large areas and most livestock perished. Ranching never recovered. Large areas of land were then brought into cultivation and by 1870, agriculture had replaced ranching on the most fertile bottomlands. Uplands continued to be grazed and grasslands were also cut for hay. The increased population of Martinez created a demand for fuel wood. Today, most stands of blue oak on the upper portions of Mt. Wanda contain decayed sawn stumps. In 1911, Muir kept 100 pigs and 25 cows on Mt. Wanda and in 1914, there were 500 cattle grazing the mountain. Grazing continued from 1920 until 1996, but was intermittent and moderate in intensity.

4. **Mass wasting and soil erosion**. Slopes greater than 50% with shale or poorly cemented sandstone may slump badly (Alhambra Creek Watershed Inventory 1997). In 2002 a team of park service employees will conclude a geomorphology survey of the watershed focused on bank incision, erosion and flooding.

5. **Flooding**. Potential natural sources of contaminants could come from floodwaters. Franklin Creek flows between the Muir-Strentzel house and the Martinez Adobe house and has been known to overflow its banks creating flood conditions in the vineyard and orchards. Potential anthropogenic sources of contaminants include industrial and municipal wastewater discharges, urban stormwater runoff, pomological activities, and atmospheric deposition.

   Flooding has frequently occurred in the watershed located on the south side of Mt. Wanda. The NPS is responsible for managing 44% of this watershed basin. In 2000, the NPS concluded an evaluation of how watershed processes on John Muir lands affect the potential for producing floods (Inglis 2002). Vegetation, channel condition and the presence/absence of stock water detention structures were the management variables evaluated. Flooding will likely occur in the Strentzel Lane neighborhood under current conditions with any flows above an estimated 20-50 cfs. From the model, improving vegetation condition from 50 to 75% cover may reduce peak flow by 10%. Repairing the existing stock ponds on NPS land would not significantly reduce flooding downstream because their upper watershed locations influence only a very small percentage of the total watershed. The most significant reduction of flooding occurred by adding a large detention basin in the lower watershed. The reach around the Strain Ranch is critical because all of the discharge from the watershed passes through it and it is located very near residences and other buildings that are at risk from flooding. A best management practice for this area should be developed. A detailed topographic survey is needed to accurately map the affected area prior to sediment reduction actions or for a restoration design. The goal should be to infiltrate as much water as possible into watershed soils and attenuate the

remaining runoff as it leaves the watershed. All stakeholders need to work together to resolve this problem.

SUMMARIES OF WORKSHOPS
For
Eugene O'Neill National Historic Site and
John Muir National Historic Site

We summarize the 2 1/2-day workshop that was held January 22-24, 2002. The scoping workshop objectives were to:

1. Identify the natural resource base, significant natural resources and processes (ecosystem drivers) for the two parks,
2. Identify current threats and stressors that affect those natural resources, and
3. Recommend potential vital signs indicators for long-term monitoring that would capture changes (current and future, known and unknown) in the significant natural resources.

From sixteen to twenty-two participants developed lists during brainstorming sessions:

- the significant resources in the park,
- threats and stresses to the resources, and
- vital signs indicators that could be monitored to evaluate the condition and health of those resources.

<u>Significant natural resources - desired future conditions</u> (in alphabetical order)

1. Floodplain terrace (Strain ranch area, JOMU)
   Desired future condition is to have a functional floodplain with related values such as sediment retention, but safety may modify this condition.
2. Grassland (Mt. Wanda peak area, JOMU)
   Desired future condition is to encourage more diversity and percent cover of native grasses and herbs.
   It may not be feasible to develop native grassland. Constant disturbance will be required to maintain it. The California ground squirrel used to be a major grazer. A soil survey was encouraged to help answer the question of what vegetation type was desirable. In the meantime, maintaining the native grassland is desirable.
3. Muir meadow (off Alhambra Rd., JOMU)
   Desired future condition is unknown without further research on the appropriateness of combining oak woodland/grass restoration.
4. Migratory corridors
   Desired future condition is to create and maintain migratory corridors and linkages to allow for healthy migratory populations. Particular species of concern: coyote, grey fox, mountain lion, bobcat, raptors, owls.

5. Oak woodland
   Desired future condition is to maintain a healthy community at the current size; restore the fire road along "no name" creek to a hiking trail.
6. Pastoral cultural scene
   Pastoral means of or pertaining to the countryside. The pastoral scene includes the orchards by the Muir House, the gravesite and orchards, the agricultural areas, and the ornamentals planted by the Muir's.
   Desired future condition: A mosaic of historical, rural, pastoral and wild landscape that is quiet, clean and has dark night skies.
   Actions: See actions under Viewshed.
7. Riparian corridors and wetlands
   Desired future conditions: Healthy, functional riparian corridors and wetlands
8. Special status species
   Desired future condition: Maintain and enhance species populations and habitat.
9. Top-level predators
   Desired future condition: Maintain habitat for top-level predators such as bobcats, raptors and owls.
10. Viewshed
    Desired future conditions: Good air quality, natural sounds and quiet, dark night sky, limited man-made structures.
11. Watershed
    Desired future condition: Maintain it in a healthy state.

<u>Known stresses:</u>

	Natural	Human-influenced
➢ External land use		X
➢ Landslides/erosion	X	X
➢ Non-native invasive plants		X
➢ Deep thatch in grassland		
➢ Wildland fire	X	X
➢ Disease	X	X
➢ Toxins/pollutants (air, water)		X

Ridgetop development is considered a deterrent to maintaining a pastoral viewshed and also has a potential for increasing sediment erosion into downstream riparian and urban areas.

Restoring sinuosity and incorporating water-absorbing wetland plants in the Strain floodplain terrace is generally considered to be the most important step in creating a sediment trap.

Ozone and particulates are the major air quality problems. Nox and sulphur sources include the oil/gas refineries and mobile sources along highways. The predominant easterly winds blow pollutants away from the park. Internal sources of air pollutants could come from diesel generators and wood stoves.

The current high thatch in the grasses may generate enough BTU's to take out the oaks. It currently is keeping native grasses and forbs from establishing.

Inventories completed or underway

- air quality (inferred from regional data)
- bats (presence/absence)
- bees (presence/absence)
- birds (presence/absence with some nesting information) – already documented 19 species nesting in the park
- cultural landscape map
- erosion potential along "no-name" creek
- herpetofauna (presence/absence)
- small mammals (presence/absence)
- vegetation (presence/absence with some distribution of non-native or species of special concern)
- water quality (selected national indicators)

Inventories, research or information that is still needed

Top priorities included:

- Soil map and description (type, thickness, moisture content, nutrient content).
- Slope and landslide potential map.

Information gaps:

- Dark night sky baseline condition
- Fire history (frequency, intensity, and location).
- Migratory corridors. Identify species needing corridors, habitats and corridor sizes
- Natural soundscape baseline condition
- Non-vascular plants (lichens, mosses, fungi as indicators of air quality.)
- Oak health (baseline map of trees affected by sudden oak death syndrome)
- Feral/domestic cats. The level of impact of the cats on ground-nesting birds and other animals is unknown and needs to be investigated.
- Terrestrial invertebrate inventory
- Vegetation map to the association level – current baseline, historic maps. A cultural landscape report and maps are being developed this year.
- Visibility/viewshed baseline photographs on good and bad air quality days. Historical photographs could be used to establish several photopoint locations for comparability to historic views.
- Water quality baseline condition for Franklin Creek and Alhambra. Identify sources, type and volume of pollutants in watershed above park.

Vital signs monitoring indicators

All monitoring was felt to be necessary, but it was recognized that funding and manpower constraints would limit the park's ability to do all of the monitoring immediately.

Highest priority = start this year, if possible

- **Invasive non-native plants** as an indicator of native plant community health. Map distribution and assess relative abundance of current populations for the baseline. Map and assess on a regular basis (frequency to be determined). Obtain historic records of control actions and keep current records to determine effectiveness of control actions. Monitor along vectors. The following invasive plants are of primary concern: tree of heaven, yellow-star thistle, and artichoke thistle.

- **Connectivity and top-level predators** as an indicator of community health. The most important aspect is to identify, maintain and monitor the migratory corridors themselves. Aerial photos could be used for this monitoring. Partnerships with large adjacent landholders such as the Almond property, Sky Ranch and Briones are important. Top level predators include: coyote, mountain lion, bobcat, grey fox, raptors (September migrant VIP event, nest cavity searches, spring counts), and owls.

Medium priority = start soon (ranked 2 to 4)

- **Native plants** (percent cover, richness and diversity). Inventory transects were established and surveyed in 1992. These could be used as the baseline and repeated every ten years. Black oaks may be a rare component of the woodland and deserve greater attention.
- **Deer** (charismatic, large mega-fauna). They browse woody vegetation and eat large amounts of acorns. Monitoring could be via habitat monitoring including mast production baskets and browse line surveys.
- **Ticks, lizards and disease**. Lizards are a dead-end vector for Lyme's disease. Yearly collection of ticks and analysis for disease will allow the park to know and share information about the likelihood of getting the disease in the park. Monitor lizard population trends.
- **Water quality**. Identify and evaluate current data from other organizations such as the Central Sanitation (Alhambra Creek) and Contra-Costa County Water District (Delta intake). Select monitoring indicators. Aquatic invertebrates in Franklin Creek could be monitored. Monitor debris in Franklin Creek.

Lower priority

- Air quality (visibility, deposition, grapes for ozone, lichens for sulphur)
- Amphibians as a sensitive indicator of air pollution
- Birds (September migrants, nesting)
- Dark night sky
- Deposition of nitrates, sulfates, heavy metals and POP's.
- Natural soundscape

- Small mammals such as the California ground squirrel (creates disturbance in grassland communities) and the Botta pocket gopher as an indicator of grassland community health
- Terrestrial invertebrates
- Visibility monitoring
- Weather – micro-climates

Eugene O'Neill National Historic Site

It was recognized that Eugene O'Neill NHS is primarily a cultural landscape. Historically, portions of the land were planted in grain, fruit or nut orchards, or ornamental plantings. Very little native habitat remains. The majority of the land is therefore a "vernacular" landscape. Due to the small size of the historic site, it was also recognized that the habitat and land use in the surrounding Las Trampas Wilderness Area greatly affected what happened in Eugene O'Neill NHS. Therefore, a close working partnership would benefit both areas.

Remaining Significant Natural Resources (in alphabetical order)

1. Feeling of isolation (all aesthetics = natural quiet, natural dark, natural vegetation)
2. Grassland strip below the Tao House
3. Oak woodland/riparian edge community
4. Migratory corridor
5. Species of special concern
6. Springs
7. Wildlife habitat
8. Viewshed

Desired future conditions were not developed for each of these resources, but are still needed.

Known Stresses to the Significant Natural Resources:

	Natural	Human-influenced
Disease		
Erosion and mass wasting	X	X
External land use		X
Non-native invasive plants		X
Thatch (grass understory)		
Toxins/pollutants (air, water)		X
Wildland fire	X	X

Much of this discussion was similar to and repeated conversations at John Muir NHS.

Inventories, Completed or Underway

- Air quality
- Bats
- Bees
- Birds
- Cultural landscape report
- Herpetofauna (amphibians and reptiles)
- Mammals
- Vegetation
- Water quality

Information Gaps

- Aquifer water quality
- Aromascape baseline
- Black walnut species identification
- Dark night sky baseline
- Fire history
- Grazing history and impact studies from Mt. Diablo
- Invertebrates
- Lichens and fungi
- Management action research study in 3 grass areas on the SE side of the park – disked annually (park property under orchards), "control" (no management since 1976), grazed spring and fall (East Bay Regional Park property). Microclimate, air quality, visibility, rainfall history
- Soil description and map – includes type, moisture content, thickness, nutrient content, landslide potential
- Paleo/fossil resources
- Soundscape baseline
- Vegetation map
- Viewscape, current and historic
- Water course topographic map with finer scale at locations of erosion and mass wasting
- Water quality upstream and in the park

Potential vital signs monitoring indicators

Highest priority (in rank order)

- **Native plants** – monitor percent cover and species composition, closely monitor invasive noxious weed distribution
- **Erosion features**
- **Deer browsing** – effect on cultural landscape and plants.
- **Surrounding land use** - viewscape, sound, air quality, dark night sky
- **Vegetation community level change**

Moderate priority

- Air quality (through existing regional monitoring stations) and visibility
- Oak health/sudden oak death

- Migratory corridor/wildlife habitat
- Riparian/woodland edge plant community
- Species of special concern

Lowest priority (in alphabetical order)

- Air pollutant deposition
- Amphibians
- Aquifer water quality
- Birds
- Surface water quality

Vital Signs Indicators of a Regional Scale Including Both National Historic Sites

During the workshop, participants identified vital signs monitoring that could include a larger, more regional scale to help understand and protect significant park natural resources were discussed. Two indicators were considered to be a high priority:

1. Landscape scale vegetation community change. In this category, change in habitat for species of special concern, vegetation community type and distribution, grazing acreage, fire locations and acreage could be captured.
2. Habitat fragmentation/connectivity .

Other indicators included:

- Oak woodland health (disease spread)
- Amphibians
- Invasive non-native plant populations locations and change
- Soundscape
- Viewscape
- Visibility and dark night sky
- Water quality
- Wildlife – deer and birds

Conceptual Model Development Workshop For John Muir National Historic Site and Eugene O'Neill National Historic Site

This document summarizes a one-day workshop held on August 5, 2002. The goal of the workshop was to create a conceptual model for the sites in order to identify indicators. Knowledge regarding the significant natural resources in and adjacent to the park that were determined at the Vital Signs Scoping Workshop in January 2002, were revisited.

The goal of this Conceptual Model Development Workshop:

1. Development of a conceptual model and assumptions about the ecosystems
2. Review/prioritize vital signs indicators and conceptualize monitoring goals.

This conceptual model will be incorporated in a San Francisco Bay Network conceptual model for large-scale, network-wide ecosystem function and management. These models are specific to the local environment and represent important resources and indicators that may be relevant only to these parks. The JOMU and EUON conceptual model is combined due to close proximity of the two parks, relatively similar ecosystems and threats, and combined management of the parks.

The group concentrated on five significant resources for the two parks. They brainstormed all threats to the resource and selected some potential indicators. The significant resources were a feeling of isolation, wildlife habitat, wildlife, species of special concern, and viewshed into park. What follows is a summary of the group's findings for each resource. Three are represented visually, as they were conceived during the meeting. The significant resources wildlife and species of special concern are presented in table form because they were not as well developed for visual representation. Following the summaries of each resource are lists of gaps in knowledge.

1. ISOLATION:

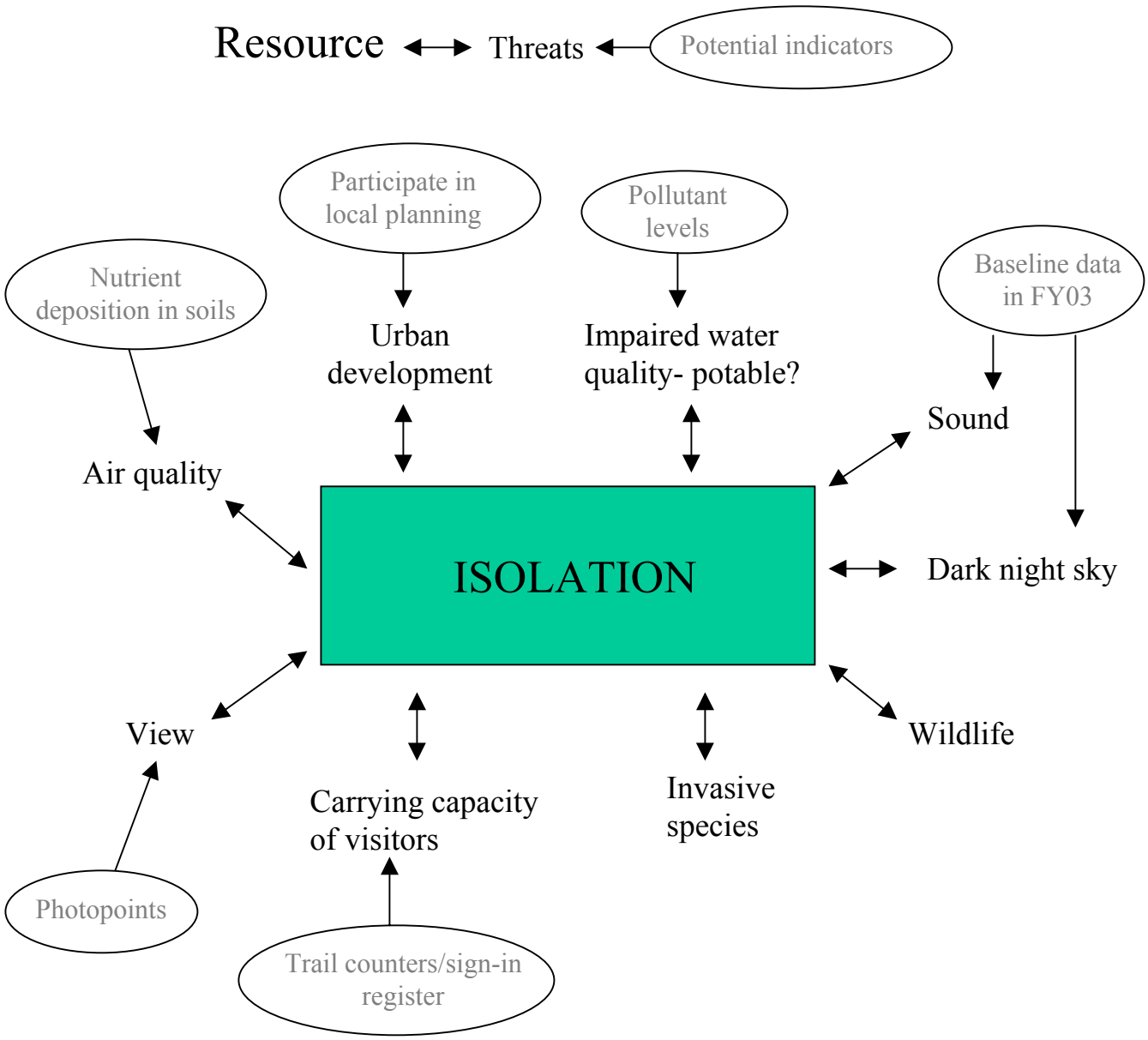
Suggestions for mitigation/management:
- Maintain connectivity to other open spaces (physically and managerially).
- Attempt to maintain a buffer (i.e. woodlands) around the park through involvement in neighborhood association and East Bay Regional Parks.
- Remove all major invasive plants.

Examples of indicator selection for this resource-

Indicator: Aesthetics (sound, view, and dark night sky).
Why is it selected: These are ethereal senses that affect the feeling of isolation.
Sensitive attribute of indicator:
Sound- decibel level, type and frequency
Light pollution – location, intensity
View- distances and objects seen
Management objective: Develop baseline data for later use in decision making.
Management response: Become involved in planning of nearby areas, and evaluate baselines and determine future protocol.

Indicator: Nutrient deposition in soils.
Why is it selected: Nutrient flow, invasibility, air pollution deposition, water quality, health of ecosystem.
Sensitive attribute of indicator: Concentration
Management objective: Understand until we have a baseline and then reconsider (decrease?) Will only work if monitored as a network

Management response: Education (present info to air quality board)



2. WILDLIFE HABITAT

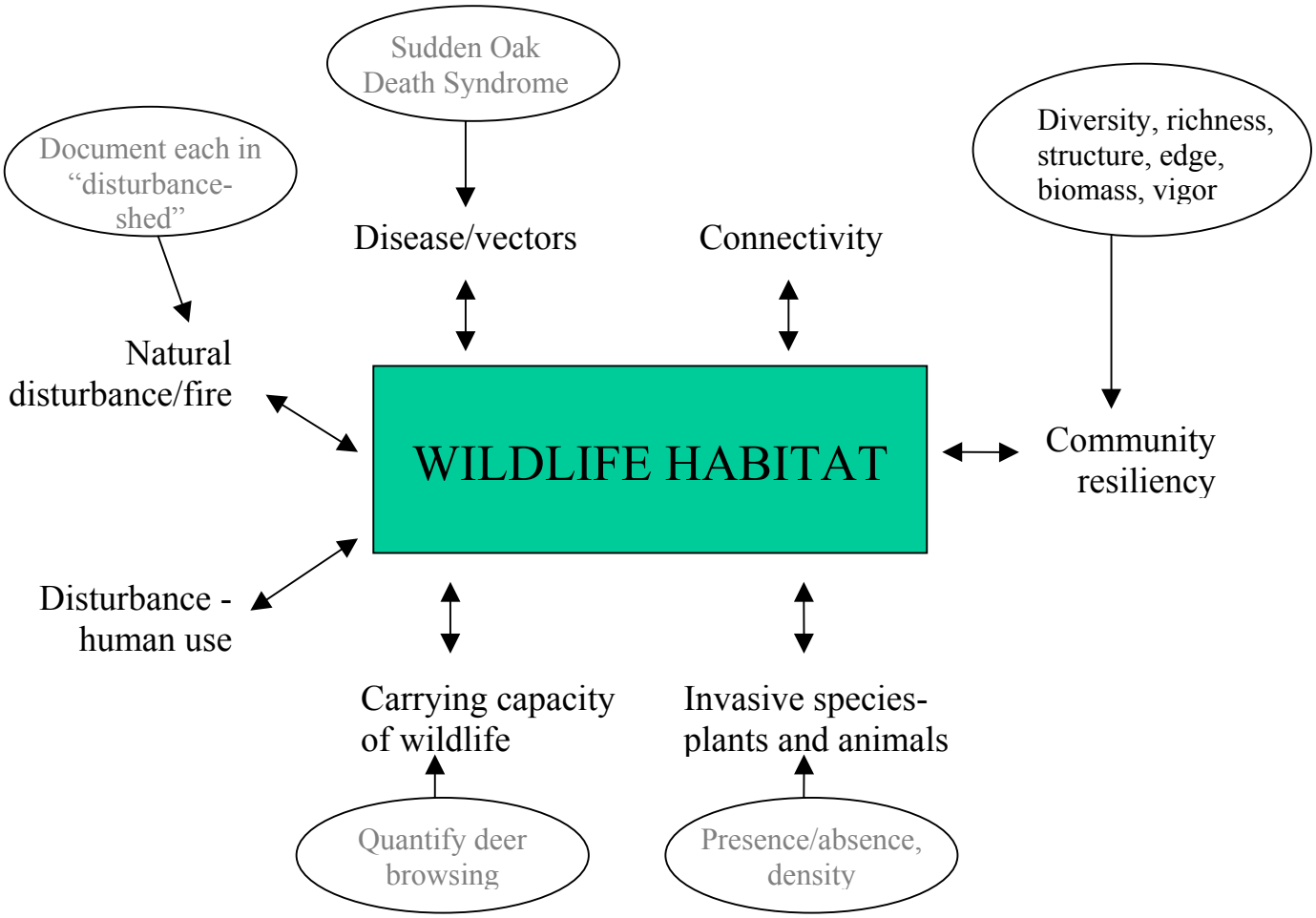
Research needed for wildlife habitat:

- Determine the historical vegetation communities present on Mt. Wanda and the potential for native grassland communities.
- Research corridor needs for wildlife and plants.
- Determine natural disturbance regimes.
- Determine natural oak regeneration – started summer 2002.

- Artificial pond at EUON should be studied as a source for bullfrogs, algal blooms, habitat potential, etc

Obtain a vegetation map (utilize CNPS, WHR, park teams).

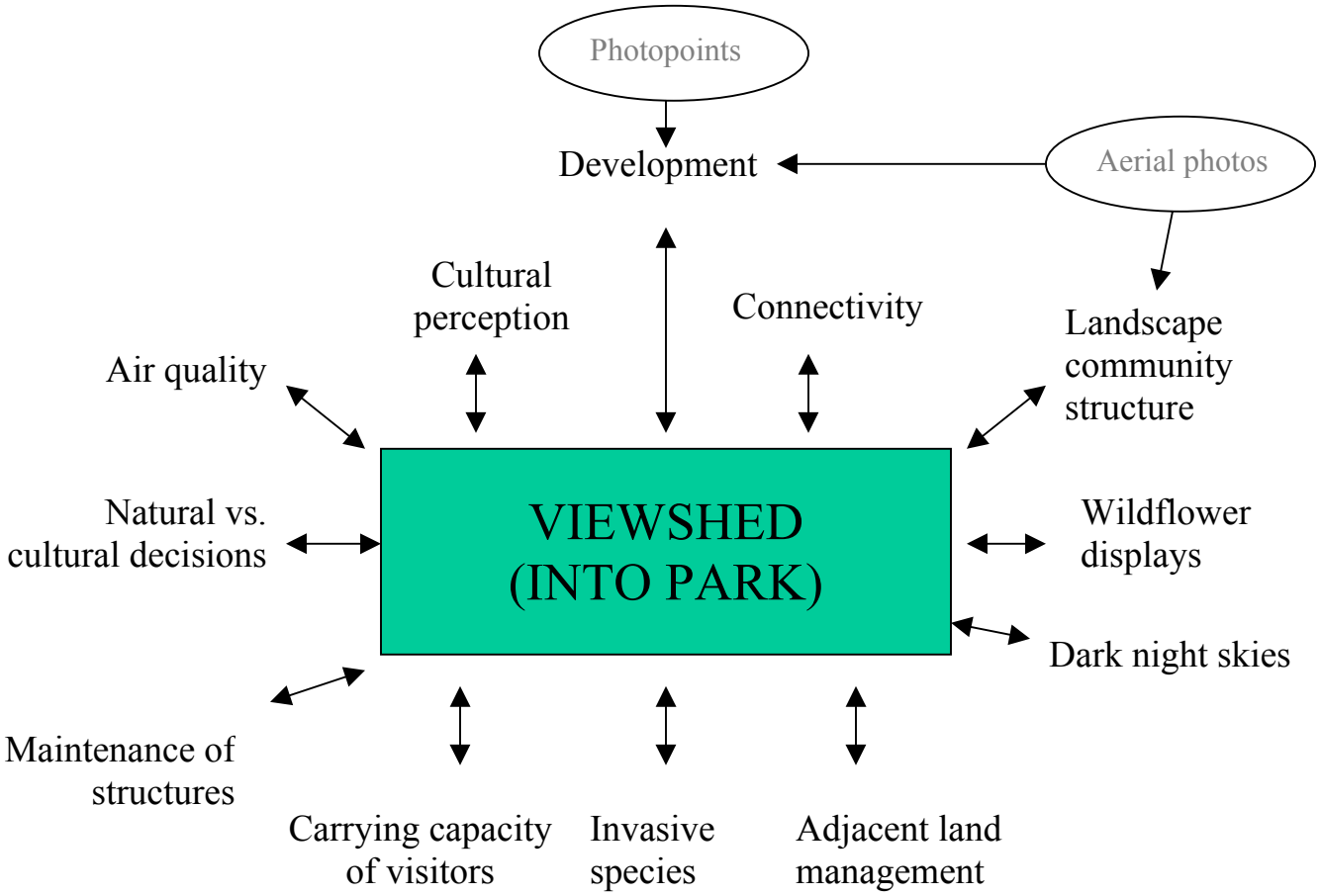
-



3. **VIEWSHED INTO PARK**

Research needs:

- Develop landscape maps during periods of Muir and O'Neill. Compare and assess what is left or has changed (done for EUON)
- Review by a cultural landscape expert
- Define pastoral scene



4. **WILDLIFE (**large and medium sized vertebrates)

Threats:	Potential indicators:
Disease	
Parasitism	
Predation	
Quality and quantity of habitat	
Population viability/genetic stability	Trailmaster camera
Poaching	
Invasive species	
Ingestion of toxins	

Research needed:

- Conduct an invertebrate inventory.
- Determine natural level of variation for population sizes.
- Gary Feller's report on vertebrates at JOMU and EUON (subject will be revisited for indicators following his report) is needed before further indicator selection.
- Presence of feral cats, ground squirrels (Mt. Wanda), red fox (EUON)

5. **SPECIES OF SPECIAL CONCERN** (Rare and invasive species)

Threats:	Potential indicators:
Inter-annual climate	
Global climate	
Microclimate	
Herbivory	
Disease	Sudden Oak Death
Competition from non-natives	
Disturbance	
Competition from natives	
Soil	Nutrient levels
Population size/structure	Mortality/recruitment
Land management	
Poaching/collecting	
Parasites	
Change in community structure or composition	

List of species of special concern:

- Invasive plants and animals (starlings, feral cats, etc.)
- *Helianthella castanea* (JOMU)
- All oak species
- *Salvia mellifera* (JOMU)- northernmost range for black sage
- *Helianthemum scoparium*
- *Asclepius cordifolia*- southernmost populations (2 plants on Mt. Wanda)
- Amphibians

Research needed:

- Research stressors and impacts to each species

Examples of indicator selection for this resource-
Indicator: Disease- *Phytophthora ramoram*
Why is it selected: Protocol already described, tie into larger project, know condition of a significant natural resource (oak woodland), potential large ecosystem-wide impacts.
Sensitive attribute of indicator: Magnitude and location of affected trees. Look at pattern for potential natural resistance, signs of symptoms.
Management objective: Maintain or improve the oak woodland
Management response: Cache acorns for future use. If present, determine vectors and follow procedures, improve prevention of transmission. Update as more is known.

Indicator: Mortality/recruitment
Why is it selected: Easy for management to understand and quantify whether populations are increasing/decreasing, strength, health and vulnerability.
Sensitive attribute of indicator: presence/absence, number of individuals, aerial extent, and presence of seedlings.

Management objective: Maintain or increase rare species, decrease invasive species
Management response: For rare species, if population drops below current size start research, reintroduce, consult external databases. For invasive species, if there is an increase that should trigger research and an increase in control efforts.

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