

**ATTACHMENT K**

Letter from WRA Environmental Consultants  
Re: Oakland Zoo Habitat Enhancement Plan Feasibility and Cost Estimates



May 27, 2011

Darin Ranelletti  
Planning and Zoning Division  
City of Oakland  
250 Frank H. Ogawa Plaza, Suite 3315  
Oakland, CA 94612

Re: Oakland Zoo Habitat Enhancement Plan Feasibility and Cost Estimates

Dear Darin,

As requested by the Zoo, WRA has reviewed the Oakland Zoo's Master Plan Amendment (MPA), Habitat Enhancement Plan (HEP), and April 13, 2011 Grassland Mapping Memo prepared by Environmental Collaborative associated with the Zoo's proposed expansion and mitigation requirements. We have also reviewed recent letters submitted by the California Native Plant Society (April 2011) and California Native Grassland Association (April 27, 2011) regarding the project. WRA biologists have also conducted preliminary investigations throughout the proposed Zoo expansion area and neighboring Knowland Park. We are writing here to acknowledge the feasibility of the MPA and HEP and provide some cost estimates for the work.

WRA is a full service environmental consulting firm with over 30 years experience with biological and environmental regulatory compliance in the San Francisco Bay Area. With over 40 professionals specializing in plant, wildlife, and habitat restoration ecology, we have planned and overseen dozens of habitat restoration projects, many of which are on the scale of the Oakland Zoo/Knowland Park project.

Based on our review of the above mentioned letters, it is clear that these groups question the feasibility of the HEP due to the high costs and difficulty of conducting habitat restoration, especially with native grasslands. We disagree with that assertion and believe it is important to reiterate the scope of the HEP. The term 'habitat restoration' has broad implications. Based on WRA's review of the MPA and HEP, and based on our preliminary assessment of the geographic areas in question, we feel that a more appropriate term for the majority of the HEP work is habitat 'enhancement'. This distinction is important as restoration implies a much more significant effort than enhancement. Most of the natural habitats in the zoo expansion area and Knowland Park are relatively intact with scattered, isolated patches of non-graminoid weeds. These areas are priority target areas for habitat enhancement through weed removal and in some cases planting of native seed or container stock. A few areas observed have extremely dense infestations of weeds (e.g. french broom, eucalyptus). Restoring these areas to native grassland is indeed extremely difficult and expensive and is not recommended. These areas are better suited for restoring native scrub or woodland, depending on the specific site characteristics. The shrub and tree species native to these habitat types can more easily compete with the invasive plants than small-statured native grasses can. Due to these factors

the items outlined in the HEP are indeed very feasible with respect to technical, geographic, and economic concerns.

Based on the requirements set forth in the MPA and HEP, WRA has divided the goals of the documents into 4 main tasks for the purposes of this letter:

- Baseline assessment, habitat and weed mapping, and integrated pest management plan development,
- Priority weed treatment and habitat enhancement,
- Annual monitoring and reporting,
- Ongoing maintenance.

The baseline habitat and weed mapping is one of the first steps in the process and is essential for understanding the extent of intact, native habitats and the distribution and abundance of non-native invasive species that threaten those habitats. Using this information, an integrative pest management (IPM) plan can be prepared that identifies priority areas for allocating resources, defines appropriate methodologies for carrying out the weed abatement and subsequent habitat enhancement, and defines long-term maintenance, monitoring requirements and success criteria (*Implementing Action 1-1, 1-2*). This one-time task is estimated to cost \$20,000 to \$25,000 for the entirety of the zoo expansion area and adjacent Knowland Park.

The next step is to implement weed control and habitat enhancement in the priority treatment areas (*Implementing Actions 1-4, 2-1 - 2-3*). Based on our field investigations, invasive plant species are scattered throughout the zoo expansion area and Knowland park, but for the most part they are in relatively low densities. These areas can be largely controlled at minimal cost using zoo grounds-keepers and the large volunteer outreach groups that the zoo has been able to maintain over the years. The removal of native and invasive trees (e.g. eucalyptus, Monterey pine, and acacia; *Implementing Actions 2-4, 4-1*) and some shrubs may require assistance from more qualified personnel. The continued use of goat grazing for fire suppression is advised, but the timing and duration of their use should be altered and closely monitored to align with restoration efforts, instead of hampering them. Alternatively, managed mowing has also been proven successful at enhancing native grasslands. After the initial weed control, a restoration contractor with assistance from volunteer staff can assist with habitat enhancement through grassland, woodland, scrub, and riparian planting (*Implementation Actions 3-1 – 3-4, 4-2*). This initial process is expected to take several of the first five years. Approximately \$40,000 to \$50,000 per year should be allocated toward weed removal and habitat enhancement activities during the first five years. These initial efforts are to be focused in the Ecological Recovery Zones and areas surrounding the primary impact areas within the greater zoo expansion area, and will include satisfying the 3:1 grassland restoration/enhancement mitigation requirements in addition to initial woodland, riparian, and scrub habitat enhancement.

While on-going maintenance of the areas identified above will be necessary for several years, after completion of the initial tasks outlined above, the zoo can shift the majority of their resources to weed management in the remainder of Knowland Park. A phased approach of weed control in these areas, starting with the highest priority zones, will make the process economically feasible. As stated in the HEP, when weed control results in areas of barren ground, native seeding is required. The annual weed control and reseeding budget will depend on the size of the target zones and the issues therein, but should be on the order of \$20,000-

\$30,000. This will allow the zoo to make significant annual progress in controlling the weedy species that are invading the natural habitats in Knowland Park.

Annual monitoring and reporting is necessary to assess the success of weed control and habitat restoration (*Implementing Action 3-5*). The annual monitoring will cover all areas treated within the previous three to five years, depending on success criteria achievement. Monitoring reports will include maps showing locations of weed re-infestations that need to be treated and restoration areas that need additional seeding or planting. Annual monitoring and reporting will vary over the years depending on the acreage of treatment areas to be assessed, but will average between \$5,000-\$10,000 annually. Additional pre-construction monitoring will also be necessary prior to conducting work in new areas. There is potential for special status plant and animal species or nesting birds to occur in areas proposed for enhancement any given year. These areas need to be surveyed prior to the start of enhancement activities to ensure no sensitive species are impacted. If present, special status species and/or breeding birds would need to be protected during work activities. Pre-construction surveys and species protection measures are estimated to cost approximately \$5,000 annually (*Implementing Action 5-1 - 5-4*).

After areas have been treated, ongoing maintenance will be required to eradicate invasive species that re-sprout from the seed bank or otherwise are growing in the restored areas (*Implementing Action 1-3*). Additional native seed or plugs may also need to be installed in previously treated areas to replace dead stock. Ongoing focused goat grazing to promote native grasses and reduce the cover of non-native species should be continued. Ongoing management costs of treated areas will depend on levels of effort required for specific areas, but may range from \$10,000-\$20,000 annually.

The Zoo is still in discussions with the US Fish and Wildlife Service and California Department of Fish and Game about mitigating impacts to Alameda Whipsnake. The specific requirements related to this species will be determined through the permitting process. Therefore costs associated therein are not included here (*Implementing Action 5-5*).

While habitat restoration and enhancement is an evolving science with mixed results, the habitats east of the Oakland Zoo and in Knowland Park are relatively intact with generally limited cover of invasive species. Approximately 10.5 acres of native grassland have been identified within the boundaries of the proposed Zoo expansion perimeter fence that are ideally suited to this habitat enhancement as they are being actively invaded by the invasive species mentioned in the HEP. An additional three acres exist immediately adjacent to the fence and significantly more native grassland exists throughout the remainder of Knowland Park that is equally suited to enhancement, which in sum will provide more than enough acreage necessary to satisfy the required mitigation. Manually controlling the invasive plants in addition to implementing a regulated goat grazing or mowing regime will reduce the cover of non-native species while promoting the growth of natives. These efforts will enhance the native habitats considerably, and most importantly stop the spread of invasive species that can permanently alter these habitats if left unchecked. The result of the HEP implementation will be to permanently save the remaining dozens of acres of native grassland that exist in the Zoo expansion area and the remainder of Knowland Park from irreversible infestation from exotic invasive species.

Refer to Table 1, below for a tabular breakdown by year of the costs cited above. The costs estimates are based on our firm's experience with similar projects in the region and are subject to change as more information is gathered during the development of the IPM plan.

Table 1. Estimated Annual Costs of HEP Implementation		
Year	Action	Annual Cost
0	Habitat and Weed Mapping and IPM Plan	\$20,000-\$25,000
1 to 5	Weed removal and habitat enhancement in Priority Ecological Recovery Zones	\$40,000-\$50,000
	Pre-construction surveys	\$5,000
	Annual monitoring and reporting	\$5,000-\$10,000
	Ongoing Maintenance	\$10,000-\$20,000
	<b>Total annual cost years 1-5</b>	<b>\$60,000-\$85,000</b>
6 to 10	Weed removal and habitat enhancement in greater Knowland Park	\$20,000-\$30,000
	Pre-construction surveys	\$5,000
	Annual monitoring and reporting	\$5,000-\$10,000
	Ongoing Maintenance	\$10,000-\$20,000
	<b>Total annual cost years 6-10</b>	<b>\$40,000-\$65,000</b>
11+	Annual Monitoring and Reporting	\$5,000-\$10,000
	Ongoing Maintenance	\$10,000-\$20,000
	<b>Total annual cost years 11+</b>	<b>\$15,000-\$30,000</b>

Please feel free to contact me with any additional questions.

Sincerely,



Geoff Smick, MA  
Associate Principal Ecologist