



August 28, 2013

Sponsor: Baldwin Hills Regional Conservation Authority

Proposal entitled: "Urban Biodiversity Assessment: Baldwin Hills Biota Update"

Principal Investigator:	Travis Longcore
Time Period:	1/01/2014 – 6/30/2015
Total Cost:	\$140,795.00

On behalf of the University of Southern California (USC), I am pleased to submit the proposal above referenced. This proposal has been approved by the department of Contracts and Grants on behalf of the administration of the University.

The USC proposal contemplates a project as laid out in the proposal at a cost of \$140,795.00. In the event that an award is made, USC anticipates participating in the project under an agreement that is subject to mutually agreeable terms and conditions and beneficial to both institutions.

Should you have any questions of a business or fiscal matters please contact us at routree@usc.edu or by phone at (213)740-1894, our fax number is (213)740-6070.

Katie Rountree
Principal Contract and Grant Officer

The University of Southern California, Spatial Sciences Institute offers this scope of work and budget to provide an update to the biota assessment for the Baldwin Hills region, and an online tool that makes these data available to the public.

PROJECT NARRATIVE AND TIMELINE

In the years since release of the 2001 Biota Report for the Baldwin Hills (Molina et al. 2001), the landscape for managing protected lands in this area has changed significantly. First, the oilfield has gone from being a site eyed for acquisition and transformation to parkland to the epicenter for conflict around hydraulic fracturing (fracking) in southern California. Second, the Baldwin Hills Scenic Overlook has been purchased as public land. Third, many small restoration and landscape projects have been undertaken that have incrementally changed the natural landscape. Fourth, the opportunities for communication with the public have undergone a revolutionary change, with most park and open space visitors carrying a device with them capable of accessing information at any location at any time. Taken together, these developments indicate the need to update information about the distribution of species and habitats in this region and to develop pathways to communicate this knowledge to visitors that take advantage of the ubiquity of mobile telecommunications devices.

In February 2001, the Natural History Museum of Los Angeles County and Community Conservancy International released *The Biota of Baldwin Hills: An Ecological Assessment* (Molina 2001). The report contained chapters on vegetation, arthropods, reptiles and amphibians, birds, and mammals. Although the distribution of species in the Baldwin Hills is not expected to have changed dramatically since 2000, various advances in survey techniques and improved local expertise make it worthwhile to revisit specified topic areas. This is needed to provide baseline information at a scale that is suitable to track restoration of vegetation, to ascertain the status of taxonomic groups left out of previous efforts, and to clarify the status of species in some groups for which previous survey efforts were insufficient.

Vegetation. The 2001 biota report uses a modified vegetation classification scheme that is useful to identify vegetation types of interest, but is not well suited to use as baseline information to track restoration progress. The resolution of the mapping units is coarse and does not follow current California Native Plant Society (CNPS) vegetation classifications (Sawyer et al. 2009), which are also those recognized by the California Department of Fish and Wildlife. The 2001 map does not include the oil field because access was not available. Using remote sensing techniques (e.g., LIDAR, and multispectral imaging), a reasonable map of those areas could be created even if access were still not granted. A new vegetation map that covers the oil field, uses CNPS Alliance classifications, and incorporates other existing mapping efforts (e.g., weed maps), would dramatically improve the tools available to managers and to inform the general public.

Arthropods. Although additional surveys throughout the year would enhance knowledge of arthropod groups, this is not a priority. The 2001 survey provided an excellent snapshot of arthropod diversity and no sensitive species require additional focus at this point.

Reptiles and amphibians. The 2001 report includes the results of visual encounter surveys for reptiles and amphibians. Because of the weather during the surveys and the lack of other sampling methods, key species were missed (e.g., salamanders). Further investigation into the reptile and amphibian fauna is warranted, especially since some park officials have warned hikers of the possible presence of rattlesnakes. It is nearly impossible that any venomous snake is present, but better characterization of this group would be a valuable asset for interpretation of park resources to the public.

Birds. The bird surveys in the Baldwin Hills were quite extensive and the various public open spaces continue to be the site of recreational birding. It is occasionally the site of rarities spotted by the public, which are quickly publicized through social media networks, particularly eBird (www.ebird.org). An update of this part of the biota report is not necessary at this time.

Mammals. The 2001 Biota report included trapping for small mammals and the development of a species list for larger species through observations of scat, tracks, runways, or sightings of live or roadkilled individuals. No surveys for bats were undertaken. Advances in sound processing software now make it possible to identify bat species by their calls and through automated processing of recordings. In addition the feasibility of using remotely triggered infrared wildlife cameras has dramatically increased. Because some sensitive bat species may forage in the Baldwin Hills, a survey of the distribution and species diversity of bats would be important for managers. Some nocturnal camera trapping would also be beneficial to confirm continued presence of some key mammals (e.g., gray fox) and learn some about their movement patterns.

The Spatial Sciences Institute proposes to manage and implement an update of the 2001 biota assessment for the Baldwin Hills. The goals of the update are: 1) to provide more detail where needed to support ongoing efforts to restore native vegetation and control exotic plants in the project area, 2) provide clarity on the presence and distribution of key fauna groups, in particular bats, larger mammals, and reptiles and amphibians, and 3) serve the information in the original report, other surveys (e.g., weed maps), and the update to potential end users through a web map that standardizes, archives, and depicts geographic data about the Baldwin Hills in a manner useful to land managers and the general public.

Biota Update

Vegetation. The first component of the biota update is the development of an updated vegetation map of the Baldwin Hills Conservancy territory. The base map will be developed using a combination of 4-inch aerial photographs (available through the Los Angeles Region Imagery Acquisition Coalition license to USC), combined with other remotely sensed data such as NAIP imagery and lidar to discern vegetation units of a quarter acre (1,000 m²) or greater. This will allow extension of the mapped area to the large private landholding in the center of the Baldwin Hills used for hydrocarbon extraction. Polygons derived from remotely sensed data will then be checked in the field and assigned to vegetation alliances as defined by the California Native Plant Society. The oil field lands will be assigned to vegetation types from aerial photographs, use of binoculars on the ground, and potentially access for this purpose if it can be arranged. The map will be enhanced by inclusion of weed mapping efforts already completed in the base layer to save time in the field.

Reptiles and Amphibians. To increase the number of documented species in the study area, three types of surveys will be undertaken. First are visual encounter surveys to be directed at species that were missed in previous surveys and to confirm presence of the key reptile species at the major management units in the region (Baldwin Hills Scenic Overlook, Kenneth Hahn State Recreation Area, West La College, Holy Cross Cemetery, etc.). If permission is secured, surveys will be extended to the oil field. Second will be a targeted set of nighttime surveys for turtles at the ponds at Kenneth Hahn State Recreation Area. Third will be a set of pitfall arrays to be set up in three locations distance from regular human activity to target reptiles. These will be run one week on/one week off for the spring season during two springs (2014 and 2015). This work will be done by the Natural History Museum of Los Angeles County under the direction of Gregory Pauly, Ph.D.

Bats. Monthly visits will be made to each of the major management units around the Conservancy territory (including along Ballona Creek). Using a handheld bat detector, bats will be identified to species. Then, for sites with high bat foraging potential (e.g., over the ponds at KHSRA), a long-term monitoring station will be set up to record bat calls. These calls will then be collected and evaluated in the laboratory to identify all species. The work will be concentrated in Spring, Summer, and Fall of 2014 and undertaken by Orange County bat expert Stephanie Remington.

Mammal Connectivity. To document the presence and relative abundance of larger mammals in the project area, remotely-triggered wildlife cameras will be installed and monitored at key locations serving as potential connections between management units. Camera traps are available that do not require flash and can be secured to posts and infrastructure to reduce theft and vandalism. They will be run for 18 months at sites leading to crossings over or under La Cienega Boulevard and Stocker Street, plus within the oil field area if permission can be secured for this purpose.

Online Data Management and User Interface

All geographic data from the original biota report, data produced since that time (e.g., weed maps), and data produced as part of this project will be incorporated into an online map interface. This interface will be built on existing tools (either from Google or Esri) in a manner that allows for quick access to key information about the region in terms of vegetation, restoration efforts, sensitive species, and infrastructure. It can be built on open-source website coding designed to facilitate exchange of ecological restoration and monitoring data (Figure 1). The user interface will be designed to allow uploading of new monitoring data as it is obtained, as well as information about restoration actions that are taken in the various protected lands. For download purposes, all data will be archived at the USC Spatial Sciences Institute Geoportal (<http://geospatial.usc.edu/geoportal/>). To ensure that the public has access to this information, an online version of the information about species distribution will be developed and will be accessible using mobile devices.

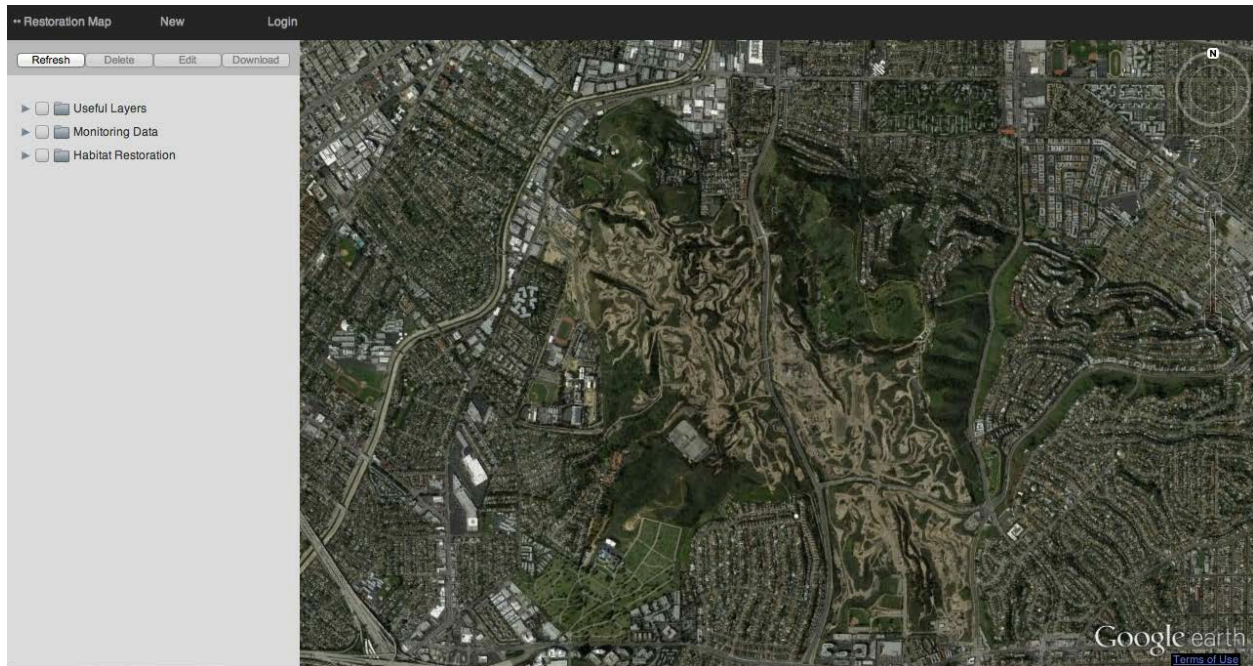


Figure 1. Example of web interface to ecological restoration and monitoring data (from <http://habitatproject.org/restorationmap/>).

Timeline

The project will be undertaken during an 18-month period from January 2014 to September 2015 as follows (by quarter).

Month	Management	Vegetation	Herps	Bats	Connectivity	Web Map
Winter 2014	Subcontract	Base map	Visual, Pitfalls		Install Cameras	
Spring 2014	Progress Report	Base map, Site Visits	Pitfalls	Site Visits	Monitor	
Summer 2014	Progress Report	Site Visits		Site Visits	Monitor	
Fall 2014	Progress Report	Site Visits		Site Visits	Monitor	
Winter 2015	Progress Report	Report	Visual, Pitfalls	Report	Monitor	Code
Spring 2015	Progress Report		Report		Report	Code
Summer 2015	Final Report					Code

Deliverable Products

Technical Reports. For each of the focal survey areas — vegetation, reptiles, and amphibians, bats, and wildlife connectivity (mammals) — a technical report will be produced that documents

the methodology, results, and conclusions of the surveys. Two of these will be produced by collaborators and two by project staff.

Progress Reports. USC project managers will report progress to Baldwin Hills Regional Conservation Authority quarterly to describe work progress and highlight areas of concern and proposed solutions to any challenges.

Final Report. The final project report will summarize each of the technical reports and describe the online tools that have been developed to share and visualize the biota information.

Online Map. Hosted at a web address agreed upon by the sponsors, an online map will be developed that shared biological information about the Baldwin Hills. All data made available on the USC geoportal will be maintained indefinitely. The user interface/web map will be provided to the sponsor at the end of the project or arrangements can be made for long-term maintenance.

References Cited

- Molina, K. C., Ed. 2001. The biota of the Baldwin Hills: an ecological assessment. Community Conservancy International and Natural History Museum of Los Angeles County Foundation, Los Angeles.
- Sawyer, J. O., T. Keeler-Wolf, and J. Evens. 2009. A manual of California vegetation, Second ed. California Native Plant Society, Sacramento, CA.

PROJECT COSTS

			YEAR 1	YEAR 2	TOTAL	BHRCA Share
Personnel	Rate	Months	Total			
PI (Longcore)	\$ 8,883.33	2	\$ 17,766.66	\$ 9,061.00	\$ 26,827.66	\$ 13,413.83
Project Specialist	\$ 4,750.00	12	\$ 57,000.00	\$ 29,070.00	\$ 86,070.00	\$ 43,035.00
Programmer	\$ 6,643.00	2	\$ 13,286.00	\$ 6,775.86	\$ 20,061.86	\$ 10,030.93
Fringe Benefits (33.5%)			\$ 29,497.64	\$ 15,043.80	\$ 44,541.44	\$ 22,270.72
Materials and Supplies						
10 cameras @ \$250/each plus tax			\$ 2,725.00	\$ -	\$ 2,725.00	\$ 1,362.50
Posts, bolts, locks, etc.			\$ 500.00	\$ -	\$ 500.00	\$ 250.00
Consumable supplies			\$ 1,000.00	\$ 1,000.00	\$ 2,000.00	\$ 1,000.00
SSI Computing	PI 3%		\$ 711.55	\$ 361.53	\$ 1,073.09	\$ 536.54
	Specialist 6%		\$ 4,565.70	\$ 2,328.51	\$ 6,894.21	\$ 3,447.10
	Programmer 12%		\$ 2,128.42	\$ 1,085.49	\$ 3,213.91	\$ 1,606.95
Mileage			\$ 500.00	\$ 250.00	\$ 750.00	\$ 375.00
Herpetology Consultant			\$ 25,000.00		\$ 25,000.00	\$ 12,500.00
Bat Consultant			\$ 15,000.00		\$ 15,000.00	\$ 7,500.00
Total Direct Costs			\$ 169,680.97	\$ 64,976.19	\$ 234,657.16	\$ 117,328.58
Indirect Costs			\$ 33,936.19	\$ 12,995.24	\$ 46,931.43	\$ 23,465.72
Total Cost			\$ 203,617.17	\$ 77,971.42	\$ 281,588.59	\$ 140,794.30

The Facilities and Administration (“indirect”) rates charged by USC are 64% (7/1/12-6/30/14) and 64.5% (7/1/14-6/30/15) of direct expenses. This rate is established with the federal government and represents the cost of buildings, electricity, water, and other facilities costs, plus the cost of the administration of the university. For this project, the Dornsife Dean’s office has agreed to accept the 20% Facilities and Administration rate limit imposed by the sponsor.

The costs for this project will be split between the Baldwin Hills Regional Conservation Authority (BHRCA) and the Baldwin Hills Conservancy (BHC). The budget reflects the total project costs and allocates half of each item to each of the two agencies. The project will not be undertaken if funding from both agencies is not obtained.

The total project cost for BHRCA is \$140,794. The same amount is sought from BHC. The total indirect cost normally due to USC, but waived for this project, is \$103,997.

The project will be managed by PI Travis Longcore, with an effort of 3 months over the 18-month project. A full-time project specialist will be hired to do the vegetation mapping and camera trapping and interface with the consultants and programmer to develop the project deliverables. This person will have at least a Master’s degree in a relevant field and work under

Dr. Longcore's supervision. The programmer is already on staff at SSI and will provide technical support for the online mapping and data management.

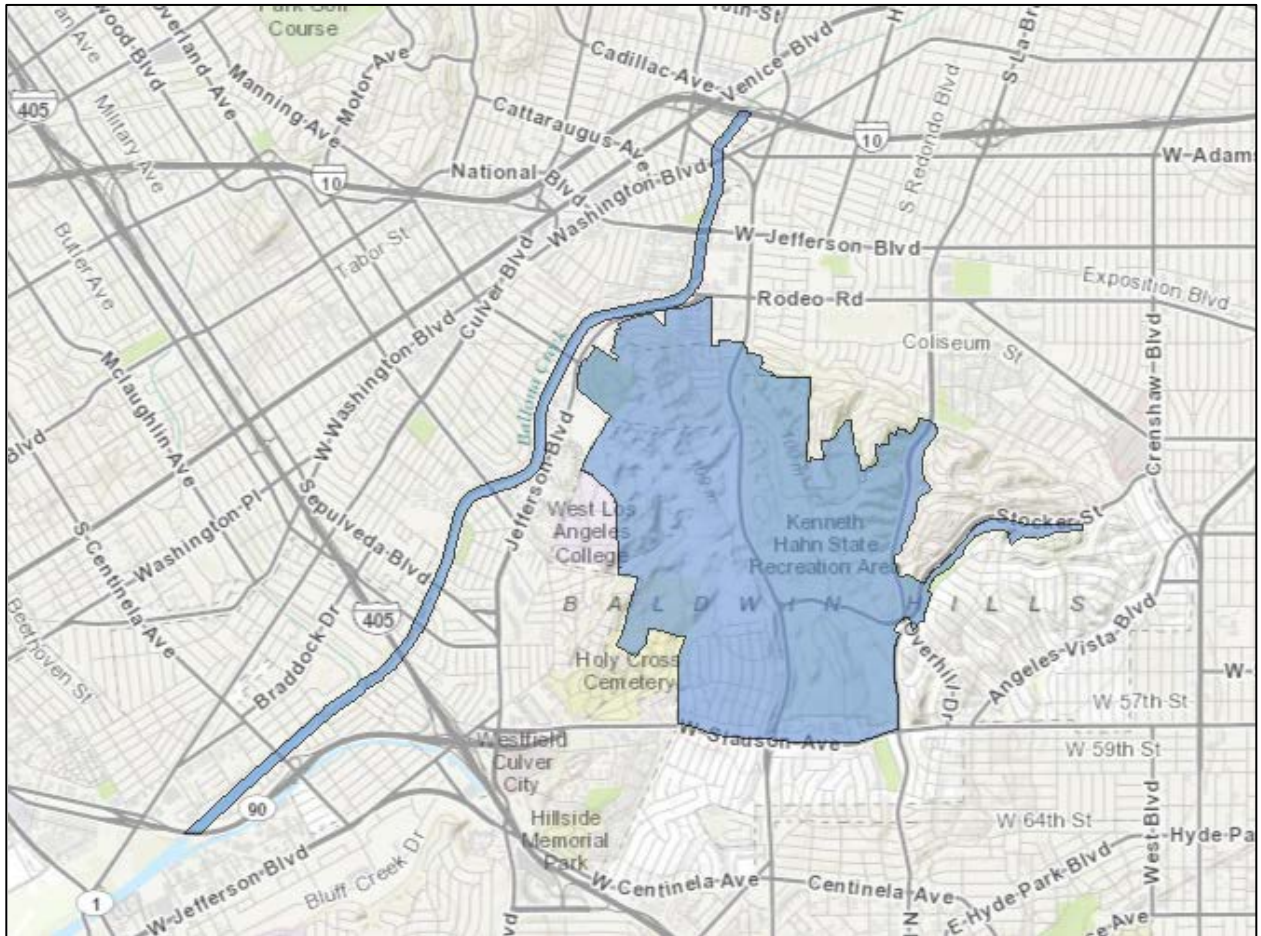
Fringe benefit rates are set by USC at 33.5% of total salary.

Materials will be needed to set up the camera traps and the mileage budget is to cover the many trips back and forth to the study site for vegetation surveys and to maintain the camera traps. Consumable supplies include text books, paper, memory cards, and other necessary items for the research.

The Spatial Sciences Institute has standardized rates to cover hardware and software computing resources and auxiliary services such as bandwidth and off-site backups. The rate varies depending on the amount of salary paid in categories that reflect low (PI), medium (Project Specialist), and high (Programmer) computing resources. These rates cover all software licenses, computer resources, storage, backup, membership in Los Angeles Region Imagery Acquisition Consortium (which provides 4-inch resolution aerial photographs), etc.

The herpetology and bat consultants will be leading regional experts who provide consultant services. The preferred individuals are Dr. Greg Pauly at the Natural History Museum of Los Angeles County and Stephanie Remington (an independent consultant specializing in bats). These consulting agreements will go through the regular USC procurement process.

MAP OF PROJECT AREA



The project lies within the Ballona Creek watershed and includes the territory covered by the Baldwin Hills Conservancy. Approximate total area is 2,000 acres.

APPLICANT BACKGROUND AND RELATED EXPERIENCE

Dr. Travis Longcore is Associate Research Professor at the University of Southern California Spatial Sciences Institute. He serves also as Science Director of The Urban Wildlands Group, a Los Angeles-based conservation nonprofit, and is the volunteer president of the Los Angeles Audubon Society. His research interest is urban ecology and conservation, with emphasis on: conservation planning and management, edge effects of development, especially artificial night lighting, and monitoring and management of endangered species. He is co-editor of the book *Ecological Consequences of Artificial Night Lighting* (Island Press, 2006) and author of over 25 peer-reviewed articles in journals such as *Conservation Biology*, *Biological Conservation*, *Restoration Ecology*, *Environmental Management*, *Urban Geography*, and *Frontiers in Ecology and the Environment*. His research has been covered in *National Geographic*, *Audubon*, *New York Times*, *Wall Street Journal*, *Life*, and *Discover*.

Dr. Longcore has managed over \$1.5 million in contracts and grants to implement applied conservation actions, including surveys for endangered species at locations in Los Angeles and the Central Valley. He has advised projects to measure connectivity for mammals in Los Angeles County in the Santa Monica Mountains and through the essential link under State Route 14 between the Los Padres and Angeles National Forests. Dr. Longcore's expertise will be supplemented by subject-matter consultants expert in bats and herpetology, and a full-time project specialist hired for the duration of the proposed project to do the vegetation mapping, camera trapping, and design the user interface.

The ***Spatial Sciences Institute*** is a research and educational center for the acquisition, analysis, and sharing of data on the world around us. It is housed in the Allan Hancock Foundation Building and boasts an impressive array of computing technologies dedicated to research and education. Housed within USC's state-of-the-art data center, the core consists of 14 multi-core processor IBM blade servers and three clustered IBM 3650m servers hosting a VMware environment. These machines power a multitude of applications, including the entire suite of industry-standard GIS applications from Esri and GPS applications from Trimble, specialty software like the Idrisi Taiga GIS and Image Processing software, and the latest in virtualization technologies from Citrix. On the back end, a fiber channel SAN running high speed disk over a gigabit network ensures high availability and fast access to data. We utilize a variety of security physical and virtual features to guard against unwanted access. We also follow a stringent disaster recovery plan that includes weekly and monthly backups which are sent to a remote location for secure storage. These computer facilities are supported by the Dornsife College Technology Services Office and a dedicated computer services consultant housed in the Spatial Sciences Institute.

Nearly 500 distinguished scholars are engaged in systematic inquiry within the humanities, social sciences and natural sciences at the ***USC Dana and David Dornsife College of Letters, Arts and Sciences***. USC has attracted a large pool of the world's leading scholars and rising stars who will help shape the research enterprise of the 21st century. Sponsored research has nearly doubled at USC in the last 10 years to \$485 million in 2008. In fact, USC is the ninth-largest recipient of federal research dollars among all private universities in the U.S.

References

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