



LOS ANGELES CENTER FOR URBAN NATURAL RESOURCES SUSTAINABILITY

STRATEGIC PLAN 2014 — 2018





At the Los Angeles Center for Urban Natural Resources Sustainability, we believe that green infrastructure and the functions provided and supported by a network of natural ecosystems is as critical to a city as good roads, water supply, sewers, and electric grids.

We believe urban trees, forests, gardens, & ecosystems can make a good city into a great city – socially, culturally, economically, and environmentally; we intend to demonstrate this to the greater Los Angeles metro area.



TABLE OF CONTENTS

INTRODUCTION AND PURPOSE & NEED	4
1. MISSION, VISION, & GUIDING PRINCIPLES	5
1.1 MISSION	5
1.2 VISION	5
1.3 GUIDING PRINCIPLES	6
2. PRIORITY NEEDS	7
3. SCIENCE PLANNING	8
3.1 Urban Natural Resources Sustainability	8
3.2 Trees	9
3.3 Social	9
3.4 Water	9
3.5 Air	10
3.6 Soil	10
4. OVERSIGHT & MANAGEMENT	10
4.1 Executive Oversight Team	10
4.2 Administration	14
5. BUSINESS OPERATIONS	14
5.1 Calendar of Events	14
5.2 Budget	15
5.3 Request for Proposals	15
5.4 Los Angeles Urban Natural Resources Sustainability Science Fellowship	15
5.5 Implementation Team	17
6. USDA FOREST SERVICE PACIFIC SOUTHWEST URBAN FIELD STATION	17
6.1 Urban Water	18
6.2 Green Infrastructure	18
6.3 Environmental Justice	19
6.4 Humans and Fire	19
APPENDIX A. ORGANIZATIONS REPRESENTED AT PARTNER STAKEHOLDER MEETINGS	20
APPENDIX B. BACKGROUND	22
APPENDIX C. RESEARCH & DEVELOPMENT DELIVERY NEEDS	23
APPENDIX D. CALENDAR OF EVENTS	32



The Los Angeles Center for Urban Natural Resources Sustainability (“LA Center”) operates through a partnership including the USDA Forest Service, Pacific Southwest Region and Research Station and the City of Los Angeles (Department of Recreation & Parks and the City Plants Initiative). Additional partners include non-governmental organizations (such as the California Urban Forest Council), state entities (such as Cal Fire), academic institutions (such as the University of California at Los Angeles), and other urban forestry groups (such as private industry partners like The Davey Resource Group). These partners work jointly to oversee the LA Center in urban natural resources stewardship and promote adaptive management, technology transfer, and science. See Appendix A for a full list of the partner groups and organizations represented at the initial stakeholder meetings held in October 2012 and January 2013.

PURPOSE & NEED

The purpose of this Strategic Plan is to outline the LA Center’s direction and priorities.

The goal of the LA Center is to serve as a *center of excellence* in urban natural resources stewardship and promote adaptive management, technology transfer, and science to improve the quality of lives and environment in the Los Angeles metropolitan area. The LA Center serves as a “Research Destination Hub” where key environmental, urban ecosystem, urban natural resource and socioeconomic studies will inform decisions and actions to enhance the urban forests, waterways, wildlife, green infrastructure and quality of lives throughout the Los Angeles metropolitan area. The LA Center is a physical place¹ to focus research and technology transfer as well as a hub in the network of relationships among a growing community of scholars, policy makers, cooperators, and their facilities focused on urban natural resources sustainability.

The LA Center is a multi-faceted partnership of Federal, State and local government partners as well as academic, industry, private, and non-profit organizations. The LA Center’s foundation lies within the efforts established by the City of Los Angeles and their partners founded during the tenure of the Million Trees LA Initiative (now reorganized as City Plants). Previously, there was no such facility, center, or organization to serve these unique urban forestry and stewardship needs.

¹ The physical office is located at: 221 N. Figueroa Street, Suite #1520, Los Angeles, CA 90012



The LA Center exists as a partner-based collaborative for the purpose of conducting scientific research and collecting and sharing research and tools that can improve the quality of lives and environment in the Los Angeles metropolitan area. The LA Center constitutes a full-time and permanent USDA Forest Service presence in Los Angeles, through the USDA Forest Service Pacific Southwest Research Station’s Urban Field Station, connecting those inhabiting the urban Los Angeles metropolitan area with USDA Forest Service National Forest System (“NFS”) lands. The LA Center (1) seeks out partnerships with public and private entities and community and academic-based groups, (2) coordinates events to target communications about scientifically quantifiable benefits of green infrastructure and stewardship projects in the Los Angeles metropolitan region, and (3) connects urban and wildland-urban interface inhabitants, including urban under-served youth, of the Los Angeles metropolitan region with stewardship, ecological restoration, and research-focused opportunities.

See Appendix B for more background on the development of the LA Center.

1. MISSION, VISION, & GUIDING PRINCIPLES

1.1 MISSION

Foster collaboration and generate science, science delivery, technology transfer and communication to sustain the health and diversity of natural urban ecosystems and enhance the quality of life within the urban landscape of the Los Angeles metropolitan region.

1.2 VISION

To improve and enhance the urban forests, urban waterways, urban wildlife, green infrastructure and quality of life for all individuals throughout the Los Angeles metropolitan area and to create a healthy, safe and sustainable urban ecosystem for the benefit of individuals, communities, nature and the economy.



1.3 GUIDING PRINCIPLES

These guiding principles help to inform the LA Center's practice and priorities and provide guidance for formal actions and decisions.

1. Sustain and expand the quality and function of urban natural resources in the Los Angeles metropolitan region by supporting current initiatives and special emphasis programs of partner organizations and local government.
2. Form interdisciplinary research teams to improve understanding of the critical functions of urban ecosystems and their vulnerability to biological, physical and social threats.
3. Engage children, young adults, young scholars, and urban residents to foster knowledge, understanding, and stewardship of the natural environment.
4. Develop landscape-scale management practices to increase the value of the natural resources of the Los Angeles metropolitan region.
5. Create, manage, and apply information about urban natural resources to assess the outlook for natural resources and assess policies for enhancing ecosystem services.
6. Assist local partners in expanding citizen engagement and volunteerism to promote community-based stewardship.
7. Create new partnerships and promote coordination to better leverage existing resources.
8. Enhance environmental justice to ensure that benefits of nature are equitably distributed and that all social and economic groups benefit from the activities and programs of the LA Center.
9. Promote economic development and collaborative learning opportunities leading to new jobs and career opportunities.
10. Ensure that the LA Center is accessible to communities and the public and responsive to community-based concerns, needs, and priorities.



2. PRIORITY NEEDS

2.1 Promote collaboration with similar research hubs & USDA Forest Service Urban Field Stations.

2.1.1 Apply relevant tools and research from other urban areas to the Los Angeles metropolitan region and deliver research and results to partner organizations. Promote a research network that can leverage current and future resources to catalyze large-scale interest and investment in green infrastructure and urban natural resources stewardship, identify “who is doing what” (research), identify gaps in needed research and development, and leverage resources to gain investment.

2.2 Build an accessible & comprehensive database of existing relevant research.

2.2.1 Conduct a literature search and compile an annotated bibliography on urban natural resources and urban forestry research. Create an accessible, organized, and comprehensive database for urban natural resources and urban forestry research and data to catalyze research and assessments with partner organizations and to mitigate an unnecessary duplication of future efforts.

2.3 Create research and science-delivery opportunities for Los Angeles metro-area youth and scholars.

2.3.1 Administer a Los Angeles Urban Natural Resources Sustainability Science Fellowship Program to provide research and science-delivery opportunities for scholars and academics from a diversity of academic disciplines and socio-demographic backgrounds, while advancing the Mission, Vision, and Guiding Principles of the LA Center.

2.4 Develop a web and media presence.

2.4.1 Develop a research center newsletter, webinar series, and website that share and communicate relevant urban natural resource research and tools.

2.5 Conduct and share research and develop tools relevant for the Los Angeles metropolitan region.



3. SCIENCE PLANNING

LA Center partners met in January 2013 to identify the primary science topics the LA Center might address. These science topics were grouped into six categories: urban natural resources sustainability, trees, social (includes benefits of environmental services and economics), water, air, and soil. While in need of refinement, these topical areas are the best guide for determining future LA Center research activities.

See Appendix C for the full list of science topics and needs identified by partners during the development of the LA Center.

Prior to undertaking any new research the process will be to assess published and reported findings from completed research to date and apply as much of that knowledge as possible to the Los Angeles area. USDA Forest Service Pacific Southwest Research Station scientists in the urban field station will conduct work as appropriate to their lines of research. Additional studies should be conducted by LA Center partners, funded either independently or by those desiring the study results, or in combination through the LA Center as appropriate.

3.1 Urban Natural Resources Sustainability

Our partners are looking for an assessment of the ecological values found within the Los Angeles urbanized area. Of most value are measures of biodiversity. One particular topic of interest was the diversity of birds found in Los Angeles and a desire to understand impacts and benefits of non-native species of birds. There was also interest in species losses (and ties to climate change) and the impacts of non-native species. Additionally, partners were interested in the environmental impacts from the forest downstream to the city as well as impacts from the city on the forested lands. There was also interest in information about the benefits of chaparral, especially the carbon storage benefits. There was interest in how to characterize and quantify the benefits provided by trees and urban forest canopy cover within a metropolitan area especially considering air pollution mitigation, water pollution mitigation, carbon sequestration, urban heat island mitigation, and reduced energy demand from shading of building. Partners wanted to know the impacts of climate change on urban forests and the anticipated changes to tree mortality, species selection, water availability, etc.



3.2 Trees

The partners were interested in many topics related to trees, tree health, and longevity. They requested long-term monitoring of urban tree planting in varying settings including sustainability studies based on neighborhood-scale street tree plantings, school plantings and commercial corridor plantings. They were also interested in information about pests and potential invasions, and how these differ under a changing climate. They were interested in what to plant today for carbon sequestration into the future. They requested research that identifies when and under what circumstances it is beneficial to not plant trees, especially if planting conflicts with other values (other species, pests, etc.) and wanted to know the role of root pruning when they do plant trees. They asked for more information on the benefits of residential trees for home owners, and neighbors. Additionally, they were interested in urban tree life expectancy.

3.3 Social

There was a wide variety of social topics of interest to the partners. Topics included public health, an assessment on how to utilize citizen science, how to promote environmental literacy and environmental justice, and how to bring pressing urban environmental issues to the minds of our urban youth. Additionally, they were interested in kids and outdoor connections such as the impacts to school test scores and satisfaction with school related to having “green space” on campus or on the way to campus. Other topics included urban environmental policies (such as finding ones that work in other urban locations), the role of urban forests in feeding people, public land usage by urban residents (such as best ways to promote access to low-income communities, and to understanding why people fish in the Los Angeles River), and identifying perceptions about the economic and non-economic values of natural places and environmental services.

3.4 Water

The partners mentioned several topics related to water. Of concern was the drought in southern California. They were interested in using trees in bioswales, capturing stormwater runoff, watering practices, and the balance between rainfall interception/capture, water uptake, and ground water recharge. They asked about the feasibility of rainwater harvesting in Los Angeles as one solution to anticipated climate change impacts and water shortages. There was also interest in the long-term effects of use of recycled water. They suggested an assessment of vegetation at urban waterways and information on how to identify what plant species need to be planted now in anticipation of low water levels.



3.5 Air

The partners were interested in the trading of carbon credits and needed more information about what that is, if it is worth it, and what happens for different micro-climates. There was also interest in vegetation for air quality screening (such as along roadways). Specifically, they wanted research to determine which vegetation types to use, what is effective (including special arrangement), and for what pollutants.

3.6 Soil

The partners expressed a need for studies that assessed soil volume and quality, and the role of soil organic matter, especially loss of organic matter and tree/plant health assessment.

4. OVERSIGHT & MANAGEMENT

4.1 Executive Oversight Team

Advisory oversight for the LA Center is provided through an Executive Oversight Team (“EOT”) consisting of at least one (1) representative, but no more than two (2) representatives,² from each of the following seven (7) sectors:³

1. USDA Forest Service
2. City of Los Angeles
3. California State Urban Forestry Representative
4. Private Industry (Urban Forestry or Arboriculture)⁴
5. Regional Urban Forestry Non-Profit Organization⁵

² No more than two (2) EOT members from the same organization or representative sector may serve on the EOT concurrently, e.g. no more than two (2) representatives from the USDA Forest Service may serve on the EOT, regardless if the added USDA Forest Service representative may represent additional sectors such as Academic/Research, Urban Youth Outreach, etc.

³ All reasonable efforts will be made to ensure all sectors are represented on the EOT. However, it should be noted that in some instances, an organization may be well suited and fully capable to represent more than one sector.

⁴ Private Industry (Urban Forestry or Arboriculture) representative must be actively involved in the Pacific Southwest Region, with substantial engagement in southern California.



6. Urban Youth Outreach, Environmental Justice, and/or Environmental Literacy

7. Academic/Research (Urban Forestry, Environment, Social, etc.), incl. Citizen Science

With the exception of the inaugural LA Center EOT⁶ members who continue to serve on the LA Center EOT, no more than two (2) EOT members from the same organization or representative sector may serve on the EOT concurrently.

4.1.1 Inaugural Executive Oversight Team Composition

The inaugural EOT was comprised of the following founding members and sectors:

Representative Sector	Executive Oversight Team Member
USDA Forest Service	Dr. Deborah Chavez , Urban Ecosystems & Social Dynamics and Fire & Fuels Program Manager, Pacific Southwest Research Station, USDA Forest Service
USDA Forest Service	Sandy Macias , Urban & Community Forestry Program Manager, State & Private Forestry, Pacific Southwest Region USDA Forest Service
City of Los Angeles	Lisa Sarno , Executive Director, Million Trees Los Angeles, Office of Mayor Antonio Villaraigosa, City of Los Angeles
City of Los Angeles	Vicki Israel , Assistant General Manager, Department of Recreation and Parks, City of Los Angeles
City of Los Angeles	George Gonzalez , Chief Forester, Urban Forestry Division, City of Los Angeles
Private Industry (Urban Forestry or Arboriculture)	Jack McCabe , Regional Operations Manager, Davey Resource Group, a division of The Davey Tree Expert Company

⁵ Regional Urban Forestry Non-Profit Organization must be actively involved in the Pacific Southwest Region, with substantial engagement in southern California.

⁶ See Section 4.1.1 Inaugural Executive Oversight Team Composition



4.1.2 Duties & Responsibilities

EOT members serve as an advisory and recommending body, representing the unique issues, needs, capabilities, and opportunities of their represented sector. The EOT is expected to be familiar with the relevant issues facing the region's urban natural resources as well as the LA Center's funding⁷ sources and structure. The EOT is also expected to recommend potential outreach activities and strategic partnerships for the LA Center and provide recommendations and input on how the LA Center can best contribute to the region and support its partner organizations.

EOT members will serve without compensation and can expect to dedicate 6-12 days to LA Center business per calendar year. EOT members are expected to attend quarterly LA Center EOT calls and any necessary meetings involving LA Center business. In the event an EOT member cannot attend any LA Center EOT call or meeting, the EOT member may send an alternate for purposes of dictation and collection of notes for the EOT member. EOT members who fail to attend any two (2) consecutive calls or meetings and fail to send an alternate may be removed from the EOT at the election of the attending EOT members (requiring simple majority⁸) and a new EOT member may be selected for that represented sector. Reasonable exceptions may be made if either (1) advance notice is made and an alternate cannot be sent or (2) there is a highly compelling reason in the judgment of the EOT (requiring simple majority).

4.1.3 Nomination & Term of Appointment

For purposes of successfully launching the LA Center, the inaugural EOT members were nominated by the LA Center Administrator from among the organizations involved in the founding of the LA Center, longstanding regional partners, and other organizations representative of the following seven (7) sectors: (1) USDA Forest Service, (2) City of Los Angeles, (3) California State Urban Forestry Representative, (4) Regional Urban Forestry Non-Profit Organization, (5) Private Industry (Urban Forestry or Arboriculture), (6) Academic Research (Urban Forestry, Environment, Social, etc.), including Citizen Science, and (7) Urban Youth Outreach, Environmental Justice, and/or Environmental Literacy.

⁷ See Section 5.2 Budget for budget and grant management.

⁸ For purposes of conducting LA Center business and as it is used herein, simple majority shall be interpreted to mean a voting requirement of more than half of the quorum of the attending EOT members.



EOT members are appointed for a two-year term and no individual EOT member may serve more than three (3) consecutive two-year terms. EOT Members may re-nominate themselves upon the conclusion of their two-year term so long as their continued tenure would not exceed the three (3) consecutive two-year term limit.

All Executive Oversight Teams subsequent to the inaugural EOT will be nominated and selected to a two-year term⁹ of appointment according the following process:

Those EOT members either departing before the end of their two-year term or departing at the end of their two-year term and choosing not to re-nominate themselves for a subsequent EOT term may nominate their replacement from their represented EOT sector. The appointment of the subsequent EOT nominee must be confirmed by simple majority of the remaining EOT members at the next scheduled EOT call or meeting. Should an outgoing EOT member not nominate a replacement or the outgoing EOT member's nominee not be confirmed by the remaining EOT members, the LA Center Administrator shall nominate a replacement from the outgoing EOT member's represented sector. The LA Center Administrator's nominee must be confirmed by simple majority of the remaining EOT members at the next scheduled EOT call or meeting. Should the LA Center Administrator's nominee not be confirmed, this process of the LA Center Administrator selecting a nominee is to be continued until a subsequent EOT member is selected by simple majority of the EOT members. In the event the LA Center Administrator is called to nominate in the case of an outgoing EOT member's nominee not be confirmed, that outgoing EOT member may continue to vote for their sector's replacement.

4.1.4 Function & Capacity

All processes involving LA Center funds, resources, and structure shall require EOT approval via simple majority and any LA Center business decision to be made by the EOT must be made available to the EOT no later than forty-eight (48) hours in advance of the EOT meeting. Any EOT member may add an item to an upcoming EOT meeting agenda by contacting the LA Center Administrator no later than seventy-two (72) hours in advance of the EOT meeting so as to give the EOT sufficient notice of the agenda item.

A quorum of EOT members must be present to make any LA Center decision. Simple

⁹ The commencement of the inaugural two-year Executive Oversight Team term will begin upon ratification on this Strategic Plan.



majority of the EOT shall constitute a quorum. All EOT members shall be fully advised of any decision made by a quorum in their absence.

EOT members may remove themselves from any decision making process without penalization should there be an actual or perceived conflict of interest. In the event a quorum is present but for the abstaining EOT member, the decision making process may continue without interruption.

4.2 Administration

The USDA Forest Service Pacific Southwest Research Station currently provides the support of a Social Science Analyst full-time to serve as the LA Center Administrator and manage all day-to-day operations, facilitate meetings and stakeholder groups, convene partners and develop partnerships, promote research studies and projects, draft talking points and documents for LA Center use and distribution, conduct year-end reporting activities, maintain various tracking documents, and supervise any LA Center hired staff.

The City of Los Angeles provides work space/offices¹⁰ for the LA Center Administrator and other personnel necessary to carry out the activities of the LA Center. Personnel may include, but is not limited to, post-doctoral scholars and visiting scientists, students, Forest Service personnel, other Federal agency personnel, non-profit and municipal partners, and any other personnel deemed appropriate by the Executive Oversight Team. Meeting facilities and miscellaneous administrative office support will also be provided by the City of Los Angeles.

5. BUSINESS OPERATIONS

5.1 Calendar of Events

The LA Center has annual events and activities which can be found in Appendix D. These include quarterly Executive Oversight Team meetings, biannual partner meetings, webinars, newsletters, and planning for activities listed below (budget, Requests for Proposals, and implementation of the strategic plan).

¹⁰ The physical office is located at: 221 N. Figueroa Street, Suite #1520, Los Angeles, CA 90012



5.2 Budget

Initial funding for the LA Center was provided by a grant from the USDA Forest Service, Pacific Southwest Region with matched grant funding from the City of Los Angeles, City Plants Program. The grant was provided to Community Partners, an IRS section 501(c)(3) non-profit, tax exempt organization on behalf of the City of Los Angeles, City Plants Program, for the purpose of establishing and funding the Los Angeles Center for Urban Natural Resources Sustainability. In addition to the implementation funds provided by the USDA Forest Service, Pacific Southwest Region, long-term funding will require a diversified funding strategy, requiring partner involvement and stakeholder support.

Pursuant to the terms of the initial grant document, which funded the development and launch of the LA Center, between the USDA Forest Service, Pacific Southwest Region and Community Partners on behalf of the City of Los Angeles, City Plants Program, only the grantor (USDA Forest Service) and grantee (Community Partners) may formally decide how and when to expend LA Center funds, including any subsequent grant modification(s). EOT members may, however, propose suggestions for LA Center funded projects and make recommendations for LA Center funded opportunities, consistent with the grant document.

5.3 Request for Proposals (RFP)

Any solicitation or request for LA Center funds shall be made through a formal request for proposal (RFP) process. All LA Center funding opportunities will be made publically available on the LA Center website (www.LAUrbanResearchCenter.org) and in office at 221 N. Figueroa Street, Suite #1520, Los Angeles, CA 90012. All complete and timely submitted RFPs will be reviewed by the Executive Oversight Team for consideration. Each year the implementation team will help the Executive Oversight Team decide direction for that year. Each year the science team will make recommendations to the Executive Oversight Team on science topics to consider for the RFP process.

5.4 Los Angeles Urban Natural Resources Sustainability Science Fellowship

In the fall of 2014 the LA Center presented a new program, the Los Angeles Urban Natural Resources Sustainability Science Fellowship. The Fellowship provides research and science-delivery opportunities for graduate students from a diversity of academic disciplines and sociodemographic backgrounds. Selected Fellows conduct projects that contribute to the core mission and vision of the LA Center. Fellows receive a stipend of \$5,000 and are required to develop a poster and present their research findings through a webinar at the close of the fellowship period. The \$5,000 fellowship award is to be dispersed in four equal



payments of \$1,250 over the course of the fellowship (the fourth payment will be held until the completion of the Fellow's poster and webinar presentation related to the research conducted during the fellowship).

Each Fellow is expected to conduct and provide a literature review and accompanying annotated bibliography related to their project. Each Fellow shall develop an original research question and project or proposal related to the Fellow's ongoing work within the general topic parameters provided in the Research Areas section below. Each Fellow is expected to secure a research mentor who the Fellow will spend time working with on data collection and professional development. This may vary considerably for each project, but Fellows should expect to commit up to 100 hours over the course of the fellowship working with their mentor. These interactions will serve as an opportunity for Fellows to develop relationships with researchers and practitioners in their area of interest. Although not a requirement, Fellows are encouraged to seek mentors with USDA Forest Service, Pacific Southwest Research Station Research Scientists. Each Fellow will develop a poster to communicate the Fellow's research findings and present their research through a webinar at the close of the fellowship period.

5.4.1 Fellowship Research Areas

Social Science: utilization of citizen science, urban environmental policies/issues, environmental justice, urban sustainability and low-income communities, etc.

Water and Sustainability: new technologies for management, rainwater capture, climate change and water, water and vegetation, recycling water, etc.

Trees/Plants: urban tree planting, environmental/social aspects of tree planting, restoration, invasive species, climate change and urban forests, etc.

Air Quality: public health, urban heat island, air quality and the urban environment, etc.

Green Technology and Sustainability: green infrastructure, energy efficiency, green alternatives, etc.

Biodiversity and Urban Natural Resources Sustainability: urban ecology, urban wildlife surveying, urban plant surveying, natural restoration or renovation, etc.

Other Possibilities: applicants are also invited to propose a current related project concerning urban natural resources and sustainability that they are actively engaged. For this possibility, applicants will need to state the current research



question, how this fellowship would be used to augment or expand the work in a defined way, how other individuals or a faculty member would be involved and specific outcomes that could be attributed to the fellowship. Current status of the work would need to be carefully explained for this form of application, if other funding is involved, and the specific role of the applicant in the ongoing work. Preference will be given to projects of this type when the applicant can clearly define their unique and identified role in the ongoing work and how this fellowship would result in a unique addition with a defined outcome.

5.4.2 Science Review Team

In conjunction with the EOT, a Science Review Team comprised of LA Center partners and researchers/academics will be assembled for the purpose of planning topics for the call for proposals and the call for fellowships, reviewing applications from prospective Los Angeles Urban Natural Resources Sustainability Science Fellows, and reviewing the research proposals. The Science Review Team will convene remotely (e.g. phone) and/or virtually (e.g. video teleconference) to plan for the calls, to rate prospective fellow and proposal applicants, to consider the academic and community needs of the proposed research, and to consider the value to the LA Center partners and the overall urban metropolitan area of the proposed research.

5.5 Implementation Team

Following the ratification of this Strategic Plan by the Executive Oversight Team, for purposes of developing an Implementation Plan further defining a program of work and creating benchmark goals, identifying a strategy to achieve each goal, identifying the action steps required for each goal, identifying what support and resources are required for each goal, and setting forth a target date to achieve each goal, the Executive Oversight Team and the LA Center Administrator shall seek out partners to serve as members of an Implementation Team. The team will meet at the beginning of each subsequent year to recommend the focus for that year.

6. USDA FOREST SERVICE PACIFIC SOUTHWEST URBAN FIELD STATION

Within the partner group is the USDA Forest Service Pacific Southwest Research Station (PSW). PSW is organized into four research programs that address ecological restoration, wildfire management, and community connections. It is mainly the scientists within PSW's Urban



Ecosystems and Social Dynamics Program who are connected to the Urban Field Station. Other USDA Forest Service Urban Field Stations exist in Baltimore, Philadelphia, New York, and Chicago. Each was developed to meet the unique needs of the partners.

PSW's Urban Field Station scientists address lines of research which contribute to the areas identified in PSW's draft strategic framework. The framework includes urban water, green infrastructure, environmental justice, and humans and fire.

6.1 Urban Water

Forested mountains are important sources of clean water for the millions of inhabitants of western urban centers. Some urban residents, particularly at the wildland-urban interface, rely on groundwater from wells; however, regardless of the type of water supply, the health of the surrounding forested land is integral to the health of these water-supply systems. Rainfall and ground water that passes through forests is cleaner than rainfall that drains from roads or water running off farm fields surrounding many urban areas. The same may be true of rain and stormwater runoff within the urban environment.

The loss of forest area and degradation of forest watershed functions through environmental changes can negatively impact urban water quantity and quality. Lack of awareness of the importance of this critical "ecosystem service" provided by forests, often distant from urban dwellers, can result in a lack of understanding of the most basic value of sustainable natural resource management. Similarly the value and ability of resources such as trees and vegetation within the urban environment to enhance the well-being of people and communities may go unrecognized or underappreciated. PSW research scientists and partners will study the complex issues of urban water.

6.2 Green Infrastructure

Green infrastructure includes the trees and vegetation in yards, parks, public spaces, and along streets. Greenways, such as tree-lined streetscapes, wetlands, river fronts and lake shores, are all components of green infrastructure of urban ecosystems which may provide environmental benefits such as cleaner air and water, and other ecosystem services including reduced energy costs, buffering of wind and noise, recreational opportunities, and increased property values. PSW research scientists and partners will study the cost-benefits of sustainable green infrastructure in urban ecosystems, optimal vegetation designs, and management practices in the face of environmental stressors such as insects, diseases, and changing climatic conditions.



6.3 Environmental Justice

Economically deprived neighborhoods often lack trees and other vegetation, parks and other greenways, and frequently are situated near industrial sites, which can be sources of pollution. Investments, both social and economic, in green infrastructure may help mitigate some of the effects on air and water quality and human health. However, remedying past inequities in a sustainable manner requires a detailed understanding of barriers to equity. PSW research scientists and partners will study the barriers to the introduction and maintenance of green infrastructure in urban ecosystems.

6.4 Humans and Fire

Wildland-urban interface issues, such as suppression activities and planned use of fire can be among the most difficult and contentious issues for forest managers. Homeowner knowledge and perceptions of fire policies and fire hazards have changed over the last two decades. Education efforts have helped change the public's attitude about management policies for preventing fire hazards at the wildland-urban interface; however, we lack information about how citizens view their own obligations as participants in interface issues. PSW research scientists and partners will study fire risk, perceptions of suppression activities, and public involvement.



APPENDIX A. ORGANIZATIONS REPRESENTED AT PARTNER STAKEHOLDER MEETINGS, OCT. 30, 2012 & JAN. 16, 2013

Participants	
Name	Organization
Aaron Katzenstein, Ph.D.	South Coast Air Quality Management District
Anthony Claustro	Fuego Tech Fire Rangers
Barbara Romero	Mountains Conservancy
Beth Jines	City of Los Angeles, Strategic Initiatives
Charlotte Pienkos*	The Nature Conservancy
Christine Nota	USDA Forest Service, PSW Region
Dan Knapp*	LA Conservation Corps
Dana Karcher	The Davey Resource Group
Deborah Chavez, Ph.D. €	USDA Forest Service, PSW Research
Deborah Weinstein	TreePeople
Edward Belden	National Forest Foundation
Elizabeth Skrzat*	City of Los Angeles, Million Trees LA (<i>now City Plants</i>)
Emina Darakjy	Los Angeles & Orange County Street Tree Seminar, Inc.
Fabian Garcia	USDA Forest Service, PSW Region, So. California Consortium
Francisco Ortega	City of Los Angeles, Facilitator
George Gonzalez €	City of Los Angeles, Urban Forestry Division
Jack McCabe* €	The Davey Resource Group
Jeanne Wade Evans	USDA Forest Service, PSW Region
Jerilyn Mendoza, Commissioner	City of Los Angeles, Board of Public Works
Jim Absher, Ph.D.	USDA Forest Service, PSW Research
Jim Downer, Ph.D.	Univ. of California Cooperative Extension
Joe St. John*	Korean Youth & Community Center
Jose Rangel	Fuego Tech Fire Rangers
Josephine Powe	Los Angeles Parks Foundation
Joumana Silyan-Saba	City of Los Angeles, Facilitator
Julie Prejean*	TreePeople
June Dudas	California Center for Sustainable Energy
Kevin B. O'Donnell*	USDA Forest Service, PSW Research
Laura Bauernfeind*	City of Los Angeles, Dept. of Recreation & Parks
Lisa Sarno* €	City of Los Angeles, Million Trees LA
Luis Torres*	City of Los Angeles, Urban Forestry Division
Marty Dumpis*	USDA Forest Service, PSW Region
Megan Whalen	City of Los Angeles, LA River Revitalization Project
Meghan Shearer*	LA Conservation Corps
Melinda Bartlett*	City of Los Angeles, Bureau of Sanitation



Miranda Rodriguez	LA River Revitalization Corp.
Nancy Hughes	California Urban Forest Council
Pam Johnson*	Inside the Outdoors
Patricia Villasenor	City of Los Angeles, Facillitator
Patricia Winter, Ph.D.	USDA Forest Service, PSW Research
Reynal Guillen	Univ. of California, Los Angeles
Robin Rivet	California Center for Sustainable Energy
Ron Lorenzen	City of Los Angeles, Urban Forestry Division
Sabrina Cabe	Show Biz Kidz Foundation
Sabrina Drill, Ph.D.*	Univ. of California Cooperative Extension
Sandra Macias €	USDA Forest Service, PSW Region, Urban & Comm. Forestry
Scott Maco, Ph.D.	The Davey Resource Group – The Davey Institute
Sharyn Romano*	LA/Hollywood Beautification Team
Sheldon Cruz	City of Los Angeles, Facillitator
Stephanie Pincetl, Ph.D.	Univ. of California, Los Angeles
Steve Dunlap	City of Los Angeles, Dept. of Recreation & Parks
Thalia Uribe*	City of Los Angeles, Million Trees LA (now City Plants)
Thomas Shoots	Cal Fire

* An asterisk indicates individuals who attended both stakeholder meetings on Oct. 30, 2012 & Jan. 16, 2013
 € The Euro symbol indicates individuals who are or were (at the time of the meeting) members of the EOT



APPENDIX B. BACKGROUND

In April of 2012, an agreement was executed between the USDA Forest Service and the City of Los Angeles¹¹ thereby formalizing a partnership and the establishment of the Los Angeles Center for Urban Natural Resources Sustainability. The partnership was designed to serve as a center of excellence in urban natural resources stewardship and promote adaptive management, technology transfer and science to improve the lives and environment in the Los Angeles metropolitan area. The USDA Forest Service Pacific Southwest Research Station will have a presence in the LA Center that will constitute an Urban Field Station (“UFS”) and will be housed in office space/facilities provided by the City of Los Angeles, Department of Recreation and Parks.

On October 30, 2012, the Los Angeles Center for Urban Natural Resources Sustainability held its first convened meeting, led by Kevin O’Donnell, USDA Forest Service PSW Social Science Analyst & LA Center Administrator and facilitated by City of Los Angeles City facilitators. This introductory meeting focused on identifying the most important and relevant science-based questions for which the Los Angeles metropolitan region needs answers using the following goals:

1. Determine the most critical areas the LA Center can enhance, augment, and/or compliment the progress already being toward the Los Angeles metropolitan region’s goals of advancing urban natural resources sustainability and stewardship. In a breakout session, the stakeholder meeting participants discussed the following: (1) what are the driving science-based questions related to each goal? (2) What are the science & technology transfer needs? (3) What are the communication needs related to these issues?
2. Determine where and how our partner organizations can contribute to the LA Center within four (4) primary focus areas/categorical themes: (1) scientific research, (2) technology transfer and science delivery, (3) outcome-based communication, and (4) urban natural resource stewardship. The categorical themes were further broken down into three (3) sub-categorical themes of (1) water, (2) planning, and (3) sustainability.

The LA Center stakeholder group reconvened on January 16, 2013 for a 2-part meeting. Part 1 addressed the questions of (1) what can the LA Center do for you?, (2) what can you do for the LA Center?, and (3) how can we work collaboratively together? Part 2 addressed the questions of (1) what science/research-related questions do you have within your organization that you are unable to answer, (2) why do you need this information, (3) how will this information be used, and (4) when do you need the science/research?

¹¹ The agreement was executed between (1) the USDA Forest Service, Pacific Southwest Region, State & Private Forestry, Cooperative Forestry: Urban and Community Forestry Program, (2) the City of Los Angeles, Department of Recreation and Parks, and (3) the Million Trees LA Initiative.



APPENDIX C. RESEARCH & DEVELOPMENT DELIVERY NEEDS

The complete list of research and development delivery needs addressed at the October 30, 2012 and the January 16, 2013 stakeholder meetings are contained below.

OCTOBER 2012 MEETING

- a. Conduct a comprehensive assessment of urban trees and soils, including ecosystem function, health, and condition.
- b. Conduct research on optimizing the health, lifespan, and cost/benefit ratio of green infrastructure, with an emphasis on air and water quality and stormwater runoff/capture. This includes facilitating integration of urban natural resources valuation into traditional economic decision-making.
- c. Develop landscape-scale management practices. Discover new ways to increase and optimize ecosystem services at a regional scale, taking advantage of the diverse landscape and ecosystems and the unique opportunities each may have to improve the functioning and health of the Los Angeles metropolitan region.
- d. Identify impact of fires on urban forests and ecological impact area: assess fire recovery models (i.e. invasive plant control vs. tree planting).
- e. Conduct an economic assessment of municipal urban forestry programs to determine required minimum costs/resources for department operation.
- f. Conduct a future assessment needs analysis of what trees and tree-related needs are required.
- g. Determine what effect climate change can/will have on an urban forest.
- h. Determine best/most efficient model for delivering science/research to policy makers (what science is being utilized, how is the science being utilized, how was that science "delivered"?).
- i. Assess the linkage of urban forestry and public health (i.e. air quality, pollution, stress reduction, etc.).
- j. Identify impact of fires on urban forests and ecological impact area: assess fire recovery models (i.e. invasive plant control vs. tree planting).
- k. Conduct an economic assessment of municipal urban forestry programs to determine the required minimum costs/resources for department operation.



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- l. Conduct a future assessment needs analysis of what trees and tree-related needs are required.
 - m. Determine what effect climate change can/will have on an urban forest.
 - n. Determine best/most efficient model for delivering science/research to policy makers (what science is being utilized, how is the science being utilized, how was that science “delivered”?).
 - o. Assess the linkage of urban forestry and public health (i.e. air quality, pollution, stress reduction, etc.).
 - p. Generally: deliver translatable science that can be used (by policy makers) for “development” and “implementation” (“useful science”).
 - q. Identify the critical areas for applied science and technology investment.
 - r. Foster further investment in the urban forest (5-year goal).
 - s. Identify how data and research can be integrated into development projects for “true” sustainability.
 - t. Identify what impacts urban forests have on climate change and what impact climate change has on urban forests.
 - u. Identify what sustainability projects in an urban forest can best promote the protection of its natural resources.
 - v. Identify the social dynamics of urban environmental outreach.
 - w. Conduct a risk management assessment on municipal urban forestry programs (required resources to sufficiently operate and maintain and determine a “standard of care” for municipal urban forestry).
 - x. Conduct urban tree monitoring that builds off previous municipal, UFORE and MTLA inventories and utilizes the standardized urban tree monitoring protocol being developed by the Urban Tree Growth & Longevity Working Group.
 - y. Conduct a regional urban forest assessment of carbon storage, sequestration, and displaced emissions from energy savings, as well as other benefits for the existing and future tree population.



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- z. Conduct a landscape water use assessment, including the amount of water used for landscapes and the energy/carbon equivalents, the potential to conserve and harvest rain water, vulnerability and resilience of tree populations in the changing climate, and the potential impacts of reduced landscape water use on Urban Heat Island effects, human thermal stress, and air quality.
 - aa. Develop carbon equivalencies for Urban Heat Island mitigation and energy demand reduction effects through urban forestry.
 - bb. Develop “Green Area Ratios” for cities based on cost-benefit analyses of trees and other green infrastructure strategies that quantify carbon sequestration and concurrent adaptive benefits and give communities the tools to plan for green infrastructure investments based on their cost-effectiveness for their geographic area and corresponding climate.
 - cc. Urban biomass/tree residue utilization, marketing and technological barriers and opportunities.

JANUARY 2013 MEETING:

Urban Natural Resources Sustainability

- a. Climate change and urban forests
 - i. What are the impacts of climate change on urban forests – anticipated changes to tree mortality, species selection, water availability, etc.?
 - ii. What are the adaptation benefits (and potential costs) of urban forests?
- b. Identify perceptions about natural values (attribute value to natural landscapes)
 - i. Ecosystem services: keep urban landscape and urban biodiversity in mind
 - ii. Understand natural landscapes and how we want/need them to look like
- c. Impact of invasive species removal and natural restoration.
 - i. Species loss consideration – value and drawbacks of non-native species to a region



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- d. Ecosystem services.
 - i. What's the value of chaparral, does it have carbon storage benefits?
 - ii. What are the current capabilities to characterize and quantify the benefits ("ecosystem services") provided by trees and forest canopy cover within a metropolitan area (considering air pollution mitigation, water pollution mitigation, carbon sequestration, urban heat island mitigation, reduced energy demand from shading of building)?
 - iii. What are the current capabilities for assigning quantitative economic value to these services and strategies for improving these capabilities (i.e. policies that compensate land owners for good forestry conservation and planting practices)?
 - e. Environmental impacts in forests and non-urban areas affect the urban environment and vice versa.
 - i. Who benefits downstream?
 - ii. Need to quantify benefits
 - f. What value is derived from being the bird"iest" county in California?
 - i. What value do non-native species add to the ecosystem?
 - ii. What are the drawbacks?
 - g. Assessment needed of ecological values in LA urbanized area – looking for biodiversity.

Trees

- a. What do you plant today for carbon sequestration into the future?
 - i. How to plant trees planning for climate change
 - ii. Role of anticipated temperature rise
- b. Some low BOC emitting trees have been identified; expand City of LA Tree Species List for more trees; needs to be broader and add diversity.
- c. Long-term monitoring of urban tree planting in varying settings.
 - i. Sustainability studies based on neighborhood-scale street tree plantings, school plantings and commercial corridor plantings
 - ii. Indicators: environmental (i.e. stormwater runoff reduction, air quality improvement, presence of wildlife, soil health, ambient temperatures), social (i.e. community impacts/social relations, student test scores, etc.), and economic (i.e. property values, shopping behavior, etc.)



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- d. Maintenance, sustainability, and care of planted trees.
 - i. Establish and/or identify a standard of care, including staffing needs, per quantity per municipality
 - ii. Need hard data on the baseline for tree care
 - iii. Identify the optimum level of investment considering return, both qualitative and quantitative
 - iv. Assess based on climate zone
 - e. Examining pests and potential invasions.
 - i. Pest management problem – how to handle infested/infected wood in an urban environment
 - ii. Role and value of invasive species
 - iii. Consider measures taken by other municipalities (include wind and frost damage)
 - f. Examine how invasive pests respond to climate change.
 - i. Does heat exacerbate outbreaks?
 - g. Root pruning research; have a living lab in LA.
 - i. What are the benefits (structural stability, health benefits, life expectancy), regeneration rate of roots; what about sidewalk impacts?
 - h. Identify when and under what circumstances it is beneficial to not plant trees, especially if planting conflicts with other values (other species, pests, etc.).
 - i. Benefit of residential tree(s) for home owner and neighbors (question has been asked by utility companies).
 - i. Quantify the investment and benefit
 - ii. Benefit of trees on adjacent property? Public vs. private trees?
 - j. Trees as an afterthought.
 - i. City planners are slow on uptake and implementation has been slow. How do we change that?
 - ii. Provide “model” ordinances for others to use (e.g. engage the American Planners Association)
 - iii. What are the challenges of planning/managing urban forests in a manner that optimizes multiple ecosystem services simultaneously (i.e. synergies, trade-offs | selecting tree species, determining planting locations, etc.)?



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- k. Tree industry training programs (future arborist).
 - i. Establish a vocational tree worker program.
 - ii. Does the gap exist between what is needed to manage and who will be future arborists?
 - l. What are the impacts of pests on carbon storage?
 - m. Identify ways to educate urban tree owners on the value of their trees; all benefits.
 - i. How to quantify the benefits of trees in different land uses (residential, commercial, institutional and open space) in LA and Southern California?
 - n. Urban tree life expectancy.
 - i. 7-years has been widely cited, but is this still accurate and does it apply to semi-arid Mediterranean environments?
 - o. Use of recycled water (purple pipe water) – no research on long term effects of recycled water on trees; only anecdotal information on what trees can tolerate.
 - i. Are there effects associated with using such water, if polluted?
 - ii. Are certain tree species more tolerant for recycled water?
 - p. Identify the role of urban trees as a stormwater capture system
 - i. Are trees a real water capture system?

Social

- a. Need an assessment on how to utilize citizen science.
 - i. How do we set it up to be useful?
 - ii. How to collect and manage citizen science?
- b. Urban environmental policies.
 - i. Identify the urban policies that pose challenges to research
 - ii. Find policy models from other areas that are successful and propose incorporation
 - iii. Assess city and county ordinances that conflict with local goals and evaluate impact of similarly conflicting state and federal regulations



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- c. How to bring the pressing urban environmental issues to the minds of our urban youth?
 - i. How do we effectively share knowledge?
 - ii. How would they know how to get a job in any of these arenas?
 - iii. Get info back to the schools (“this is important to you because...”) and this is what you can do.
 - iv. Promote environmental literacy and environmental justice

 - d. Need to get urban residents involved in sustainability – what messages we can get out?
 - i. Consider power of social media to garner attention on issues

 - e. Need a study in LA on kids and outdoor connections.
 - i. What are the impacts to school test scores and satisfaction with school related to having “green space” on campus or on the way to campus?
 - ii. How do teachers meet environmental standards in their curricula if little to no green space on campus?

 - f. Examine models for information dissemination.
 - i. Consider the Children in Nature Network
 - ii. Use as model for “information clearing house” of data

 - g. What role does our urban forest have in feeding CA?
 - i. What are the public health, environmental, and economic impacts of urban fruit tree programs?
 - ii. What is being produced and what values are provided?

 - h. Public lands usage by urban residents.
 - i. Identify projects that can demonstrate the positive outcomes of a paid service-learning experience on public lands for youth
 - ii. Promote access by low-income communities to public lands (transit, awareness, welcoming, etc.)
 - iii. Analyze the ethnographic use of public lands and how public agencies can better serve their constituents
 - iv. Conduct a workforce analysis of forestry related worker and the impacts of these finds on inclusivity within diverse communities

 - i. Facilitate urban environmental job creation program.

 - j. LA Center fellowship program.
 - i. Provide employment and research opportunities to young scholars



Water

- a. "Trees as Bioswales."
 - i. Identify proper tree well size for maximized benefit of rainwater capture
 - ii. Link trees to stormwater capture to promote the planting of trees
 - iii. Promote watering practices and the time required to reach the water table
- b. Promote rainwater harvesting in Southern California as one solution to anticipated climate change impacts and water shortages.
- c. What role do urban forests play in stormwater management and groundwater recharge?
 - i. Is there a net water supply benefit provided by urban forests?
 - ii. What is the balance between rainfall interception/capture, water uptake and recharge?
- d. Conduct assessment of vegetation at urban waterways.
 - i. Conduct water availability predictions and impact on urban forest
 - ii. What climate change effects are likely to impact water level?
- e. Identify what plant species need to be planted now in anticipation of low water levels.
 - i. Assessment of low water needs
 - ii. What plant communities can we expect?
- f. Assess how people are using urban water ways.
 - i. What values do they get from LA River activities?
 - ii. What plants can we harvest from the LA River and could they go to compost piles?

Air

- a. Trading of carbon credits.
 - i. Value of "real" credit – what are they, is it worth it, what happens for different micro-climates?
- b. Vegetation for air quality screening (such as along roadways).
 - i. Is it effective? To what degree? For what pollutants?
 - ii. Does landscape design and vegetation type play a factor?



Soil

- a. Assess soil volume as it relates to tree and plant sustainability.
 - i. Consider soil quality ("soil health") and identify the role of soil organic matter.
- b. Conduct Loss of organic matter and tree/plant health assessment.



APPENDIX D. CALENDAR OF EVENTS

Annual Calendar	
January:	EOT meeting Implementation team meets to plan year <i>Urban Green Update</i> Newsletter
February:	EOT reviews/approves coop plans for Forest Service S&PF funding
March:	Science Review Team meets to plan RFPs and Fellowship calls
April:	EOT meeting Webinar
May:	General partner meeting <i>Urban Green Update</i> Newsletter
June:	Call for RFPs Science Review Team meets
July:	EOT meeting RFPs evaluation & decision
August:	Call for Fellowships Webinar
September:	Fellowship applications due <i>Urban Green Update</i> Newsletter
October:	EOT meeting Fellowship interviews & decisions
November:	General partner meeting LA Center Fellows begin
December:	Webinar