File No. 141264 Committee Item No. 4
Board Item No. _____

COMMITTEE/BOARD OF SUPERVISORS

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Committee: Land Use & Development **Date** Jan. 26, 2015

Board of Supervisors Meeting **Date** _____

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OTHER (Use back side if additional space is needed)

☐	☐	_____
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Completed by: Andrea Ausberry **Date** Jan. 23, 2015
Completed by: _____ **Date** _____

FILE NO. 141264 ORDINANCE NO.

[General Plan Amendments - Urban Forest Plan (Phase 1: Street Trees)]

Ordinance amending the General Plan by amending Policy 3.6 of the Recreation and Open Space Element to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees); affirming the Planning Department's determination under the California Environmental Quality Act, and making findings of consistency with the General Plan, and the eight priority policies of Planning Code, Section 101.1.

NOTE: **Unchanged Code text and uncodified text** are in plain Arial font.
Additions to Codes are in *single-underline italics Times New Roman font*.
Deletions to Codes are in ~~*strikethrough italics Times New Roman font*~~.
Board amendment additions are in double-underlined Arial font.
Board amendment deletions are in ~~strikethrough Arial font~~.
Asterisks (* * * *) indicate the omission of unchanged Code subsections or parts of tables.

Be it ordained by the People of the City and County of San Francisco:

Section 1. Findings.

A. Section 4.105 of the Charter of the City and County of San Francisco provides that the Planning Commission shall periodically recommend to the Board of Supervisors, for approval or rejection, proposed amendments to the General Plan.

B. On December 9, 2014, the Board of Supervisors received from the Planning Department a proposed General Plan amendment which amends Policy 3.6 of the Recreation and Open Space Element (ROSE) to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees).

C. Section 4.105 of the City Charter further provides that if the Board of Supervisors fails to Act within 90 days of receipt of the proposed General Plan amendment, then the proposed amendment shall be deemed approved.

D. San Francisco Planning Code Section 340 provides that an amendment to the General Plan may be initiated by a resolution of intention by the Planning Commission, which refers to, and incorporates by reference, the proposed General Plan amendment. Section 340 further provides that Planning Commission shall adopt the proposed General Plan amendment after a public hearing if it finds from the facts presented that the public necessity, convenience and general welfare require the proposed amendment or any part thereof. If adopted by the Commission in whole or in part, the proposed amendment shall be presented to the Board of Supervisors, which may approve or reject the amendment by a majority vote.

E. On October 9, 2014 the Planning Commission initiated the adoption of the General Plan amendment amending Policy 3.6 of the ROSE, at a duly noticed public hearing.

F. On July 24, 2014, the Environmental Planning Section of the Planning Department determined that the proposed General Plan amendment was categorically exempt from environmental review under Classes 4 and 8 (State CEQA Guidelines Sections 15304(b) and 15308).

G. The Planning Commission, in Resolution 19281, found that the public necessity, convenience and general welfare required the proposed General Plan amendment. The letter from the Planning Department transmitting the proposed General Plan amendment to the Board of Supervisors, the environmental determination, and the Planning Commission Resolution approving proposed General Plan amendment is on file with the Clerk of the Board in File No 141264. These and any and all documents referenced in this Ordinance have been made available to, and have been reviewed by, the Board of Supervisors, and may be found in either the files of the City Planning Department, as the custodian of records, at 1650 Mission Street in San Francisco, or in Board File No. 141264 with the Clerk of the Board of Supervisors at 1 Dr. Carlton B. Goodlett Place, San Francisco.

H. The Board of Supervisors has reviewed and considered all the documents mentioned above, and hereby adopts as its own and incorporates by reference the Planning Department's environmental determination as though it were fully set forth in this Ordinance.

I. The Board of Supervisors finds, pursuant to Planning Code Section 340, that the General Plan amendment set forth in the documents on file with the Clerk of the Board in File No. 141264 will serve the public necessity, convenience and general welfare for the reasons set forth in Planning Commission Resolution No. 19281 and incorporates those reasons herein by reference.

J. The Board of Supervisors finds that the General Plan amendment as set forth in the documents on file with the Clerk of the Board in Board File No. 141264, is in conformity with the General Plan and the eight Priority Policies of Planning Code Section 101.1 for the reasons set forth in Planning Commission Resolution No. 19281. The Board hereby adopts these findings and incorporates them herein by reference.

Section 2. The Board of Supervisors hereby amends the San Francisco General Plan by adopting the amendment to Policy 3.6 of the ROSE, as recommended to the Board of Supervisors by the Planning Commission on Nov. 20, 2014 and referred to above.

Section 3. Effective Date. This ordinance shall become effective 30 days after enactment. Enactment occurs when the Mayor signs the ordinance, the Mayor returns the ordinance unsigned or does not sign the ordinance within ten days of receiving it, or the Board of Supervisors overrides the Mayor's veto of the ordinance.

APPROVED AS TO FORM:
DENNIS J. HERRERA, City Attorney

By: _____
ANDREA RUIZ-ESQUIDE
Deputy City Attorney

n:\land\as2014\1100080\00960851.doc

SAN FRANCISCO
PLANNING DEPARTMENT

December 8, 2014

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CA 94103-2479

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Ms. Angela Calvillo, Clerk
Board of Supervisors
City and County of San Francisco
City Hall, Room 244
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Re: Transmittal of Planning Department Case Number 2013.1517M:
General Plan Amendment

BOS File No:_____ (pending)
Planning Commission Recommendation: *Approval*

Dear Ms. Calvillo,

On November 20, 2014, the Commission conducted a duly noticed public hearing at a regularly scheduled meeting to consider a Department sponsored Ordinance that would amend Policy 3.6 of the San Francisco General Plan's Recreation & Open Space Element to adopt the Urban Forest Plan (Phase 1: Street Trees) by reference.

The Urban Forest Plan was developed over a two-year period (2012-14) by the Planning Department, Department of Public Works (DPW), Urban Forestry Council (UFC) and the non-profit, Friends of the Urban Forest (FUF). The Plan grew out of the need to create a long-term strategy to ensure the ongoing health and sustainability of the city's street trees. It identifies policies and strategies to proactively manage and grow the city's street tree population. The Plan recommends increasing the street tree population and developing a comprehensive approach to street tree management and finance.

At the November 20th hearing, the Commission unanimously voted to recommend approval of the proposed Ordinance. The Ordinance would amend supporting text under Policy 3.6 of the Recreation and Open Space Element to read as follows:

> "The Planning Department, in collaboration with the Department of Public Works, *has created* ~~*is creating*~~ a plan to promote San Francisco's urban forest with a focus on street trees. The Urban Forest Plan - Phase 1: Street Trees (2014), *adopted here by reference,* identifies policies and strategies to proactively manage, grow and protect the City's street tree population."

On July 24, 2014, the Environmental Planning Section of the Planning Department determined that the Urban Forest Plan (Phase 1: Street Trees) was Categorically Exempt from environmental review under Classes 4 and 8 (State CEQA Guidelines Sections 15304(b) and 15308).

Please find attached documents relating to the Commission's action. If you have any questions or require further information please do not hesitate to contact me.

Sincerely,

Jon Swae
SF Planning Department

Cc via electronic transmittal:
Nicole Wheaton, Mayor's Office
Supervisor Scott Wiener
Supervisor Jane Kim
Supervisor Malia Cohen
Andrea Ruiz-Esquide, City Attorney,

Attachments (one copy of the following):
Planning Commission Resolution No. 19281
Urban Forestry Council Resolution No. 2014-07-UFC
Draft Ordinance (original sent via interoffice mail)
San Francisco Urban Forest Plan (Phase 1: Street Trees)

SAN FRANCISCO
PLANNING DEPARTMENT

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CA 94103-2479

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Planning Commission Resolution No. 19281

HEARING DATE: November20, 2014

Date:	November 20, 2014
Case No.:	**2013.1517M**
Project:	**Urban Forest Plan (Phase 1: Street Trees) – Adoption of General Plan Amendments**
Project Boundaries:	Citywide
Staff Contact:	Jon Swae – (415) 575-9069 jon.swae@sfgov.org
Recommendation:	Approval

A RESOLUTION TO ADOPT AMENDMENTS TO THE RECREATION AND OPEN SPACE ELEMENT OF THE SAN FRANCISCO GENERAL PLAN TO REFERENCE AND INCORPORATE THE URBAN FOREST PLAN (PHASE 1: STREET TREES) BY REFERENCE INLCUDING MAKING GENERAL PLAN AND PLANNING CODE SECTION 101.1 CONSISTENCY FINDINGS.

WHEREAS, Section 4.105 of the San Francisco Charter empowers the Planning Commission to establish and update the City's General Plan, and calls for the General Plan to contain "goals, policies and programs for the future physical development of the City and County of San Francisco." The Charter calls for the Planning Commission to periodically recommend for approval or rejection to the Board of Supervisors proposed amendments to the General Plan, in response to changing physical, social, economic, environmental or legislative conditions.

WHEREAS, the City has previously adopted the Recreation and Open Space Element of the San Francisco General Plan which describes a vision, objectives and policies to positively shape long-term growth and change in the city.

WHEREAS, the proposed General Plan amendment would incorporate the Urban Forest Plan (Phase 1: Street Trees) into the General Plan by reference by amending supporting text under Policy 3.6 of the Recreation and Open Space Element to read as follows:

> Policy 3.6. Maintain, restore, expand and fund the urban forest.
> The Planning Department, in collaboration with the Department of Public Works, *has created* ~~*is creating*~~ a plan to promote San Francisco's urban forest with a focus on street trees. The Urban Forest Plan - Phase 1: Street Trees (2014), *adopted here by reference,* identifies policies and strategies to proactively manage, grow and protect the City's street tree population."

WHEREAS, The Urban Forest Plan (Phase 1: Street Trees) carries out many of the objectives and policies of the City & County of San Francisco's General Plan, including:

ENVIRONMENTAL PROTECTION ELEMENT

OBJECTIVE 4 ASSURE THAT THE AMBIENT AIR OF SAN FRANCISCO AND THE BAY REGION IS CLEAN, PROVIDES MAXIMUM VISIBILITY, AND MEETS AIR QUALITY STANDARDS.

OBJECTIVE 8 ENSURE THE PROTECTION OF PLANT AND ANIMAL LIFE IN THE CITY.

Discussion: The Urban Forest Plan (Phase 1: Street Trees) promotes the use of trees and vegetation to achieve a range of environmental benefits including the filtration of airborne particulates, reduction of stormwater runoff, sequestration of greenhouse gases and creation of wildlife habitat.

RECREATION & OPEN SPACE ELEMENT

OBJECTIVE 3 IMPROVE ACCESS AND CONNECTIVITY TO OPEN SPACE

POLICY 3.6 Maintain, restore, expand and fund the urban forest.

Discussion: The Urban Forest Plan (Phase 1: Street Trees) supports the use of trees along streets to reinforce and improve connections along the city's open space network.

URBAN DESIGN ELEMENT

OBJECTIVE 1 EMPHASIS OF THE CHARACTERISTIC PATTERN WHICH GIVES TO THE CITY AND ITS NEIGHBORHOODS AN IMAGE, A SENSE OF PURPOSE, AND A MEANS OF ORIENTATION.

POLICY 1.4 Protect and promote large-scale landscaping and open space that define districts and topography.

POLICY 1.5 Emphasize the special nature of each district through distinctive landscaping and other features.

POLICY 1.10 Indicate the purposes of streets by means of a citywide plan for street landscaping.

OBJECTIVE 4 IMPROVEMENT OF THE NEIGHBORHOOD ENVIRONMENT TO INCREASE PERSONAL SAFETY, COMFORT, PRIDE AND OPPORTUNITY

POLICY 4.11 Make use of street space and other unused public areas for recreation, particularly in dense neighborhoods, such as those close to downtown, where land for traditional open spaces is more difficult to assemble.

POLICY 4.12 Install, promote and maintain landscaping in public and private areas.

Discussion: The Urban Forest Plan (Phase 1: Street Trees) calls for utilizing trees and landscaping to create a more enjoyable public realm and help establish unique identities for streets and neighborhoods.

TRANSPORTATION ELEMENT

POLICY 20.7	Encourage ridership and clarify transit routes by means of a city-wide plan for street landscaping, lighting and transit preferential treatments.
OBJECTIVE 24	IMPROVE THE AMBIENCE OF THE PEDESTRIAN ENVIRONMENT.
POLICY 24.2	Maintain and expand the planting of street trees and the infrastructure to support them.
POLICY 24.5	Where consistent with transportation needs, transform streets and alleys into neighborhood-serving open spaces or "living streets", especially in neighborhoods deficient in open space.
OBJECTIVE 26	CONSIDER THE SIDEWALK AREA AS AN IMPORTANT ELEMENT IN THE CITYWIDE OPEN SPACE SYSTEM.

Discussion: The Urban Forest Plan (Phase 1: Street Trees) promotes the use of trees and landscaping to support the city's transportation system by helping to create an enhanced pedestrian environment, calming traffic and promoting travel by non-auto modes (walking, bicycling and public transit).

WHEREAS, Planning Code Section 101.1(b) establishes eight priority policies and is a basis by which differences between competing policies in the General Plan are resolved. The proposed amendment is consistent with the eight priority policies in that:

1. The General Plan amendment will not negatively affect existing, neighborhood-serving retail.

2. The General Plan amendment will not affect existing housing or neighborhood character.

3. The General Plan amendment will not decrease the City's supply of affordable housing.

4. The General Plan amendment will not impede MUNI, and will improve the pedestrian qualities of streets without impacting neighborhood parking needs.

5. The General Plan amendment will not result in displacement of the City's industrial and service sectors for commercial office development.

6. The General Plan amendment will not negatively affect the City's preparedness for an earthquake.

7. The General Plan amendment will not affect Historic Resources.

8. The General Plan amendment will not affect any City parks or open spaces or their access to sunlight.

WHEREAS, On July 24, 2014, the Environmental Planning Section of the Planning Department determined that the Urban Forest Plan (Phase 1: Street Trees) was Categorically Exempt from environmental review under Classes 4 and 8 (State CEQA Guidelines Sections 15304(b) and 15308).

WHEREAS, the Planning Commission finds that the proposed General Plan amendment as set forth in Draft Ordinance, attached hereto as Exhibit I, is consistent with the eight Priority Policies of Planning Code Section 101.1.

WHEREAS, The Planning Commission finds from the facts presented that the public necessity, convenience and general welfare require approval of the proposed General Plan amendment.

NOW THEREFORE BE IT RESOLVED, that pursuant to Planning Code Section 340 (d), the Planning Commission approves a Resolution to adopt amendments to the General Plan of the City and County of San Francisco, related to the Urban Forest Plan (Phase 1: Street Trees), contained in the Draft Ordinance attached hereto as Exhibit I. The Planning Commission recommends that the Board of Supervisors approve the amendments.

I hereby certify that the foregoing Resolution was ADOPTED by the San Francisco Planning Commission on November 20, 2014.

Jonas P. Ionin
Commission Secretary

AYES: 7

NOES: 0

ABSENT: 0

ADOPTED: November 20, 2014

[Resolution Endorsing the Urban Forest Plan: Phase One, Street Trees]

The Urban Forestry Council endorses the Urban Forest Plan: Phase One, Street Trees and urges the Board of Supervisors, the Planning Commission, the Department of Public Works, and the Planning Department to adopt the Urban Forest Plan, incorporate the Urban Forest Plan into the City's General Plan, and to complete the next two phases of the Urban Forest Plan related to Parks and Open Spaces (Phase 2) and Trees on Private Property and Greening Buildings (Phase 3).

WHEREAS, The Board of Supervisors formed the Urban Forestry Council to protect the community interest and ensure that San Francisco realizes the full range of tree benefits into the future; and,

WHEREAS, The Council is charged with guiding the stewardship of San Francisco's trees by promoting a healthy and sustainable urban forest that benefits all San Franciscans while ensuring public health and safety; and,

WHEREAS, The Urban Forestry Council is charged with development and adoption of a comprehensive urban forest plan; and,

WHEREAS, The Urban Forestry Council adopted the 2006 Urban Forest Plan; and,

WHEREAS, The Urban Forest Plan: Phase One, Street Trees includes important planning, funding and design considerations to improve the management, health, and size of San Francisco's street tree population; and,

WHEREAS, The Planning Department intends to develop two future phases of the Urban Forest Plan focusing on Parks and Open Spaces and Trees on Private Property and Greening Buildings; and,

WHEREAS, The City's General Plan identifies that, "The livability, amenity and character of residential areas are greatly enhanced by trees, more so than by any other single element"; and,

FURTHER RESOLVED, That the Urban Forestry Council urges the Department of Public Works to manage all street trees through their lifecycles including the establishment of a Street Tree Nursery and Urban Wood Re-Use Program, with secured adequate funding as outlined in the Urban Forest Plan; and be it,

FURTHER RESOLVED, That that the Urban Forestry Council urges the Board of Supervisors, the Planning Commission, and the Planning Department to adopt the Urban Forest Plan: Phase One, Street Trees and incorporate the Plan into the General Plan; and be it,

FURTHER RESOLVED, That the Urban Forestry Council urges the Board of Supervisors, Planning Department and other City Agencies to prioritize funding and support for the completion of the next two phases of the Urban Forest Plan; and be it,

FURTHER RESOLVED, That the Urban Forestry Council urges the Planning Department to work with the Recreation and Parks Department and the Department of the Environment to complete the Urban Forest Plan: Phase Two, Parks and Open Spaces and the Urban Forest Plan: Phase Three, Trees on Private Property and Greening Buildings.

I hereby certify that this Resolution was adopted at the Urban Forestry Council's Regular Meeting on May 23, 2014.

Monica Fish Dan Flanagan

Monica Fish, Council Secretary Dan Flanagan, Council Chair

VOTE: Approved 8-0; 2 Absent; 1 Vacant

Ayes: Council Members Flanagan, Short, Hillan, Hillson, Kida, Leffingwell, Sullivan, Swae

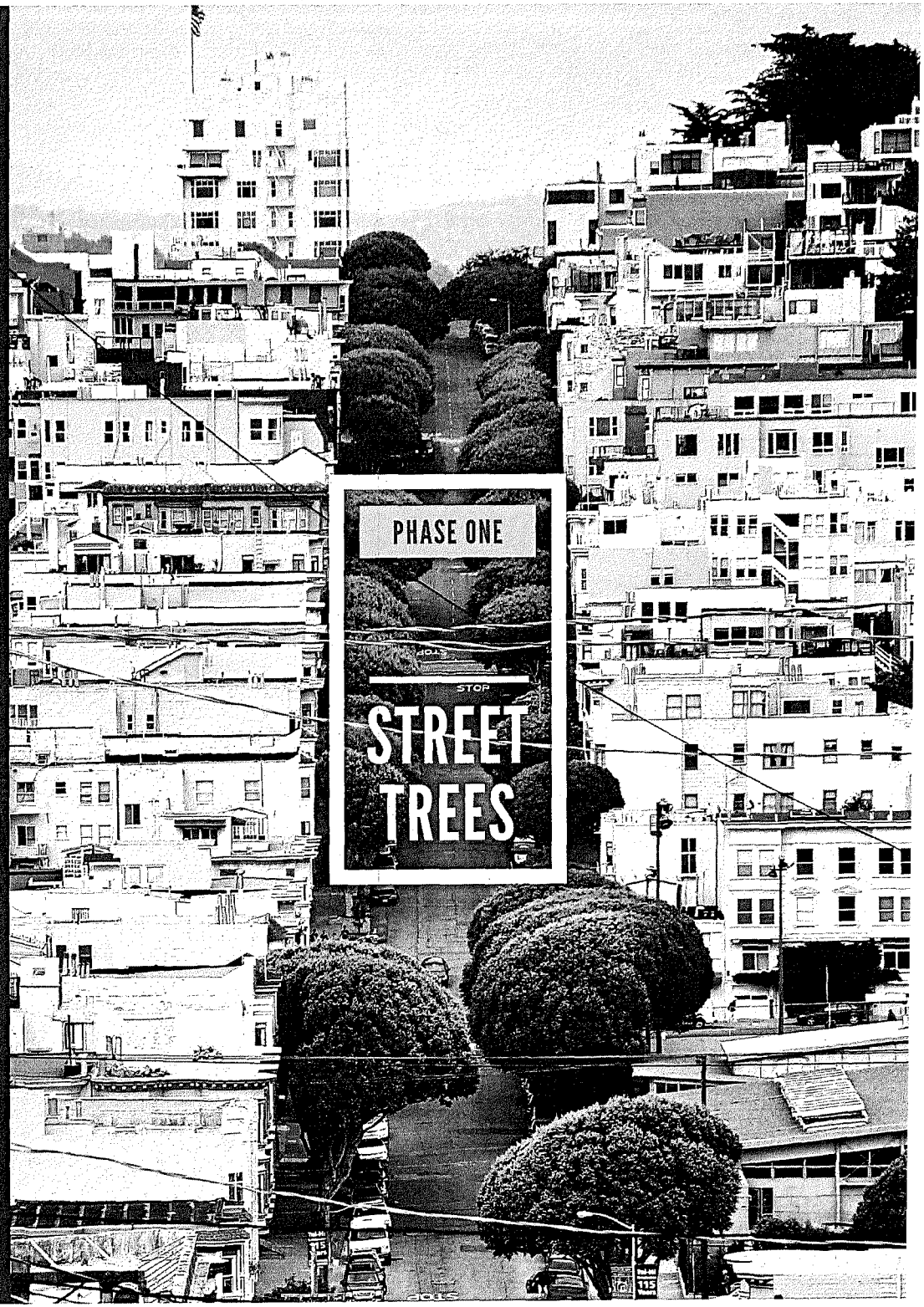
Noes: None

Absent: Council Members Most and Sherwin

SAN FRANCISCO

URBAN FOREST PLAN

FINAL FALL 2014



Special thanks

San Francisco Planning Department

John Rahaim, *Director of Planning*
Gil Kelley, *Director of Citywide Planning*
Jon Swae, *Plan Manager*
David Alumbaugh
Anne Brask
Kay Cheng
Adam Varat
Michael Webster
Gary Chen, *Graphic Designer*

Department of Public Works

Mohammed Nuru, *Director of Public Works*
Carla Short, *Urban Forester*

Recreation & Park Department

Phil Ginsburg, *General Manager*
Dennis Kern, *Director of Operations*

San Francisco Environment

Peter Brastow, *Senior Biodiversity Specialist*
Mei Ling Hui, *Urban Forest & Urban Agriculture Coordinator*

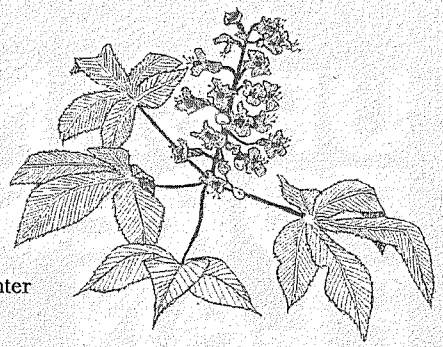
Friends of the Urban Forest

Dan Flanagan, *Executive Director*
Ben Carlson
Greg Harrell-Edge
Doug Wildman

URBAN FORESTRY COUNCIL

San Francisco Urban Forestry Council

Dan Flanagan, *Chair*
Carla Short, *Vice Chair*
Mike Barrow
Malcolm Hillan
Larry Costello
Phil Ginsburg
Rose Hillson
Dan Kida
John Leffingwell
William Most
Sandy Sherwin
Andrew Sullivan
Jon Swae



Illustrations by Rebecca Sunter

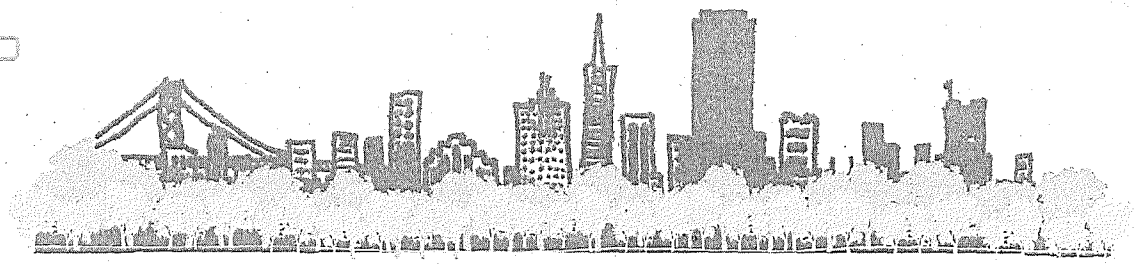
Additional thanks:
AECOM (Sarah Heard, Alexander Quinn and Vanessa Lauf) and Davey Resource Group.

This project was funded in part by a grant from the State of California Strategic Growth Council's Urban Greening Grant Program.

Cover photo courtesy of Flickr by Eric Bawn

SAN FRANCISCO

URBAN FOREST PLAN



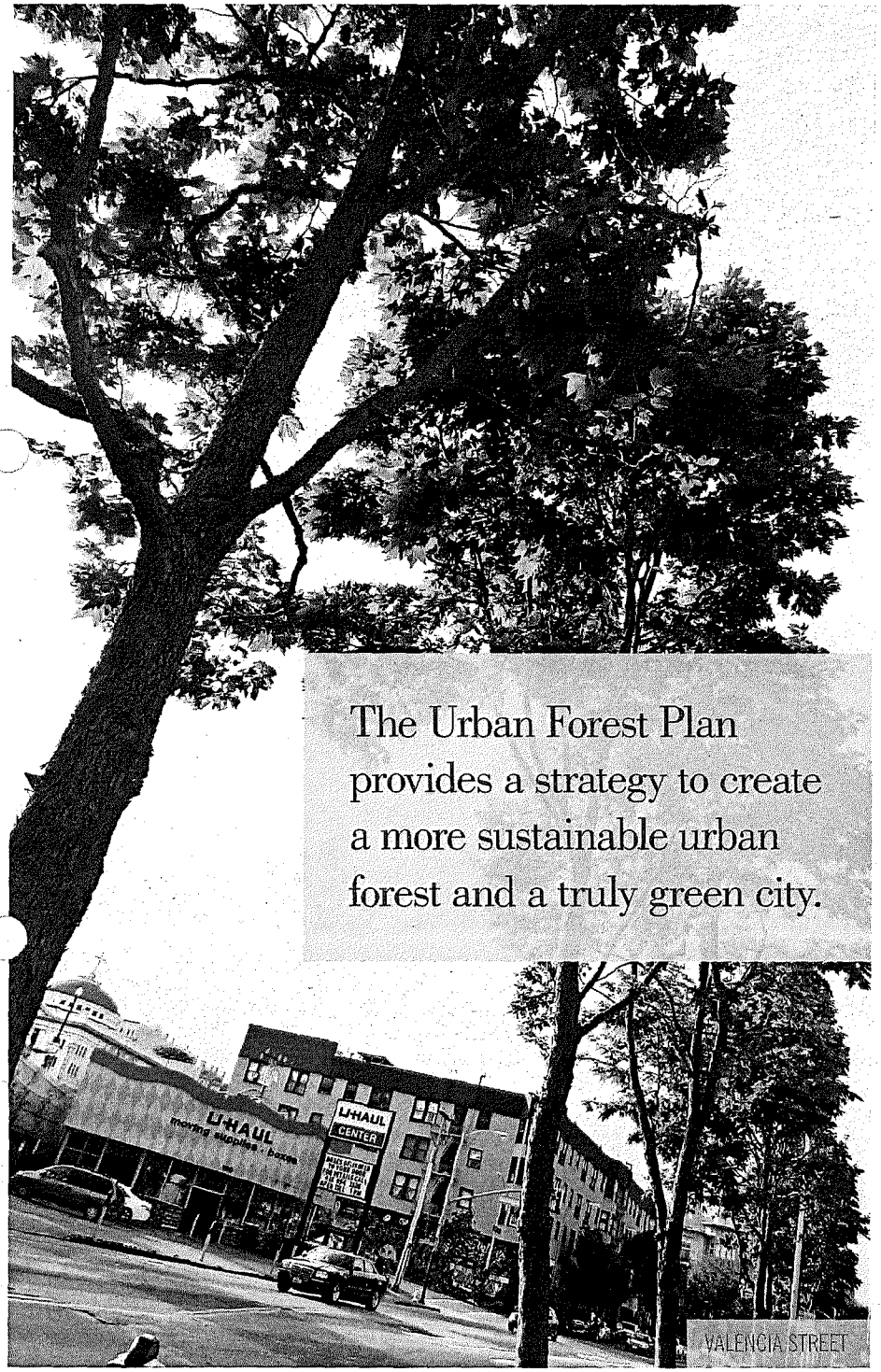
FALL 2014

URBAN FORESTRY COUNCIL

SAN FRANCISCO PLANNING DEPARTMENT

FRIENDS OF THE URBAN FOREST

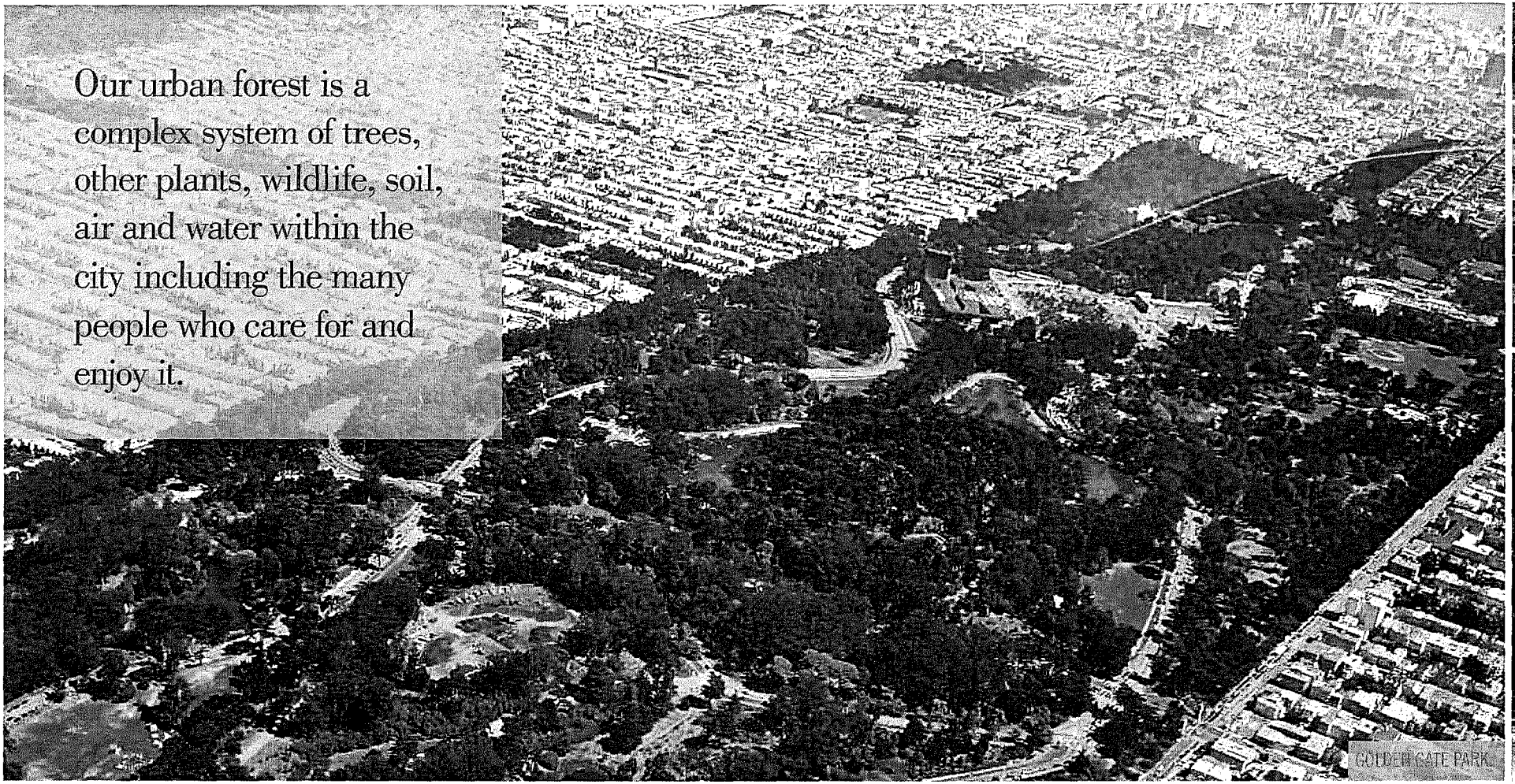
TENDERLOIN NATIONAL FOREST. An alley in the Tenderloin was transformed by community members into a vibrant public gathering space by removing asphalt to plant a redwood tree, gardens and public art installations.



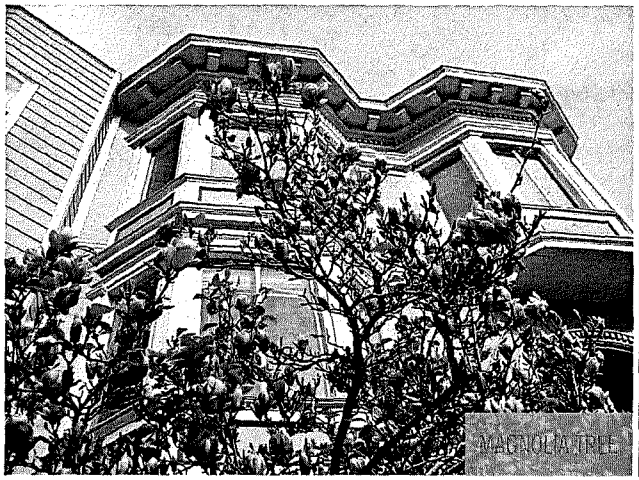
The Urban Forest Plan provides a strategy to create a more sustainable urban forest and a truly green city.

Table of Contents

Our urban forest is a complex system of trees, other plants, wildlife, soil, air and water within the city including the many people who care for and enjoy it.

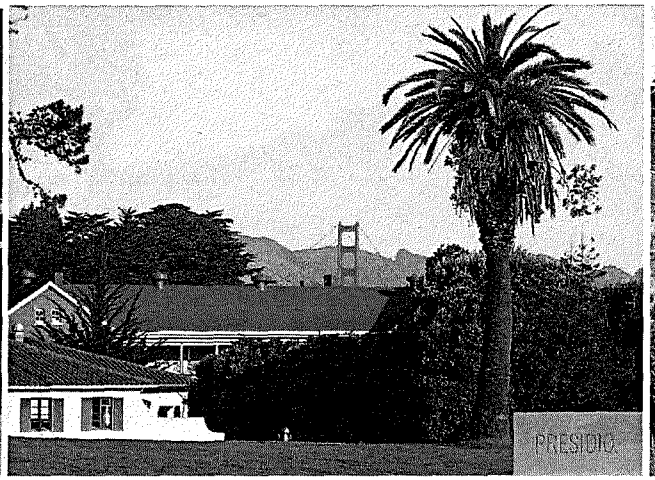


GOLDEN GATE PARK



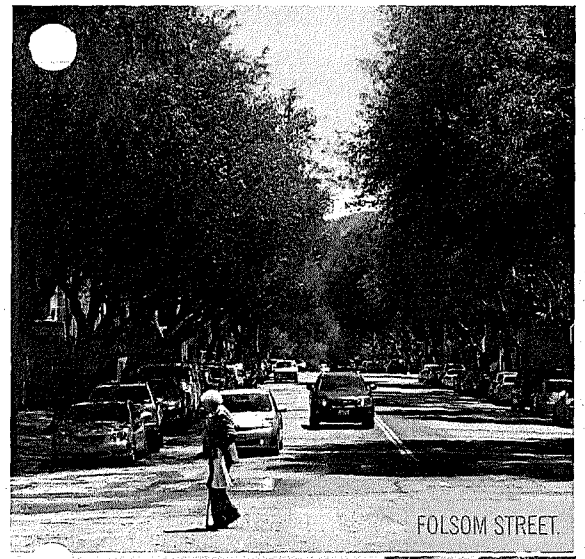
MAGNOLIA TREE

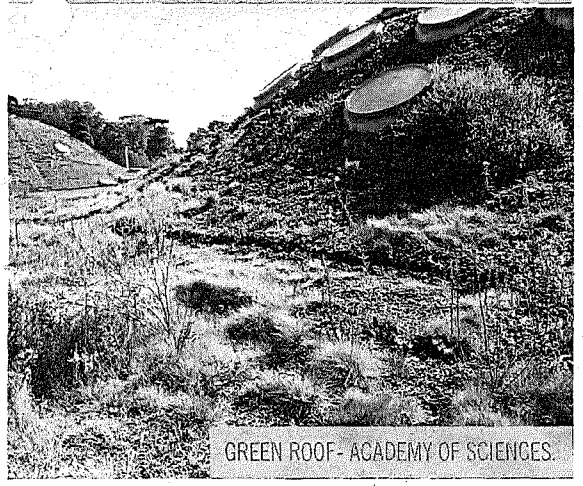
WESTERN TIGER SWALLOWTAIL



PRESIDIO


SIDEWALK GARDEN PLANTING.


FOLSOM STREET.


GREEN ROOF - ACADEMY OF SCIENCES.

Introduction

San Francisco was once a largely treeless landscape of expansive grasslands, sand dunes, coastal scrub and wetlands. Today, almost 700,000[1] trees grow along the city's streets, parks and private properties. From the Embarcadero's stately Palms to the tall Cypresses of Golden Gate Park, trees are a beloved feature of the city and critical piece of urban infrastructure.

Our urban forest creates a more walkable, livable and sustainable city. Trees and other vegetation clean our air and water, create greener neighborhoods, calm traffic, improve public health, provide wildlife habitat and absorb greenhouse gases. Annually, the benefits provided by trees in San Francisco are estimated at over $100 million[2].

Trees in San Francisco, however, face a number of challenges. Historically underfunded and inadequately maintained, the city's tree canopy is one of the smallest of any large U.S. city. Lack of funding has restricted the City's ability to plant and care for its street trees. Maintenance responsibility is increasingly being transferred to property owners. Widely unpopular with the public, this approach puts trees at further risk for neglect and potential hazards.

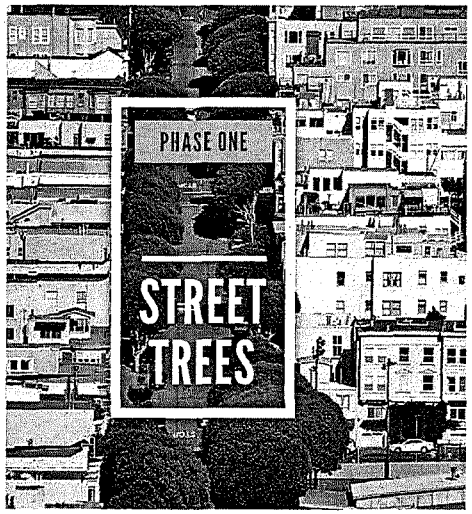
Our urban forest is a valuable capital asset worth $1.7 billion[2]. Like the public transit and sewer systems, it needs a long-term plan to ensure its health and longevity. The Urban Forest Plan offers a vision and strategy to ensure an expanded, healthy and thriving urban forest now and for the future.

1 United States Forest Service, Northern Research Station. 2007. Assessing Urban Forest Effects and Values: San Francisco's Urban Forest. Resource Bulletin NRS-8. Newton Square, PA: USDA Forest Service.

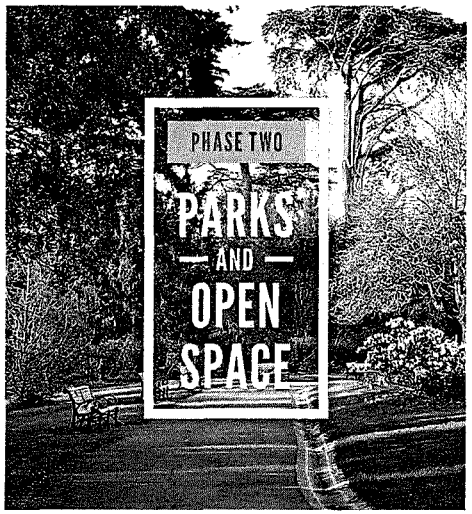
2 Simpson, J. R., McPherson, E.G. December 2007. San Francisco Bay Area State of the Urban Forest Final Report. Center for Urban Forest Research, USDA Forest Service, Pacific Southwest Research Station.

Planning for the Urban Forest

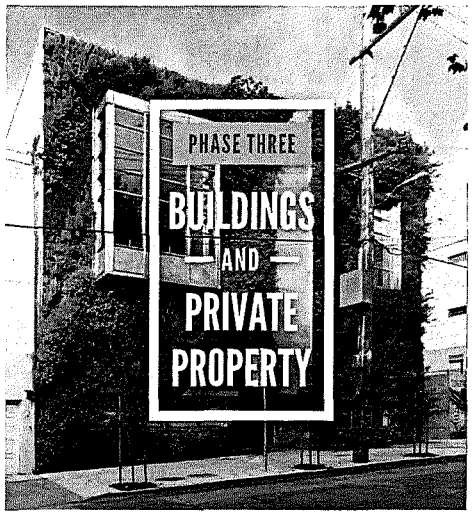
San Francisco's urban forest is a vital piece of city infrastructure. It provides enormous benefits and supports the ecological function of the city. It requires a long-term plan to ensure its ongoing health and sustainability. The Urban Forest Plan provides a phased approach to planning for trees and vegetation in the city's landscape. The three phases outlined here will together form a comprehensive strategy for San Francisco's urban forest.



January 2014: The first phase of planning discusses the overall urban forest with a primary focus on *street trees.* The Plan highlights the benefits of trees and landscaping within San Francisco. It also makes recommendations for a comprehensive approach to street tree management in San Francisco.

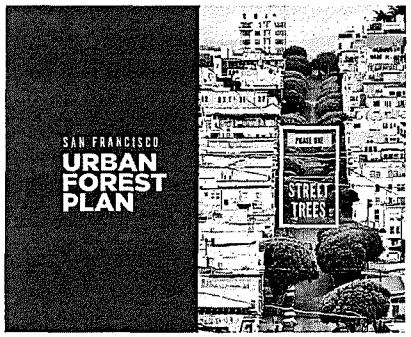


To Come: A subsequent planning effort is needed to create a specific vision and strategy for trees in parks and open spaces. Such a plan, developed in coordination with the Recreation & Park Department, would address policy, managment and financing needs of park trees. Grants and other funding sources should be secured to create the Plan.

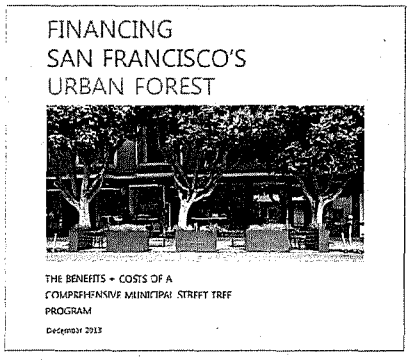


To Come: The third phase of the Urban Forest Plan will develop recommendations for trees on private property and greening opportunities on buildings. Support for property owners in maintaining and planting trees as well as guidelines for green roofs, walls and other greening tools should be included. The Planning Department, Urban Forestry Council, City agencies and community organizations will be instrumental in carrying out this work.

Background & Process

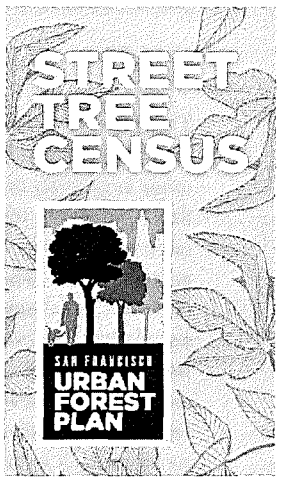


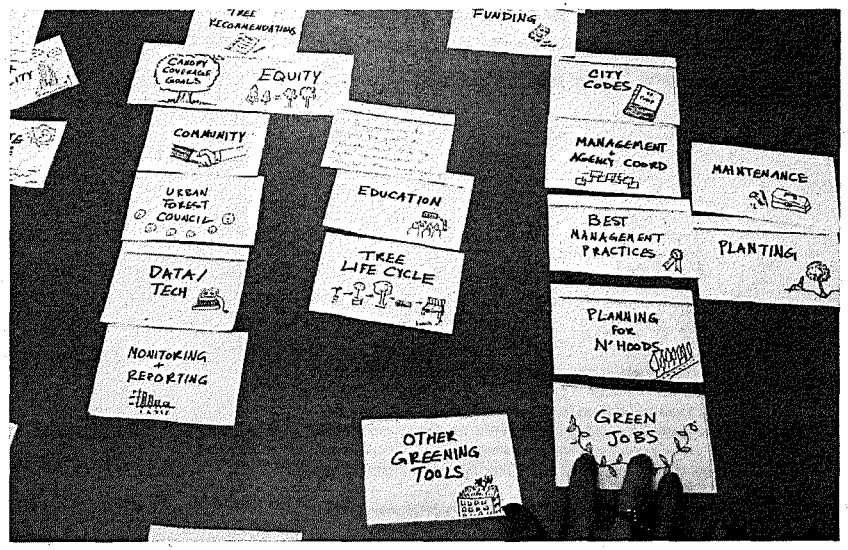
The Urban Forest Plan (Phase 1: Street Trees) was developed by the Planning Department in collaboration with the Department of Public Works (DPW), Urban Forestry Council (UFC) and the non-profit, Friends of the Urban Forest (FUF). Content for the Plan was informed by a series of meetings, workshops, public forums and think tanks with urban forestry specialists from 2012-13. In addition, the Plan is informed by two related efforts including a Street Tree Census and Street Tree Financing Study. The Plan was made possible by a grant from the State of California Strategic Growth Council's Urban Greening Planning Program.



Street Tree Financing Study. In an effort to address the City's declining urban forestry budget, the Planning Department commissioned an economic consultant, AECOM, to conduct a Street Tree Financing Study. The Study evaluated the costs associated with street tree planting and maintenance. It also examined the costs and funding required for a municipal street tree program, whereby the City would take responsibility for maintaining 100% of San Francisco's street trees. The Study is a starting point for a continuing dialogue on how to boost funding for tree planting and maintenance in San Francisco.

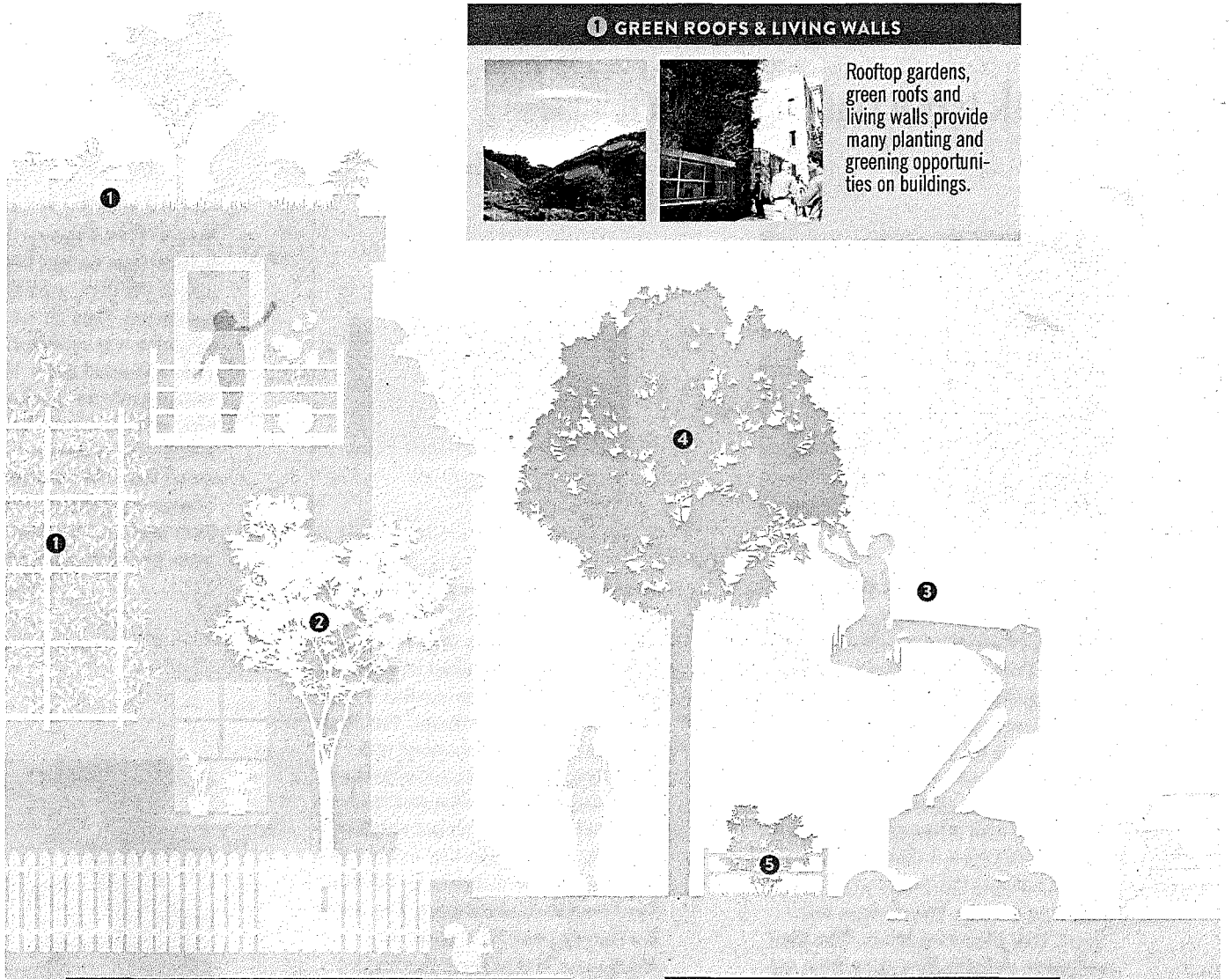
Street Tree Census. The City lacks comprehensive data on San Francisco's street trees. As part of the Plan, a partial Street Tree Census was conducted. Data on age, location, species and condition was collected for 25,000 of the city's 105,000 street trees. The final Summary Report includes info on species and population composition, stocking levels and the value of environmental and economic benefits provided by inventoried trees. The completion of the Street Tree Census is expected to take place in 2014. Data from the Census will be used to improve management and care of the city's street trees.





What Is an Urban Forest?

This Plan uses the term "urban forest"[1] to describe the collection of trees and other vegetation found along San Francisco's streets and within the built environment. The urban forest is distinguished by its **urban setting** full of paved surfaces, buildings, parks and large human population. Our urban forest is primarily **human-created** - the result of tree planting and greening activities carried out by people rather than a native forest ecosystem. Given its location, it requires **regular maintenance** to keep roads, sidewalks and parks clear and safe. The concept of an "urban forest" allows us to think holistically about trees and other vegetation found within the city, quantify their benefits, and manage this natural resource for the enjoyment of present and future generations.



1 GREEN ROOFS & LIVING WALLS

Rooftop gardens, green roofs and living walls provide many planting and greening opportunities on buildings.

2 TREES ON PRIVATE PROPERTY

Trees and plantings on private property including front and backyards of homes and apartment buildings make up a significant portion of the urban forest.

3 ON-GOING MAINTENANCE

Trees and plantings in the urban environment require consistent maintenance and care to ensure health and public safety.

1 Previous but related descriptions of San Francisco's urban forest include the following:
"San Francisco's urban forest is comprised of all the trees and other vegetation found within city limits, a collected greenscape that provides environmental, economic, and social benefits for today and into the future," (San Francisco Urban Forestry Council, 2005).
"Urban Forest: Any significant stand of non-indigenous trees," (San Francisco Recreation & Park Department, *Significant Natural Resource Areas Management Plan*, 2006).

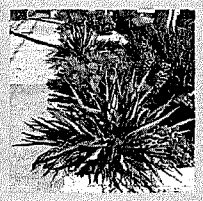
4 STREET TREES

Healthy tree-lined streets are a key component of the urban forest. An estimated 105,000 trees grow along San Francisco's streets.

6 PARK TREES

Approximately 131,000 trees grow in city parks and open spaces.

5 UNDERSTORY: SHRUBS & SIDEWALK GARDENS



In addition to trees, landscaping and plantings located along sidewalks and medians provides the opportunity to increase plantable space and vegetation in the urban environment.

7 WILDLIFE

Aside from the benefits that trees provide for people, trees provide a many benefits for birds, insects and other animals. These include food, nectar, cover and nesting spaces.

Benefits of Trees

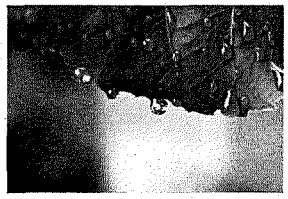
San Francisco's trees work hard each day to improve our quality of life and the urban environment. They purify the air, reduce stormwater runoff, beautify neighborhoods, increase property values, and improve our health and well-being. Trees increase San Francisco's desirability as a place to live, work and visit. This "green infrastructure" is essential to the city's sustainability. These pages describe some of the specific social, economic and environmental services provided by trees and other forms of landscaping.

BY THE NUMBERS

Scientists at the U. S. Forest Service and elsewhere have developed tools to quantify the many benefits and ecosystem services provided by urban trees. These estimates indicate the magnitude of benefits our trees collectively return to the city - millions of dollars. For every $1 spent on public street trees, it is estimated that San Francisco receives $4.37 in benefits -- a tremendous return on investment[1].

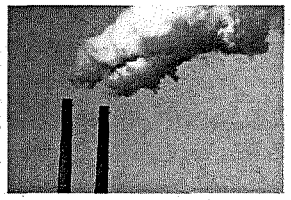
669,000

Estimated number of trees in San Francisco.[2]



516,468,000 *gal*

Estimated gallons of water trees divert from the sewer system each year.[3]



196,000 *tons*

Amount of carbon stored by the city's trees each year.[2]

260 *tons*

Amount of atmospheric pollutants filtered by the urban forest annually.[2]

$1,700,000,000

Estimated capital value of San Francisco's urban forest (i.e. replacement cost for all existing trees within the city).[2]

$98,272,878

Increase in property values provided by San Francisco's trees annually.[4]

$9,439,309

Value of environmental benefits (hydrological, air quality, and carbon storage) provided annual by the urban forest.[2,4]

1 *City of San Francisco Resource Analysis of Inventoried Public Trees*. Davey Resource Group (2013).
2 *Assessing Urban Forest Effects and Values: San Francisco's Urban Forest*. United States Forest Service (2007).
3 Based on estimate of on average 774 gallons intercepted annually per tree (Davey Resource Group 2013).
4 *San Francisco Bay Area State of the Urban Forest Report*. USDA Forest Service (2007).

BENEFITS OF TREES IN SAN FRANCISCO

Social

Create memorable and beautiful places – The visual characteristics of trees and landscaping (form, color, texture) add to the aesthetics of urban streets and can enhance the quality of the public realm.

Strengthen communities – Planting and caring for trees creates neighborhood pride, fosters social cohesion and promotes relationship building.

Improve physical health – The presence of trees makes people more likely to walk and participate in outdoor activities. Trees also filter airborne pollutants, reducing causes of asthma and other respiratory problems. Views of trees and greenery have been shown to speed healing time from injury and illness in hospital patients.[1,2]

Calm traffic and promote pedestrian/bicyclist safety – The presence of trees can reduce driving speeds by narrowing the visual width of the roadway and signaling to drivers that pedestrians and bicycles are present.

Reduce violence and crime – Greenery around houses and apartments is associated with lower crime, graffiti, vandalism, littering and domestic violence.[3]

Connect people to nature ("biophilia") – Humans are hardwired for regular contact with nature. Trees provide opportunities to connect with the natural world in a dense urban environment. This can help reduce stress and support emotional and spiritual wellbeing.

1 Ulrich, R. S. *View through a Window May Influence Recovery from Surgery*. Science 224.4647 (1984): 420-21.
2 Berger, Alan (ed.).*Health + Urbanism Report*. Massachusetts Institute of Technology Center for Advanced Urbanism (2013)..
3 Kuo, F.E. & Sullivan W.C. (2001). *Aggression and violence in the inner city: Impacts of environment via mental fatigue*. Environment & Behavior, 33(4), 543-571.

Economic

Increase property values – Healthy mature trees in front of homes have been shown to increase residential property values.

Boost commercial activity – Trees create attractive environments that draw people and encourage them to linger. Trees are positively linked to shopping activity and a willingness to pay more for goods[1].

Reduce building heating & cooling costs – Trees conserve energy by shading buildings from the sun and by serving as windbreaks that slow the loss of heat from buildings.

Reduce infrastructure costs – Trees and other greenery can help reduce the need for expensive infrastructure systems to manage stormwater.

Increase worker productivity – Employees with views of nature are often more productive, happier and healthier.

1 Wolf, Kathleen L. *Business District Streetscapes, Trees and Consumer Response*. Journal of Forestry 103.8 (2005): 396-400.
Wolf, Kathleen L. *Roadside Urban Trees, Balancing Safety and Community Values*. Aborist News Dec. 2006: 56-57.

Environmental

Improve air quality & absorb pollution – Trees clean the air by absorbing gaseous pollutants (carbon dioxide, sulphur dioxide, and nitrous oxide) and by capturing airborne particulate matter on leaf surfaces.

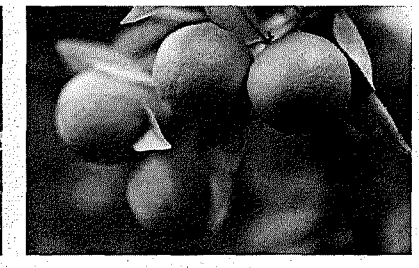
Slow climate change – Urban trees capture greenhouse gases by storing atmospheric carbon dioxide in their tissue and reducing energy demand by shading buildings. In addition, trees turn carbon dioxide into fresh oxygen through photosynthesis.

Reduce stormwater runoff – By capturing rainwater that would otherwise flow into our combined storm-sewer system, trees replenish the aquifer and reduce the occasions on which polluted overflow floods our streets or runs into the Ocean and Bay.

Decrease noise pollution – Trees absorb sound and muffle noise from freeways and other sources.

Provide wildlife habitat – Flowers, fruits, leaves, buds and woody parts of trees are used by many different species. Trees provide shelter, food and nesting areas for birds, insects and small animals.

Produce local food – Fruiting trees and urban orchards increase food independence and reduce the distance that food must be transported to reach city dwellers through urban agriculture.



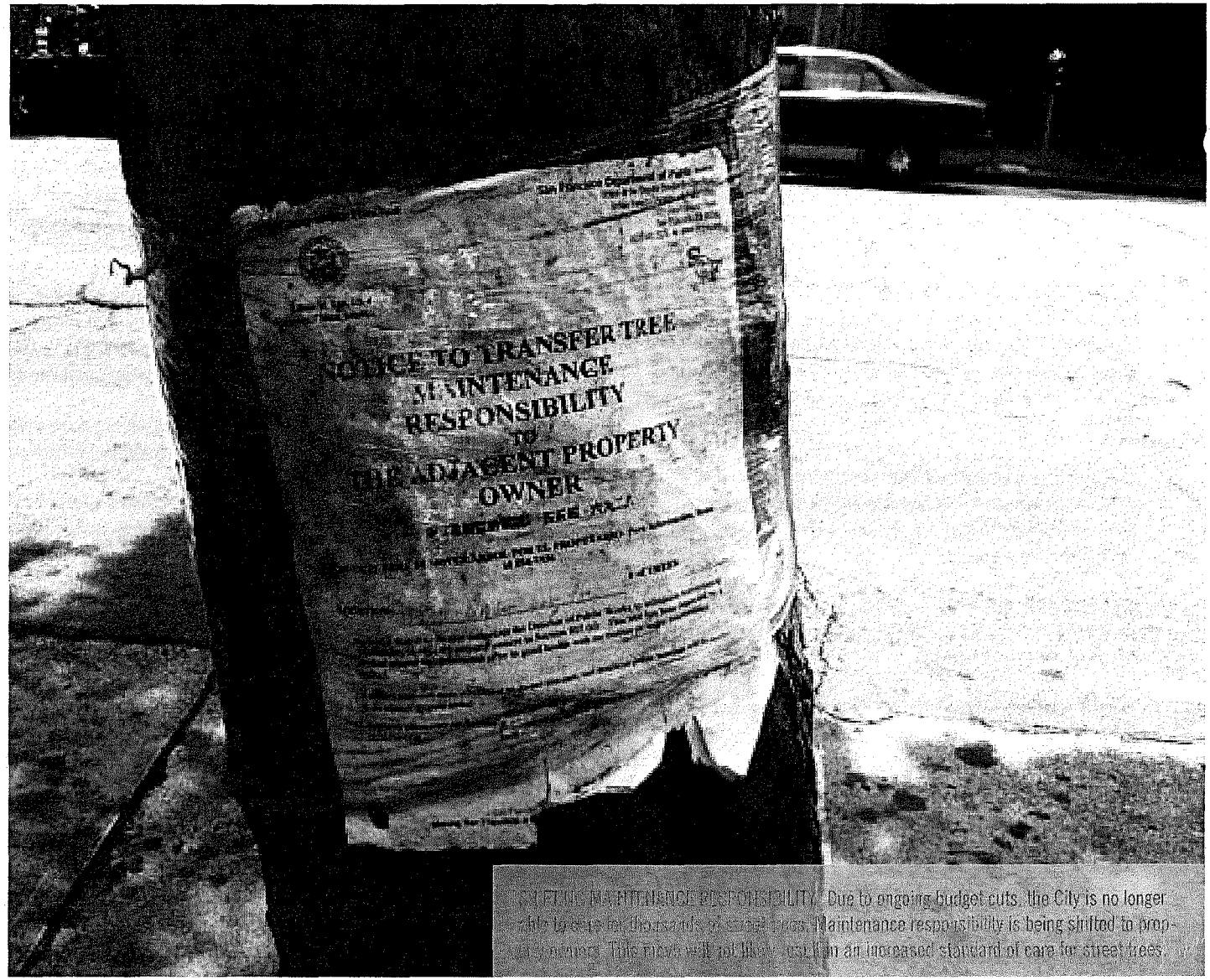
Issues Facing Street Trees

Healthy tree-lined streets are a key component of the urban forest. An estimated 105,000 trees grow along San Francisco's streets. These trees, however, face a number of challenges.

The city's streets are a difficult place for trees to take root and flourish. Small growing spaces, compacted soil, drought and vandalism make it hard for trees to survive and reach maturity. In addition, larger structural problems related to street tree maintenance and funding threaten the long-term health of our urban forest.

The primary challenges facing street trees in San Francisco include:

- an insufficient and shrinking tree canopy
- inadequate funding
- a fragmented maintenance structure; and
- lack of a cohesive vision.



NOTICE OF MAINTENANCE RESPONSIBILITY. Due to ongoing budget cuts, the City is no longer able to care for thousands of street trees. Maintenance responsibility is being shifted to property owners. This move will not likely result in an increased standard of care for street trees.

INSUFFICIENT & SHRINKING TREE CANOPY

San Francisco prides itself on being "green," but how green is it, really? The City tops lists of the world's "greenest" cities for its renewable energy and zero-waste goals, but it suffers from a literal lack of green. San Francisco has one of the smallest tree canopies of any major U.S. city. A city's tree canopy is measured by the amount of land covered by trees when viewed from above. San Francisco's tree canopy (13.7%) [1] is smaller than Chicago (17%), Los Angeles (21%), and New York City (24%). This translates to very few trees.

Even worse, the city's tree canopy is actually shrinking. New street tree plantings are not keeping pace with deaths and removals. As many as 100,000 potential street tree planting spaces remain empty. Thousands of additional planting spaces exist in parks and on private property. The city's trees are also not evenly distributed, with some traditionally underrepresented neighborhoods having less greenery. While trees may not be appropriate in all areas (i.e. sensitive habitats and natural areas), opportunities exist to expand trees and landscaping for a more equitable distribution of their benefits.

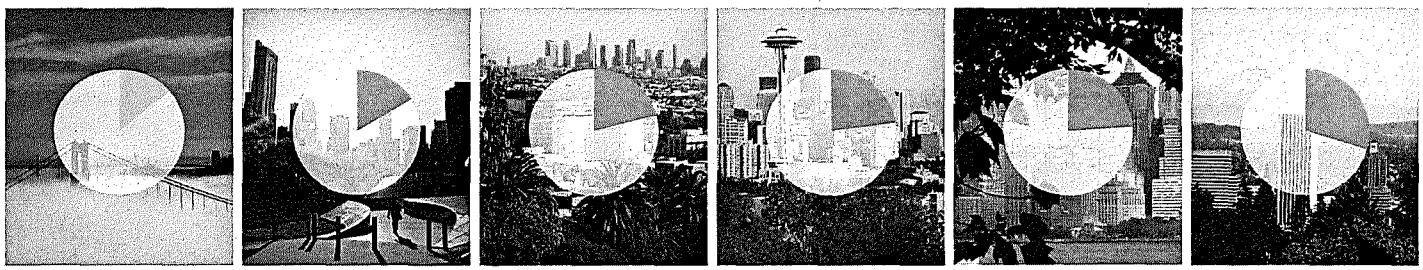
Many streets in San Francisco have little to no tree cover or landscaping. Opportunities exist to bring trees and other plantings into neighborhoods to create a more equitable distribution of their benefits.

1 See *Appendix: San Francisco Urban Tree Canopy Analysis* (2012).

San Francisco has one of the smallest tree canopies of any major U.S. city.

URBAN TREE CANOPY COMPARISON Sources: SF Planning Department (2012), City of Seattle (2007), City of Portland (2012), Million Trees NYC (2012), City of Chicago (2012) and Million Trees LA (2006).

Using aerial photos, the size of an urban forest can be monitored and its growth or decline tracked over time. The benefits and services provided by trees are directly related to the extent of a city's canopy cover. Larger leaf surface areas indicate the increased capacity of trees to clean air, absorb stormwater and beautify streets and neighborhoods.

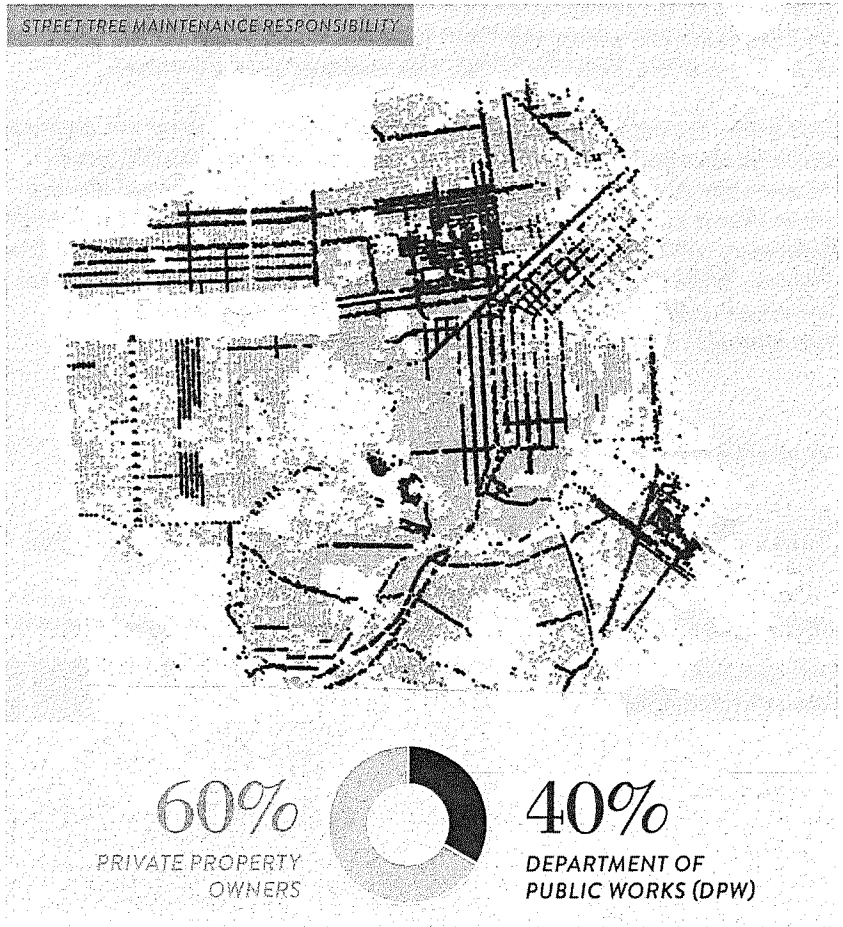


13.7% SAN FRANCISCO
17% CHICAGO
21% LOS ANGELES
23% SEATTLE
24% NEW YORK CITY
30% PORTLAND

FRAGMENTED MAINTENANCE STRUCTURE

San Francisco's fragmented street tree maintenance structure makes achieving a coordinated and standard level of tree care difficult to achieve. Although the Department of Public Works (DPW) has ultimate authority over all trees within the public right-of-way (streets and sidewalks), the agency is responsible for maintaining only about 40 percent of these street trees. Responsibility for the remaining 60 percent falls to a confusing mix of private property owners and other public agencies. The effect is a divided system whereby some property owners pay to maintain their street trees while DPW assumes the cost and responsibility for others. Some property owners do no maintenance at all because they are unaware of their responsibility or are unwilling to pay for it. This discontinuous maintenance patchwork creates an inefficient and costly maintenance program. DPW must "hopscotch" across the city maintaining only small numbers of trees over long time periods.

This discontinuous patchwork creates an inefficient and costly maintenance program. DPW must "hopscotch" across the city maintaining only small numbers of trees over long time periods.

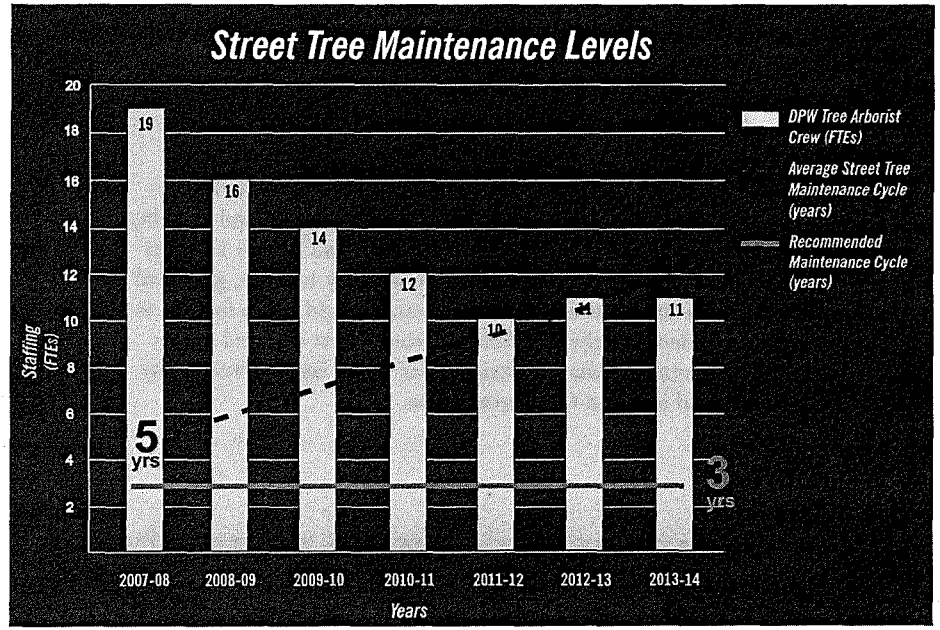


INADEQUATE FUNDING

Although the Department of Public Works (DPW) maintains the largest number of publicly managed street trees, its urban forestry budget has decreased dramatically since 2007. With key maintenance crew positions cut almost in half, the agency is unable to sustain adequate staffing and maintenance levels (see Graph). This has stretched the average pruning cycle from 5 years to 12 years per tree. Not only does lack of maintenance funding compromise tree health and safety, but it also diminishes the social and environmental benefits that street trees provide.

Without stable funding for urban forestry operations, DPW can no longer care for all the street trees under its purview. In response to repeated budget cuts, DPW announced its seven-year Tree Maintenance Transfer Plan (2011). Under that plan, DPW is transferring the responsibility for approximately 22,000 street trees under its care to adjacent private property owners. This controversial program has raised concerns among many residents and uncertainty about the future health of the city's street trees.

Research conducted for the Urban Forest Plan indicates that publicly managed street trees are maintained more frequently and in better health than those maintained by property owners. Identifying stable funding sources is essential to restoring the health of our urban forest.



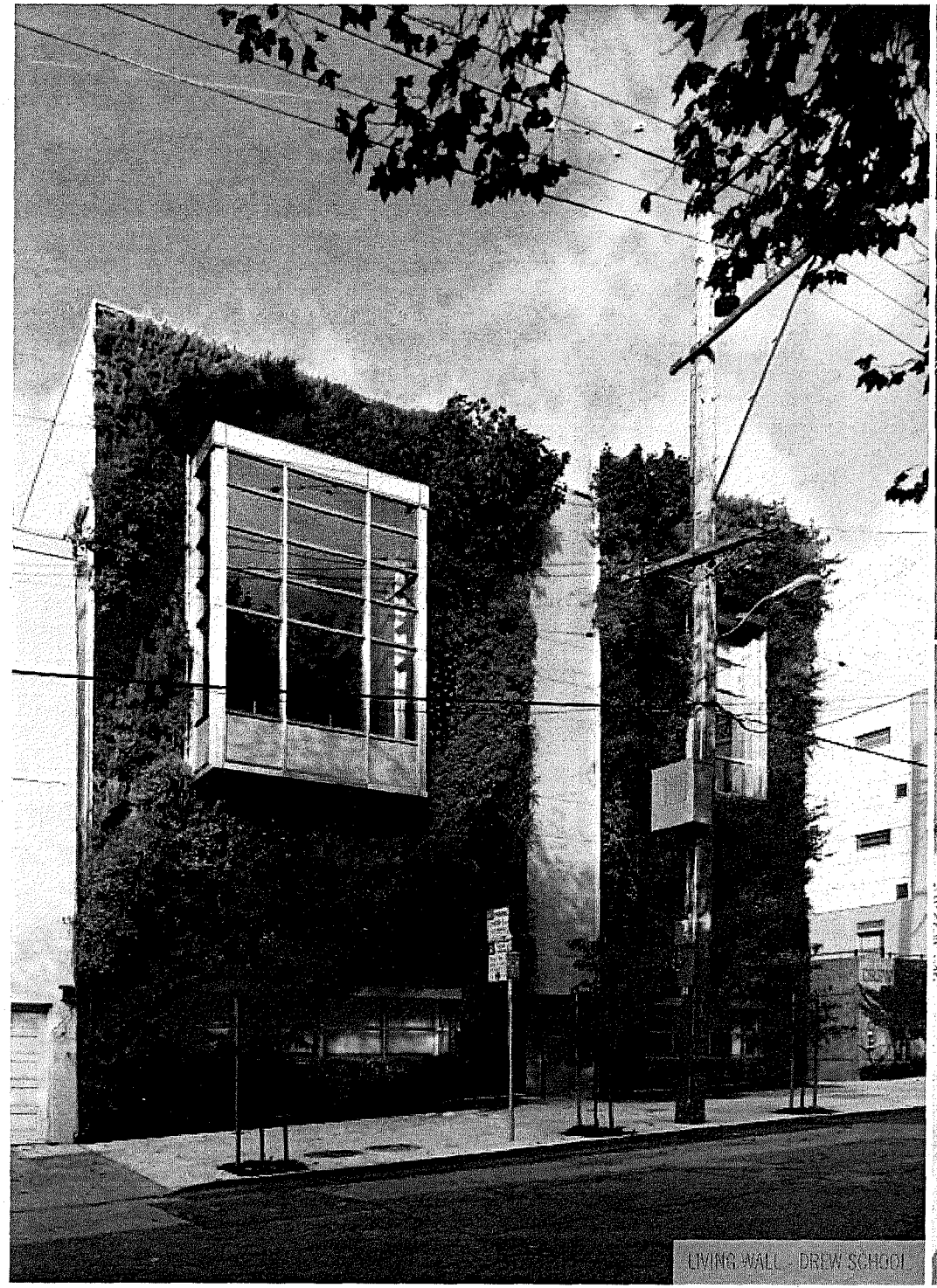
The average pruning cycle for City-maintained trees has increased from 5 years to 12 years per tree.

LACK OF COHESIVE VISION

No comprehensive vision currently exists for the long-term care and management of San Francisco's street trees. Without this vision, issues such as maintenance, funding, the uneven distribution of trees and forest expansion will not be proactively addressed.

Past efforts, including a previous Urban Forest Plan (2006) and Street Tree Action Plan (2004) have lacked the adequate support and visibility they needed to succeed. The 2014 Urban Forest Plan (Phase 1: Street Trees) identifies policies and strategies to proactively manage, grow and protect the city's street trees. The Plan presents a bold vision for how to create an expanded, healthy and thriving urban forest now and for the future. Its recommendations are designed for timely implementation by policymakers and involved City departments.

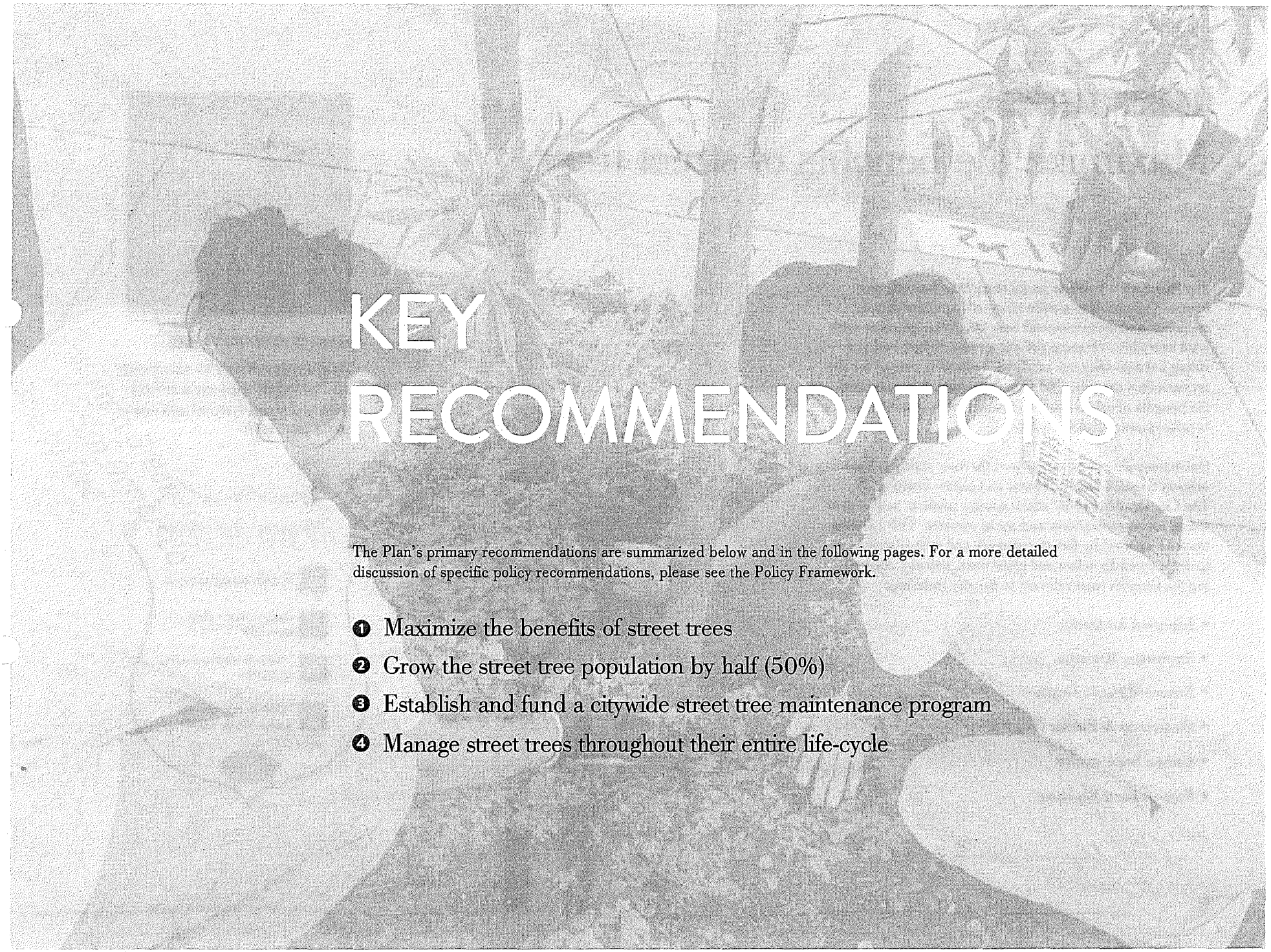
No comprehensive vision currently exists for the care and management of San Francisco's street trees.



LIVING WALL - DREW SCHOOL

SAN JOSE/GUERRERO PARK

FRIENDS OF THE URBAN FOREST



KEY RECOMMENDATIONS

The Plan's primary recommendations are summarized below and in the following pages. For a more detailed discussion of specific policy recommendations, please see the Policy Framework.

1. Maximize the benefits of street trees
2. Grow the street tree population by half (50%)
3. Establish and fund a citywide street tree maintenance program
4. Manage street trees throughout their entire life-cycle

RECOMMENDATION 1

Maximize the benefits of street trees

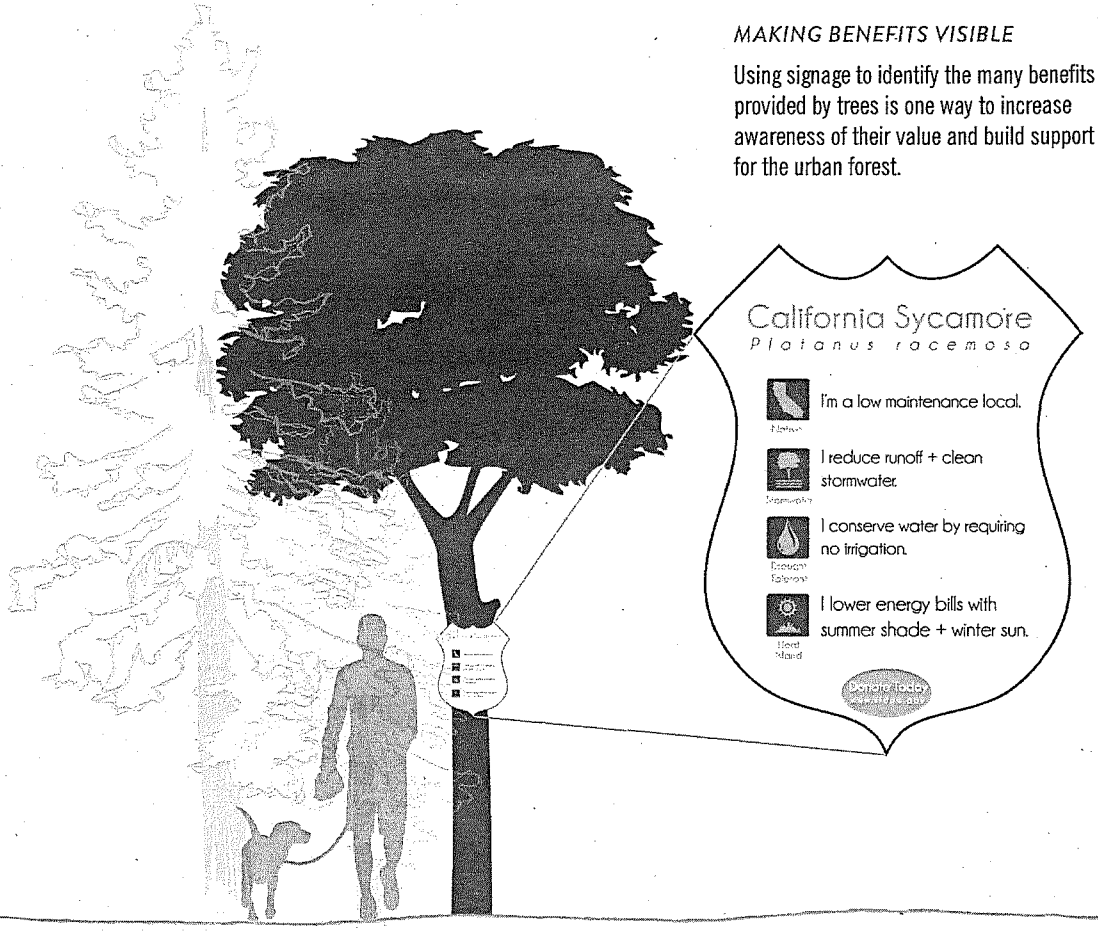
San Francisco's trees do much more than beautify our streets. They provide a wide range of important social, economic and environmental benefits. Although trees work hard everyday - cleaning the air, storing carbon and providing habitat - they are rarely recognized or valued for the services they provide. The Plan recommends maximizing the benefits of urban trees and making them more visible to policymakers and the public.

Street trees should be recognized for their ability to help achieve targeted environmental and public health goals. The City should identify which species perform best at providing various ecosystem and social services. This information can be used by forest managers and property owners to more carefully select and plant trees, thereby maximizing the benefits most relevant to the city including:

- Improved Air Quality
- Stormwater Retention
- Enhanced Public Health
- Biodiversity & Habitat Creation
- Carbon Sequestration
- Support Local Economy

MAKING BENEFITS VISIBLE

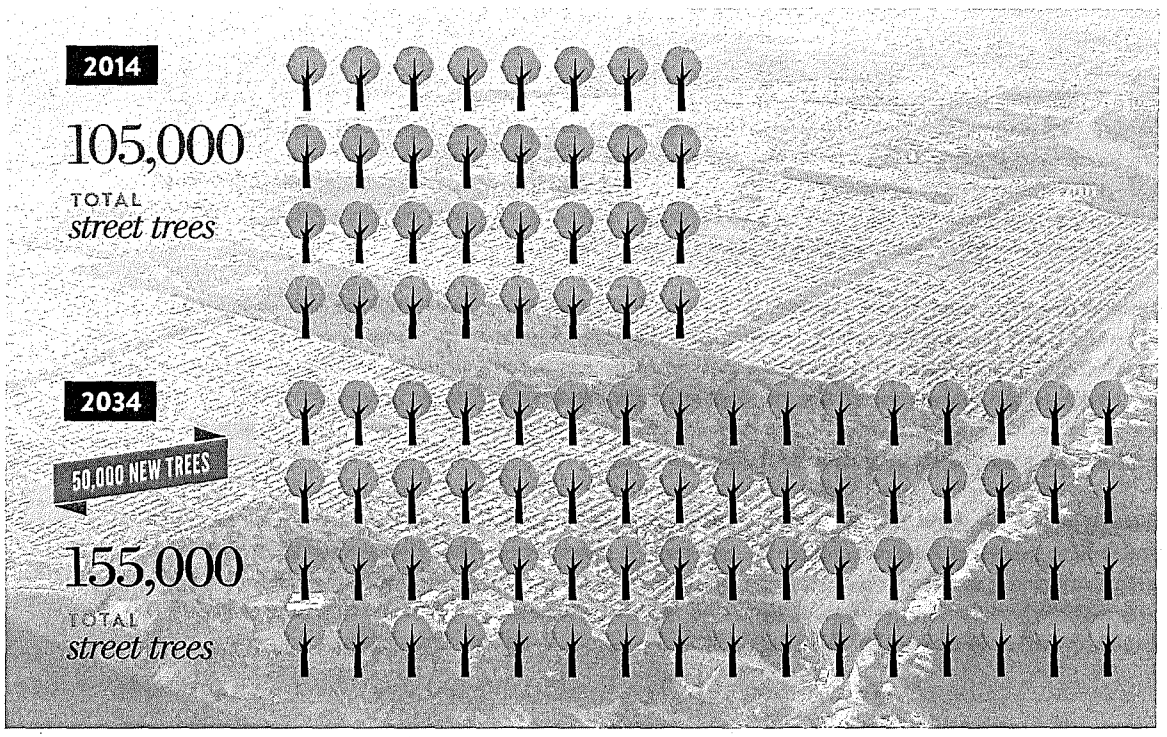
Using signage to identify the many benefits provided by trees is one way to increase awareness of their value and build support for the urban forest.



RECOMMENDATION 2

Grow the street tree population by half (50%)

The Plan calls for the planting of 50,000 new street trees on San Francisco's streets over the next 20 years. This will expand the city's street tree population by half (50%) from 105,000 street trees (2014) to 155,000 street trees (2034) - approximately 2,500 new trees per year. These new trees will help stem the decline of the urban forest and bring the many benefits of trees to more of the city's neighborhoods. In addition, they will help create a more equitable distribution of tree canopy and reduce greening inequities in different areas of the city. An associated funding and maintenance program is needed to carry out this expanded street tree planting program and ensure the long-term health of new trees.



RECOMMENDATION 3

Establish and fund a citywide street tree maintenance program

Cities recognized as urban forestry leaders - Santa Monica, Sacramento, Minneapolis, New York and Chicago - all manage and maintain their city's street trees. Privately maintained street trees generally fare worse than publicly maintained trees. The current practice of transferring maintenance responsibility[1] for street trees to private property owners should stop. The Plan recommends centralizing maintenance responsibility for 100% of San Francisco's street trees under the Department of Public Works through a fully funded municipal street tree program.

A comprehensive maintenance program for the city's 105,000 street trees would benefit both property owners and the broader public. Under such a program, homeowners would be relieved from the responsibility of maintaining trees fronting their property and making tree-related sidewalk repairs. City residents and visitors would also see significant growth of the urban forest over time (50,000 new street trees). A major reason so few trees are currently planted in San Francisco is because no maintenance program exists to care for them afterwards.

Creating a citywide street tree maintenance program would require the City to get serious about establishing long-term funding solution for our trees. A recent Street Tree Finance Study[2] identified a variety of funding options for consideration by decision-makers. The Study outlined possible funding tools including an assessment district, parcel tax, general obligation bonds and others. These tools should be further evaluated for their feasibility and potential to achieve Plan goals.

1 In response to recurring budget cuts leaving DPW with inadequate resources to sustain maintenance operations, the agency announced a seven-year Tree Maintenance Transfer Plan (2011). Under the transfer plan, DPW will relinquish responsibility for approximately 22,000 street trees currently under its care to adjacent private property owners. This will make property owners responsible for services previously provided by the City including tree pruning and sidewalk repair.

2 AECOM (2012). *Financing San Francisco's Urban Forest: The Costs & Benefits of A Comprehensive Municipal Street Tree Program.*

STREET TREE MAINTENANCE IN SAN FRANCISCO

1. EXISTING: Maintenance of San Francisco's 105,000 street trees is divided in a confusing patchwork between the Department of Public Works (green) and private property owners (dark gray).

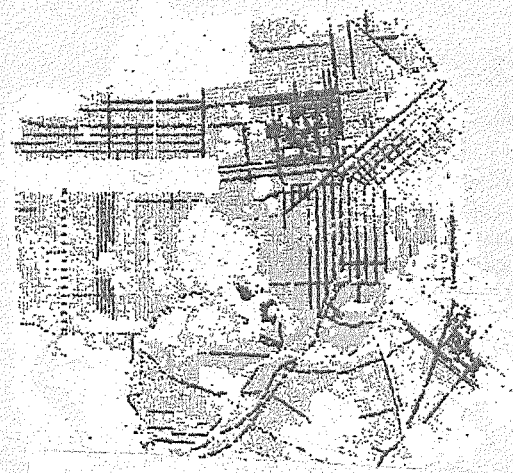
2. AFTER TRANSFER: Due to ongoing budget cuts, DPW is in the process of transferring the bulk of street tree maintenance responsibility to fronting property owners.

3. FULLY FUNDED PROGRAM: The Plan explores reversing this trend. It recommends pursuing funding mechanisms that would allow the City to assume maintenance responsibility for 100% of street trees, achieve a healthier urban forest and plant and maintain an additional 50,000 new street trees.

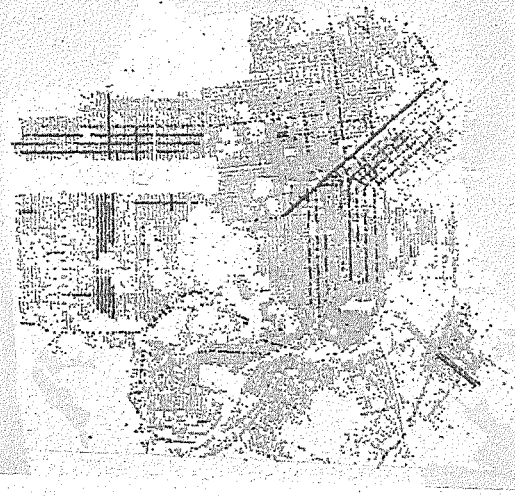
Maintenance Responsibility

- Privately maintained (Property Owner)
- Publicly maintained (City)

1. EXISTING



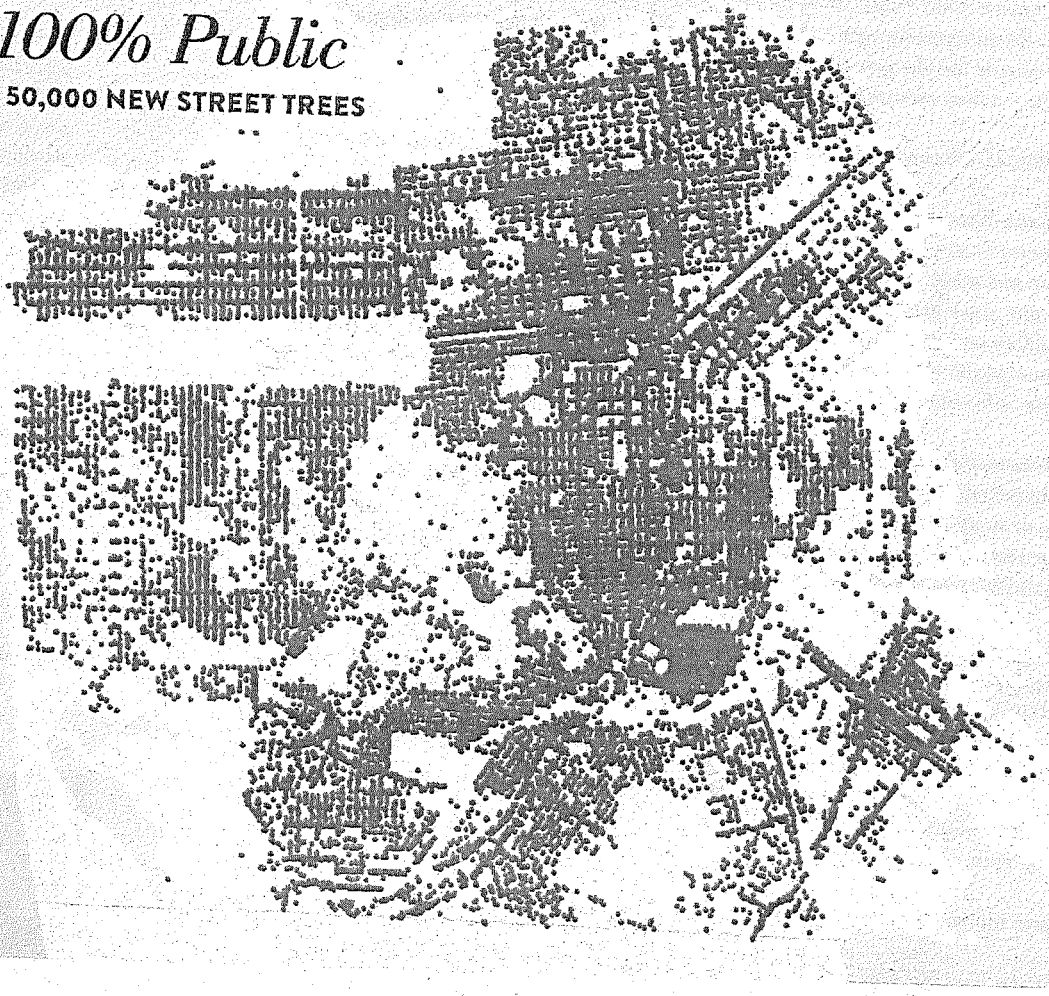
2. AFTER TRANSFER



3. FULLY FUNDED PROGRAM

100% Public

+ 50,000 NEW STREET TREES



RECOMMENDATION 4

Manage trees throughout their entire life-cycle

The Urban Forest Plan recognizes the value of the entire urban wood chain - from seeds to stumps and beyond. The Plan recommends managing San Francisco's street trees throughout their entire life-cycle be creating an interdependent urban forestry operation. By minimizing waste, reducing travel distances, and providing second-life opportunities for locally grown urban wood, San Francisco can become a model of 21st century urban natural resource management.

Components of a Street Tree Life-Cycle Management Program include the following:

Street Tree Nursery
San Francisco's street trees currently come from a range of commercial growers around the region and state. This system involves the transportation costs associated with tree delivery and presents challenges to finding uncommon species at commercial nurseries. The establishment of a Street Tree Nursery in San Francisco would allow for the growing of some street trees locally through a City and community partnership that creates green jobs, education and skill development opportunities.

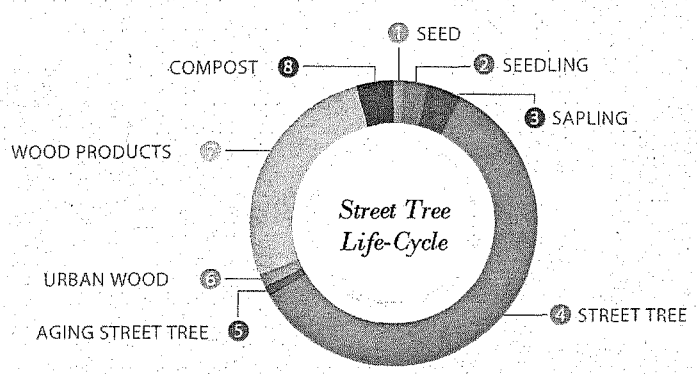
Tree Removal & Succession Plantings
A healthy urban forest reduces the occurrence of mass tree removals due to hazards, disease, or death. Aging or diseased trees near the end of their lifespan should be identified for removal to prevent potential hazards. Succession plantings should be carried out to stabilize tree canopy, ensure age diversity and reduce loss to the urban forest.

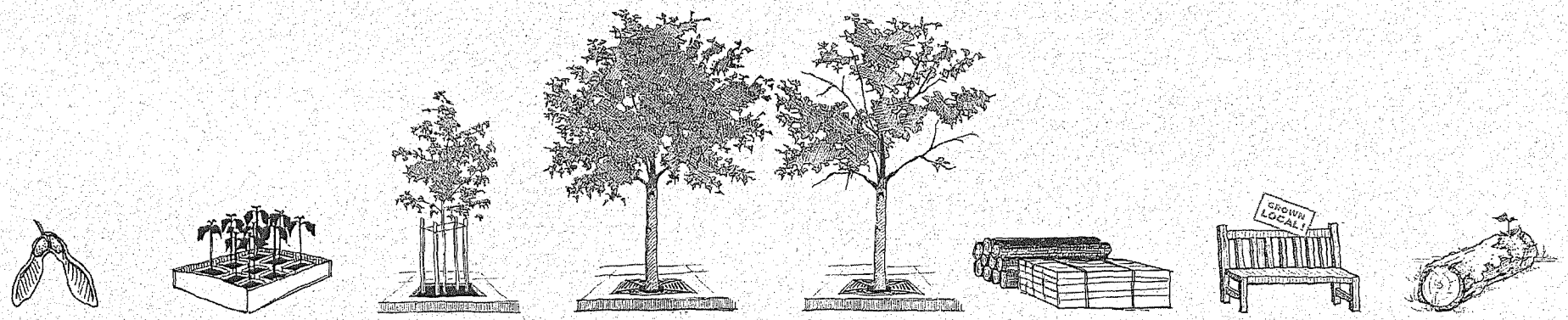
Urban Wood Re-Use
The large quantity of wood removed from city streets holds tremendous potential for re-use and to help achieve the City's "Zero Waste" goals. Trees removed from streets and development sites are often chipped for mulch or landfilled. Some travel long distances for disposal. Alternatively, the city's wood waste can provide material for second-life products such as furniture, building materials, paper, art and biomass energy. Processing of urban wood at local mills for re-use can also extend the life of urban trees while retaining their stored carbon.

For more information, see the MANAGE chapter.

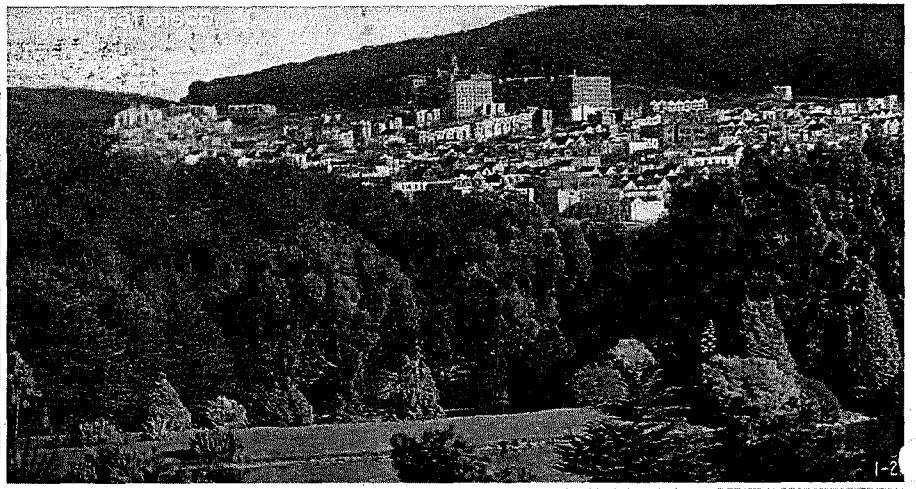
STREET TREE LIFE-CYCLE MANAGEMENT

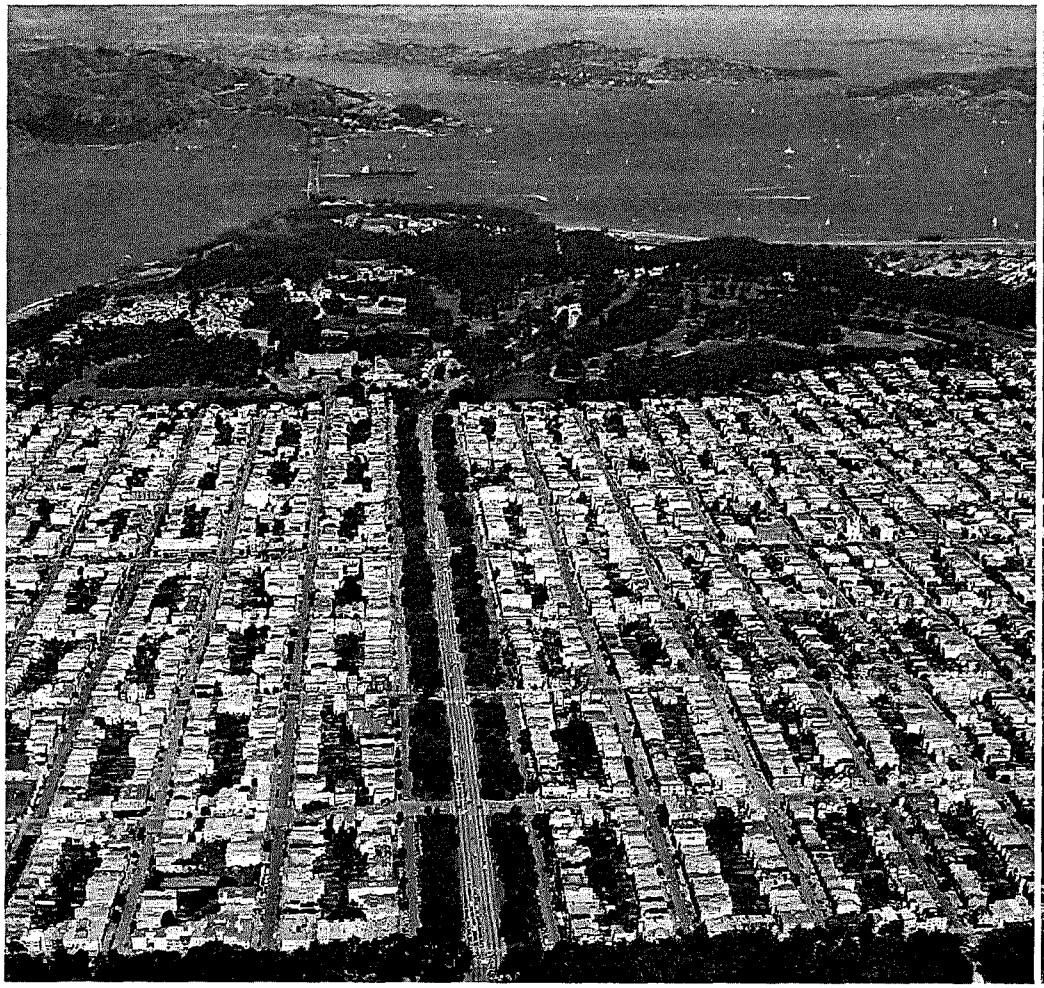
Life-cycle management evaluates the resources (inputs and outputs) produced by a system or product chain from start to finish ("cradle-to-grave"). By examining the full life-span of urban trees and processes related to their growth, maintenance and disposal, we can identify opportunities to create a more sustainable resource flow. The diagrams on these pages present a vision for a holistic urban forestry management program that cares for trees throughout their entire life-cycle and beyond.

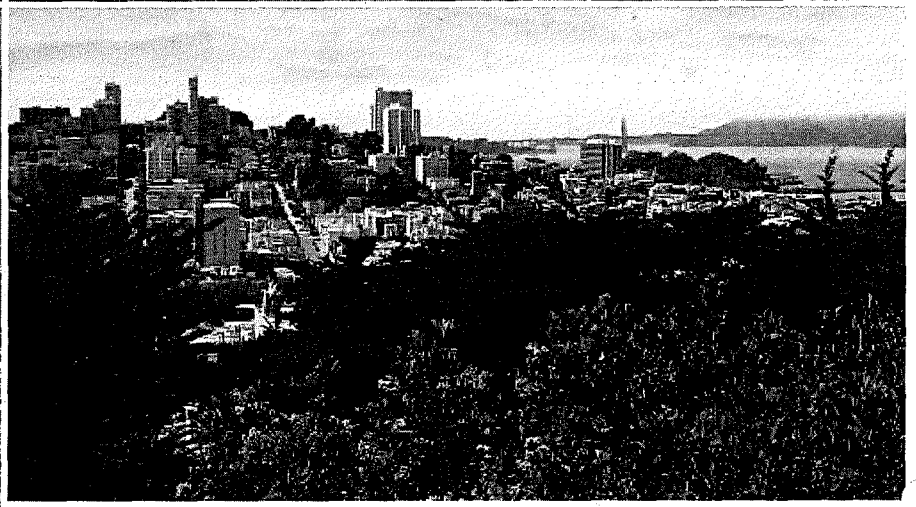


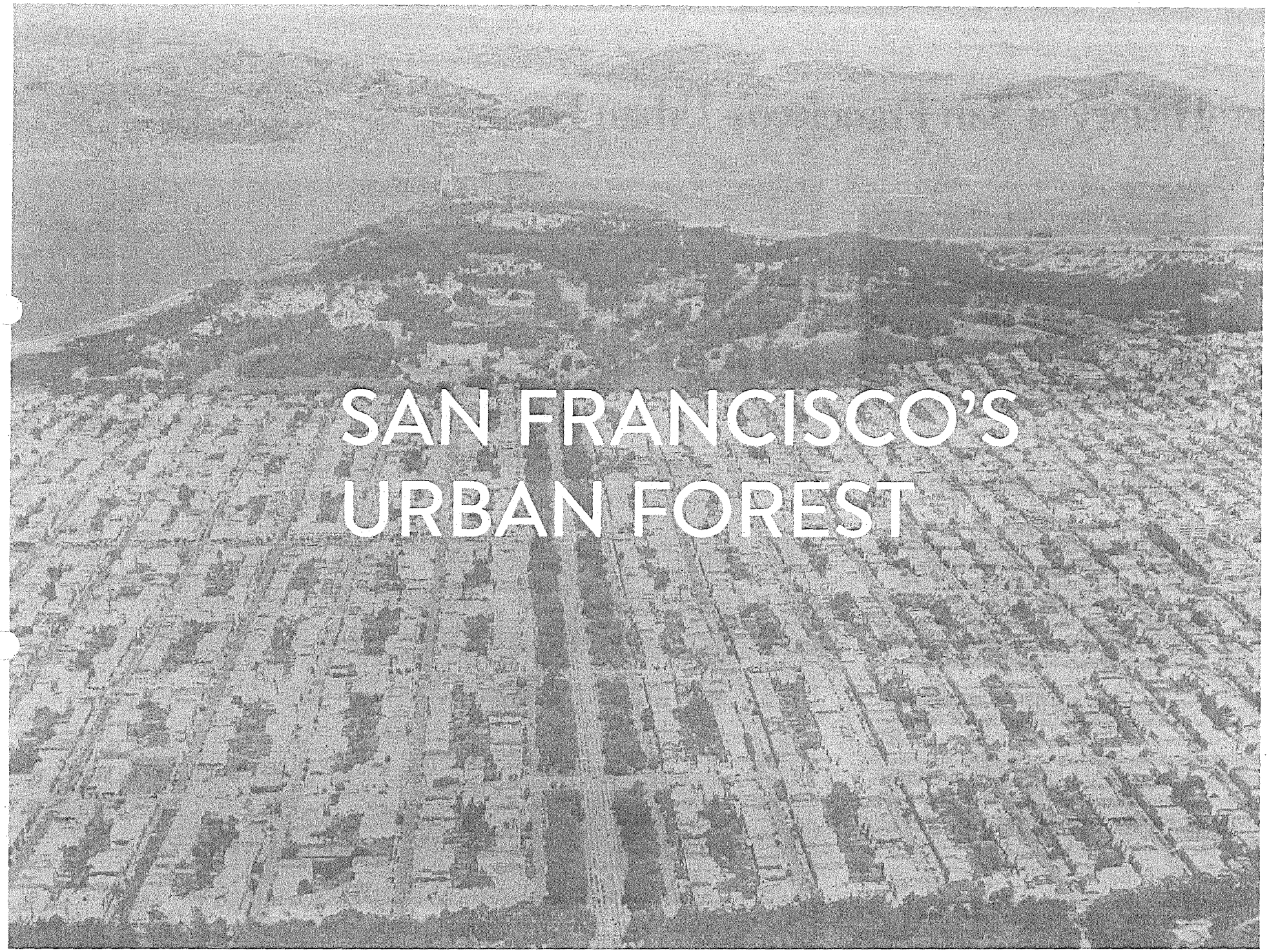


Street Tree Nursery		City Streets		Local Lumber Mill	Artisans & Manufacturers	Street Tree Nursery
1 SEED	2 SEEDLING	3 SAPLING	4 STREET TREE	5 AGING STREET TREE	6 URBAN WOOD	7 WOOD PRODUCTS	8 COMPOST
The creation of a Street Tree Nursery in San Francisco would allow for the sprouting and growing of trees locally in our natural climate near the streets they will live out their mature lives. Growing more trees in the city would also reduce the impact of importing trees from commercial nurseries miles away..	Tree seedlings would be grown at the Street Tree Nursery and tended through partnerships with youth and community organizations. These young trees would receive watering, transplanting and fertilizing during the three years it takes for saplings to reach street-ready stature.	Once a sapling reaches 6 feet tall, it would become ready for planting. For most species, a strong central leader is a forecast of street tree health. The planting of new trees would be carried out on city streets by residents, the Department of Public Works and Friends of the Urban Forest.	Street trees serve San Francisco's streets for up to 70 years or more – greening the city, sequestering carbon, creating habitat and providing other benefits. To ensure a long and healthy life, they would receive regular maintenance and pruning under a adequately funded citywide street tree maintenance program.	Once street trees reach the end of their lives or are removed, they should be replaced to minimize canopy and benefits loss. Successional planting plans should be developed for areas with large numbers of overmature trees so the urban forest can be replenished as trees age out.	Instead of being sent to a landfill, burned or fed through a chipper, the city's timber-viable street trees could be transformed into high quality lumber at a local mill. Lower-quality wood waste could be captured for use in particle board, paper products, mulch and biomass-based power and heat production.	By turning urban wood into second-life products such as furniture, building materials and artwork, we can celebrate the beauty and value of this precious natural resource while helping achieve Zero Waste goals. Wood products extend the life of an urban tree and prevent the carbon dioxide stored in wood from being released into the atmosphere.	Urban wood unsuitable for second-life products or other uses can be composted at the Street Tree Nursery to provide fertilizer for the seeds of new street trees.








SAN FRANCISCO'S
URBAN FOREST

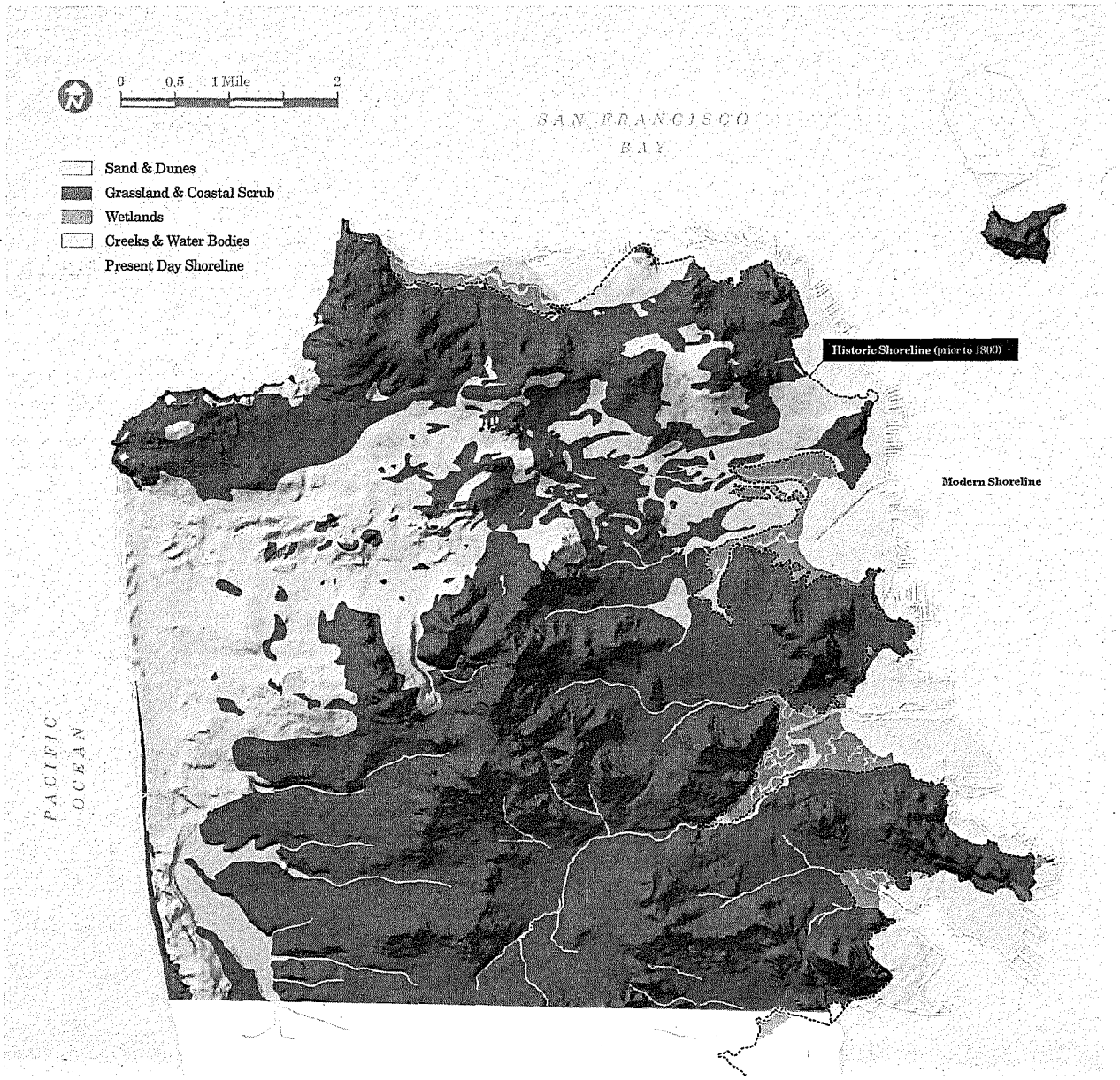
History of San Francisco's Urban Forest

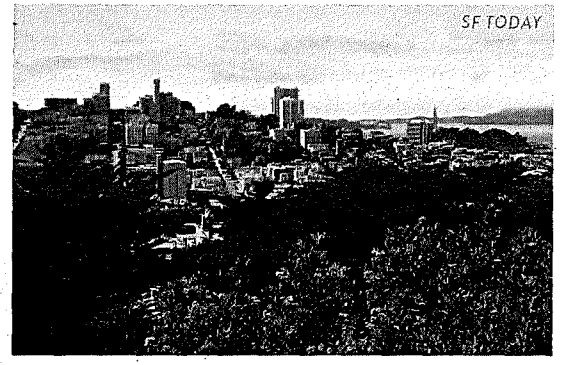
Greg Gaar Collection, San Francisco, CA

PRE-URBAN SAN FRANCISCO

Prior to European arrival and before it became a city, San Francisco's environment was a mosaic of sand dunes, grasslands, wetlands, riparian and coastal scrub vegetation. Unlike cities with naturally occurring forests, San Francisco's original landscape had very few trees. Small, scattered stands of native trees grew near creeks and in canyons and on the city's less windy eastern side.

Native trees found here included oaks, bay laurel, willows and California buckeye. Lack of expansive native tree cover reflects San Francisco's microclimate, windy conditions and sandy and serpentine soils. Remnants of the land's pre-historic trees can still be found in isolated patches such as the Oak Woodlands of Golden Gate Park.





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SAN FRANCISCO TODAY

Today, San Francisco is a vibrant city with a highly altered natural environment. Much of the original landscape has been transformed by urbanization. Creeks, wetlands, and parts of the Bay have been filled to accommodate urban development. Massive tree planting efforts throughout the years have created an urban forest where none existed prior. San Francisco's streets and parks resemble a global arboretum with over 200 species of trees from places like Australia, Asia and Africa. The wide variety of trees and other vegetation found growing here are well adapted to the city's temperate Mediterranean climate.

Open spaces, parks and natural areas still retain significant native landscapes and habitats. These support diverse plant and wildlife communities. Efforts have been made to protect and restore these areas. Although much of the landscape is now urbanized, opportunities exist for the urban forest to help strengthen the city's ecological function while also beautifying our public spaces.

URBAN FOREST TIMELINE

San Francisco's urban forest is primarily the result of human determination and ingenuity. Massive tree planting efforts of the late 1800s and early 1900s transformed expanses of sandy dunes into the green oases of Golden Gate Park and the Presidio.

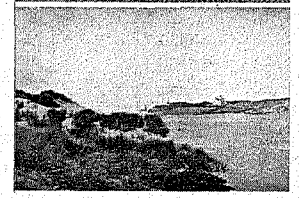
While tree planting has continued in smaller efforts over the years, ongoing funding and operational challenges have limited the reach of municipal tree planting and maintenance programs. In 1981, a non-profit, Friends of the Urban Forest (FUF), was formed in response to the City's declining urban forestry programs. Since its inception, FUF has planted 48,000 new and replacement street trees while engaging thousands of volunteers in growing and caring for the urban forest. Today, further budget cuts threaten the City's ability to provide critical maintenance services for San Francisco's trees.

The Plan provides a bold vision for improving the health and beauty of the city through an increased program of tree planting and maintenance that will also enhance the livability and ecological integrity of San Francisco.

PRE 1760

DUNES & GRASSLAND

Before the arrival of the Spanish, San Francisco is a largely treeless landscape covered by sand dunes, coastal scrub and grasslands. The land supports native human inhabitants and diverse wildlife.



"There is not a full grown tree of beautiful proportions near San Francisco. It would not be wise nor safe to undertake to form a park... which assumed as a certainty that trees which would delight the eye can be made to grow near San Francisco."

Frederick Law Olmsted (1867)

1850 - 70s

GOLDEN GATE PARK

Over a 1,000 acres of windswept sand dunes were transformed into Golden Gate Park by engineer William Hammond Hall and master gardener John McLaren By 1879, approximately 155,000 trees are planted, primarily Blue Gum Eucalyptus, Monterey pine and Monterey Cypress.

STERN GROVE

George Greene (1871) plants a forest of fast growing Eucalyptus trees on his land.

Mary Ellen Pleasant, "the Mother of Civil Rights in California" who helped slaves along the Underground Railroad during the Gold Rush, left her mark on San Francisco by planting twenty enormous blue gum eucalyptus trees along Octavia Street between Bush & Sutter Streets. These are among the city's few landmarked trees.

Mary Ellen Pleasant (1870)

1880s

PRESIDIO

Major W. A. Jones proposes a massive tree planting program (1883) for the military base at the Presidio. Coastal scrub and grasslands are covered with an estimated 350,000 trees to reduce wind and visually isolate the base. Eucalyptus, Monterey Pine and Monterey Cypress are the primary species planted.

LARGE-SCALE PLANTING

The success of Golden Gate Park inspires other large tree plantings - Buena Vista Park, Pine Lake Park, Mountain Lake Park, Lincoln Park, the Panhandle, Sunset Boulevard, and Park Presidio Boulevard.

1886

FIRST ARBOR DAY

Adolph Sutro organizes the state's first Arbor Day on Nov. 15, 1886. A large celebration is held on Yerba Buena Island where thousands of children plant trees donated by Sutro.

LATE 1800s / EARLY 1900s

SUTRO'S FOREST

Adolph Sutro buys large tracts of land west of Twin Peaks. His passion for trees leads him to plant thousands of mostly Blue Gum Eucalyptus trees over the next twenty years in Glen Canyon Park, St. Francis Wood, Ingleside Terrace, Westwood Park, Mount Sutro, Mount Davidson, and Twin Peaks.

"The people of the Pacific Coast...will wander through the majestic groves rising from the trees we are now planting, reverencing the memory of those whose foresight clothed the earth with emerald robes and made nature beautiful to look upon."

Adolph Sutro (1886)

EARLY 1900s

GOLF COURSES

Thousands of trees are planted in the city's new golf courses - the Olympic Club, San Francisco Golf Club, and Harding Park.

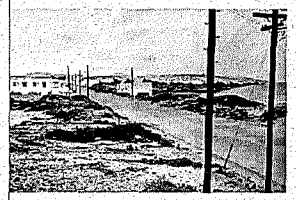
STREET TREES

Some major streets are planted with trees - Dolores Street, Sunset Boulevard, Park Presidio Boulevard.

1950s

TREELESS STREETS

Photos from the 1950s show the majority of city streets without any significant tree plantings. Nikita Khrushchev, leader of the Soviet Union, visits San Francisco in 1959 and remarks on the startling lack of trees in the city.



1955 - 1974

CITY PLANTING PROGRAM

The City expands its municipal tree program by establishing the Tree Planting Division of the Department of Public Works (DPW). DPW works with residents and the volunteer organization San Francisco Beautiful to plant trees along city streets. An estimated 100,000 street trees are planted. New tree species are introduced such as Ficus, Blackwood Acacia and Myoporum.

1981

TREE PLANTING HALTED

Municipal budget cuts halt City sponsored tree planting. DPW's urban forestry program discontinues street tree planting and shifts focus to tree maintenance.

FRIENDS OF THE URBAN FOREST

In response to City budget cuts, a non-profit, Friends of the Urban Forest (FUF), is formed to continue citywide street tree planting efforts. FUF works with neighbors to organize the planting of thousands of trees.

1990s

City crews become primarily responsible for tree maintenance on only major streets. Planting and upkeep on other streets and neighborhoods is placed primarily in hands of private property owners.

2005

25,000 NEW TREES

Mayor Gavin Newsom's "Trees for Tomorrow" campaign commits to planting 5,000 trees per year for five years to create a greener city.

2007 - 2011

MORE CUTS

In the wake of global financial crisis, DPW's Bureau of Urban Forestry is hit hard by successive years of budget cuts. Lack of funding causes DPW to initiate a Tree Maintenance Transfer Plan. The plan proposes transferring maintenance responsibility for thousands of trees under City care to private property owners.

2014

URBAN FOREST PLAN

The City releases a new Urban Forest Plan focused on improving the health and sustainability of the urban forest by protecting and expanding the city's tree population and recommending increased funding for street tree planting and maintenance.

SAN FRANCISCO URBAN FOREST PLAN

Soviet premier Nikita Khrushchev visited San Francisco in 1959 and "thought it was a very nice city, but not enough trees," recalled a member of Friends of the Urban Forest's original board of directors.

Nikita Khrushchev (1959)

Founded in 1981, Friends of the Urban Forest (FUF) has been instrumental in engaging residents in neighborhood street tree planting and care. FUF and its volunteers have planted approximately 48,000 trees in San Francisco.

Friends of the Urban Forest (1981)

REFERENCES:

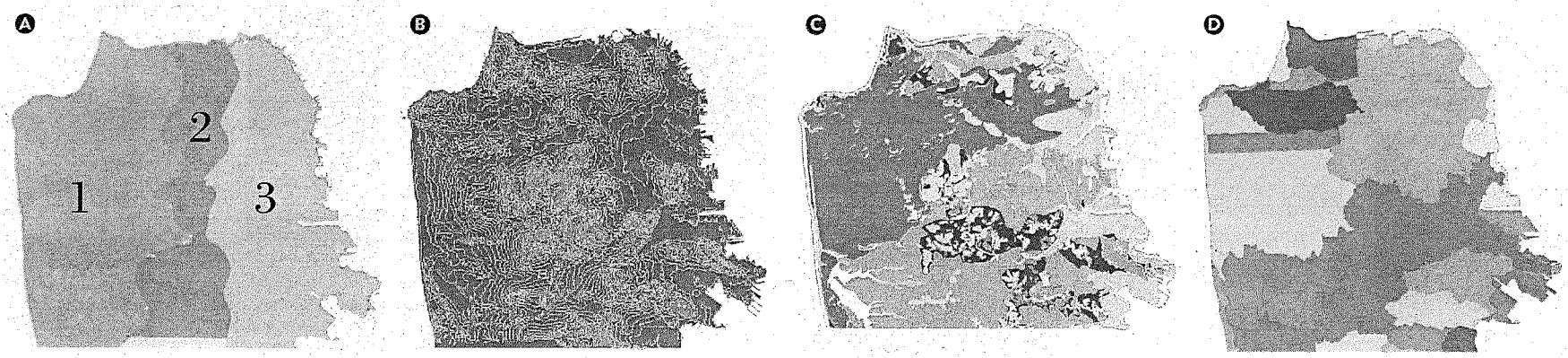
Trees for San Francisco: A Guide to Street-Tree Planting and Care
Friends of the Urban Forest (1995).

The Trees of San Francisco: A Plan for the Management of the City's Urban Forest
City & County of San Francisco, Department of Public Works (1991).

The Trees of San Francisco
Sullivan, Mike (2004).

Environmental Conditions

San Francisco exists in a unique place on Earth. Surrounded by the Pacific Ocean and San Francisco Bay and located at the tip of an environmentally diverse peninsula, the city is a phenomenal mosaic of topography, weather, geology, and ecology. San Francisco's unique environmental conditions exert a strong influence on the growth of trees and vegetation throughout the city.



A MICROCLIMATES

The city's topography and proximity to the Bay and Ocean create distinct microclimates marked by differences in temperature, sun and fog. These microclimates can vary dramatically between neighborhoods, influencing the type and species of trees and vegetation able to grow. There are many microclimates in San Francisco, but they generally fall into three major zones: 1.) Coastal Zone/Fog Belt, 2.) Transitional Zone and 3.) Bay Zone/Sun Belt.

B TOPOGRAPHY

San Francisco's terrain is characterized by hills and valleys. Many streets ascend steep topography. The hills slow wind and fog approaching from the ocean. They can also channel wind creating patterns of sun and shade that affect tree growth. Many of the city's largest hills were planted with tall trees like Eucalyptus and Monterey Cypress to serve as wind breaks.

C SOILS

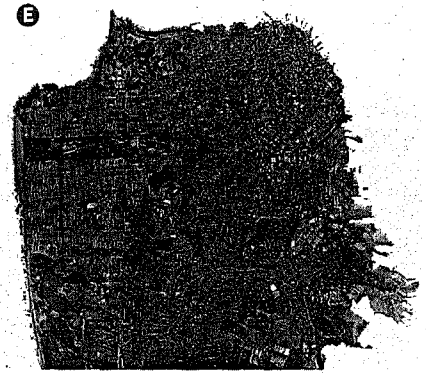
Soil conditions vary throughout San Francisco with sandy soils found closer to the ocean and artificial fill and mud found near the city's Bayside. Typical urban soil conditions closer to the surface require amendments to supply nutrients for tree and plant growth. Rocky areas on or near hills have limited soil volume for tree growth. Tree species selection and size should be compatible with soils to ensure health and adequate structural support.

D WATERSHEDS

Urban watersheds comprise the system of water flows from rainfall, natural water bodies and storm and sewer infrastructure, both on the surface and below-ground. San Francisco has eight distinct watersheds, three on the Westside where stormwater flows towards the Pacific Ocean, and five on the Bayside where stormwater flows towards San Francisco Bay. Trees and vegetation support watershed health by helping manage stormwater naturally and recharging groundwater. Plantings should be carefully considered for potential conflicts with underground collection and conveyance systems.

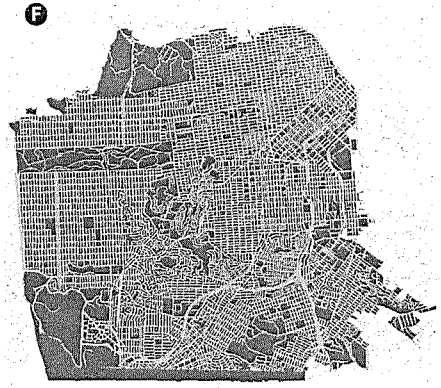
Urban Conditions

San Francisco's largely built-out environment exerts a significant influence on the urban forest. The city's density limits available planting spaces but also creates opportunities for involvement by a wide range of residents and community groups.



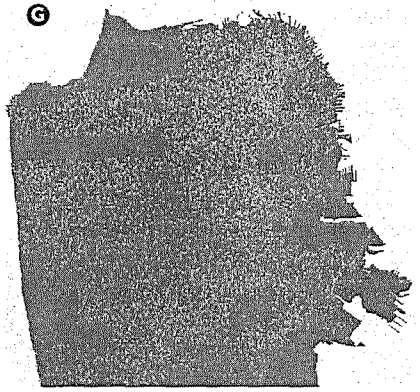
E BUILT ENVIRONMENT

The city's urban forest grows within a dense built environment. Large amounts of impervious surfaces from buildings and roads limit available planting spaces. Most buildings are constructed up to the sidewalk and directly adjacent to each other with no front setbacks or sideyards. The pattern of rear yard open space throughout residential areas provides increased potential for trees, gardens and informal habitat corridors. Removal of excess concrete and the greening of structures with living roofs and walls should be explored to expand the forest into the built environment.



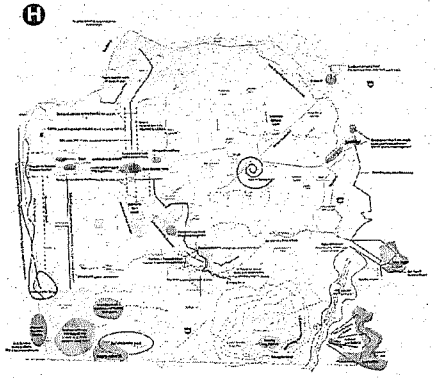
F STREETS & TRANSPORTATION

Many of the city's trees can be found planted along the grid of streets and sidewalks throughout San Francisco. Trees planted here create green corridors throughout the city, help calm traffic and buffer pedestrians from vehicles. Regular maintenance is important to keep clearances over streets and sidewalks for vehicles and people and to ensure quick removal of hazardous or storm-felled trees.



G HUMAN POPULATION & CULTURE

People are an essential component of the urban forest. Almost all of the trees found in San Francisco are the result of plantings and maintenance carried out by individuals or groups. Urban trees and landscaping connect people to nature and can hold special significance for cultural groups. Events like Japantown's annual Cherry Blossom Festival illustrate the strong ties trees can have to the city's diverse cultural and community identities.



H URBAN WILDLIFE

See Next Page...

Habitat & Biodiversity

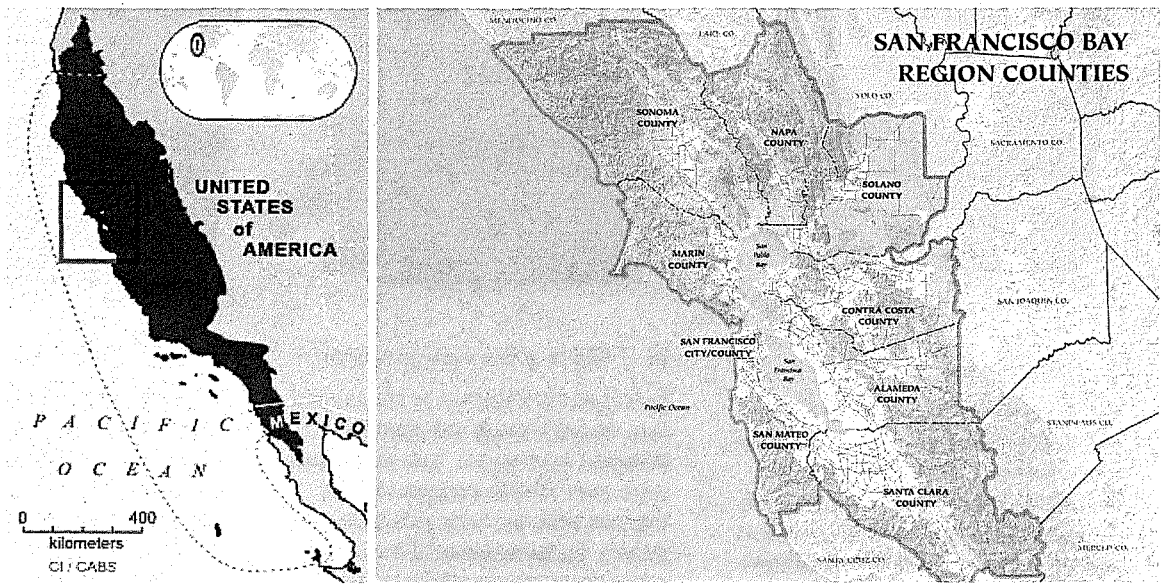
San Francisco is home to diverse ecological communities of native habitats, plants and animals - some of which can be found nowhere else on earth. The term *biodiversity* is short for "biological diversity." It refers to the variety of interconnected species – flora, fauna, fungi and bacteria – that have co-evolved into the local ecological communities, ecosystems and processes of a particular place on Earth. In cities like San Francisco this also includes species imported from other places that contribute positively to the vibrant and thriving dynamics of the city's remaining indigenous ecology.

San Francisco's trees and vegetation support local wildlife by providing food, nectar, shelter and nesting areas for a variety of birds, insects and animals. The Western Tiger Swallowtail butterfly has found an unlikely habitat among Market Street's London Plane trees. The iconic Canary Island Date Palms used to mark prominent streets have contributed to the northward range extension of Hooded Orioles and are a favorite feeding place for the famous Wild Parrots. Several species of raptors nest in Eucalyptus trees which also have served as roosts for Monarch Butterflies. One of the best trees for promoting wildlife diversity is the native Coast Live Oak, which serves a variety of species of insects as well as resident and migratory birds.

The Plan strives to increase the carrying capacity of the city's urban forest to support more wildlife and enhance local biodiversity. Strategies include diversifying plantings on streets with wildlife-serving native as well as non-native trees, shrubs, grasses and perennials. San Francisco still harbors approximately 500 native plant species creating a vast palette of wildlife enhancement opportunities. For specific recommendations see the GROW chapter.

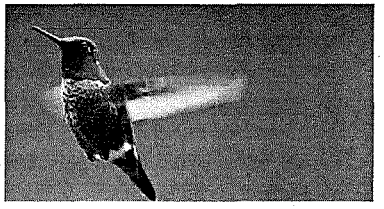
THE CALIFORNIA FLORISTIC PROVINCE

California including the San Francisco Bay Area is located in one of 34 globally recognized biodiversity hotspots. Combined, these areas contain about half of the plant and animal species on earth yet cover only 2.3% of the earth's surface. These areas are defined by their exceptional number of animal and plant species including high number of endemic (found nowhere else) species.
Source: Conservation International



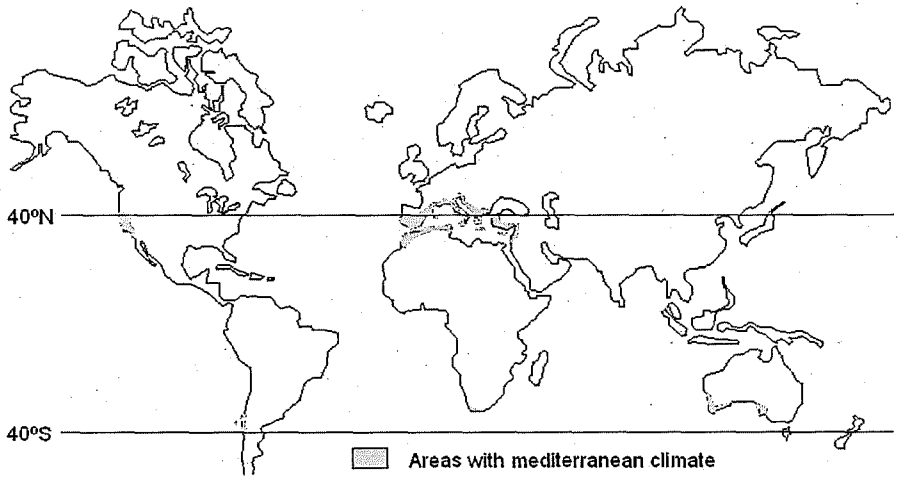

Yellow-faced Bumble Bee
Bombos vosnesenskii


Clarkia Rubicunda


Anna's Hummingbird

MEDITERRANEAN CLIMATE

San Francisco's proximity to the ocean and moderate climate spare the city from extremes of hot and cold. Typical of the California coast, our Mediterranean climate is characterized by dry summers and wet winners. Similar climatic conditions are found in parts of Australia, South America, Africa, and the Mediterranean. This allows a wide variety of animals, trees and other plants from around the globe able to grow and thrive here.

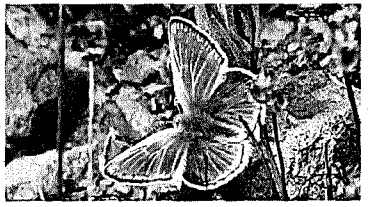


THE PACIFIC FLYWAY

The Pacific Flyway is a major north-south route of travel for migratory birds throughout North and South America, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, to follow food sources, find breeding grounds, or reach overwintering sites. The San Francisco Bay consists of many protected estuaries and mountain open space preserves that provide suitable winter quarters for birds as they fly south. San Francisco's trees, parks and water bodies provide important habitat for these migratory birds.


Wild Parrot


Green Hairstreak Butterfly


Mission Blue Butterfly

Tree Canopy in San Francisco

A Green Gap?
Tree canopy distribution varies greatly across San Francisco making some neighborhoods much greener than others. This uneven distribution of trees may be attributed to a number of factors. Historic planting patterns have emphasized certain neighborhoods over others. Socio-economic conditions, cultural preferences and the ratio of renters to homeowners can influence the number of trees in a neighborhood. Unique climatic conditions (microclimates) can make tree survival more challenging in some parts of the city. In addition, the thousands of trees found in parks and open spaces can positively influence neighborhood canopy estimates.

The Plan strives to achieve a more equitable distribution of greening throughout the city by encouraging planting in areas lacking tree cover and supporting alternate greening methodologies (i.e. sidewalk gardens and green walls/roofs) where trees may not be appropriate.

DIGITIZED TREE CANOPY MAP

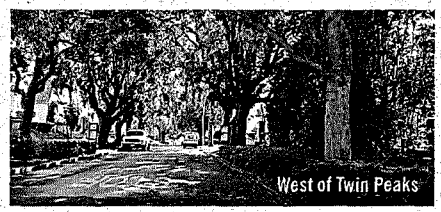
This map features a digitized display of San Francisco's tree canopy as identified using aerial photos and tree-related data. It indicates areas of high canopy cover such as Golden Gate Park and streets like Sunset Boulevard. Locations with little or few trees are appear as mostly grey.

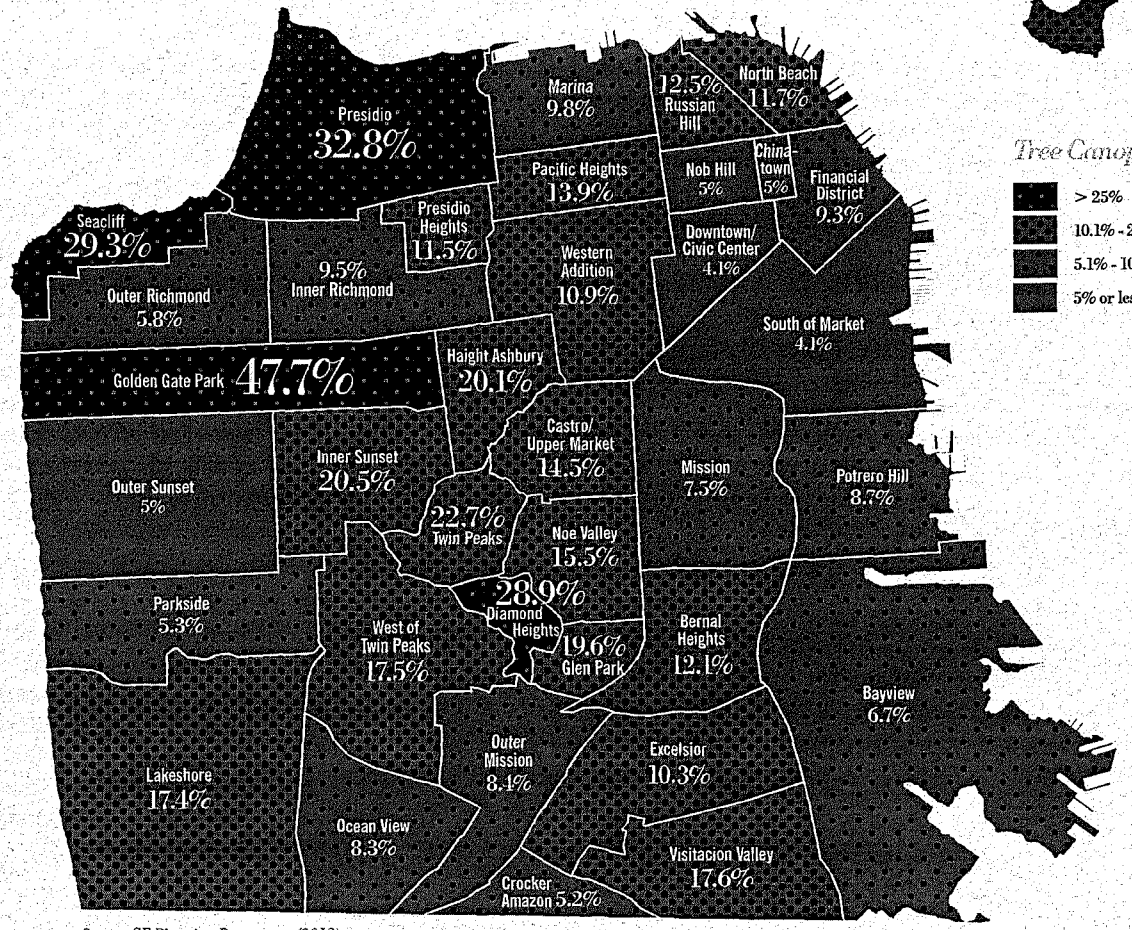
Source: SF Planning Department (2012)

TREE CANOPY COVERAGE BY NEIGHBORHOOD

San Francisco's canopy coverage is among the lowest of any large city in the United States. The city's canopy cover varies widely between neighborhoods with some traditionally underrepresented communities having less greenery. The table and map below display the distribution of trees across San Francisco.[1]

1 Canopy analysis relies on technology and photos that may be affected by urban conditions such as the presence of buildings blocking some trees.





Source: SF Planning Department (2012)

Urban Forest Management & Policy

WHO IS RESPONSIBLE?

San Francisco's approximately 700,000 trees are owned and managed by a diverse mix of public and private stakeholders. These include City, County, State and Federal agencies as well as the private sector. The major players are described in detail below.

DEPARTMENT OF PUBLIC WORKS (DPW)

The San Francisco Department of Public Works has jurisdiction over all trees and greening in the public right of way. DPW is the primary agency responsible for carrying out and enforcing the City's Urban Forestry Ordinance (Article 16 of the Public Works Code). The ordinance describes DPW's jurisdiction and oversight responsibilities including: tree planting and care requirements, removal procedures, and the landmark and significant tree programs. DPW prunes street trees, responds to tree emergencies, and performs tree inspections and tree-related sidewalk repair.

DPW also regulates the planting and removal of street trees throughout the city by issuing permits for such activities. Although DPW has the ultimate authority over all trees within the public right-of-way, the agency is responsible for maintaining only about 40 percent (or 40,000) of these trees. Responsibility for the remaining 60 percent falls to adjacent private property owners.

RECREATION & PARK DEPARTMENT (RPD)

The Recreation and Park Department (RPD) is responsible for 131,000 trees on 4,196 acres of parkland. These include trees in city parks, identified Natural Areas and public golf courses. Major sites include Golden Gate Park and Stern Grove.

OTHER CITY AGENCIES

A number of other City agencies play an important role in caring for the city's trees. These include the SF Housing Authority, SF Public Utilities Commission (SFPUC), SF Municipal Transportation Agency (SFMTA), SF International Airport (SFO), Port of San Francisco and Office of Community Investment and Infrastructure. These agencies are primarily responsible for management of trees on properties they manage such as housing sites, along transit lines, and at airport facilities.

PRIVATE PROPERTY OWNERS

Property owners are responsible for the care of approximately 65,000 street trees fronting their property (on identified streets) as well as trees and landscaping in backyards and front setbacks.

FRIENDS OF THE URBAN FOREST (FUF)

The majority of street tree planting in San Francisco is carried out by the non-profit Friends of the Urban Forest. FUF and its volunteers have planted more than 48,000 new and replacement trees in San Francisco. FUF's programs are dedicated to growing the city's urban forest while bringing neighbors together and empowering residents to green their neighborhoods. The organization offers a variety of programs include planting, young tree care, sidewalk landscaping, community engagement, training and education. In addition, FUF advocates for city policy surrounding urban forestry and greening issues.

STATE AGENCIES

San Francisco is home to various State-owned lands with tree and landscape management needs. These include Candlestick Point State Recreation Area. In addition, educational institutions manage the trees on their landholdings including the University of California, San Francisco's Mount Sutro Open Space Reserve, the grounds of the San Francisco Unified School District, and San Francisco State University's campuses.

FEDERAL AGENCIES

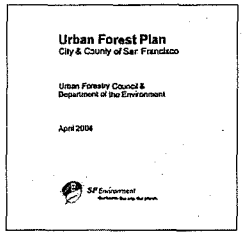
A significant portion of the city's urban forest is cared for and managed by federal agencies including the Golden Gate National Recreation Area (Land's End, Fort Funston and Ocean Beach) and the Presidio Trust. The large number of trees, particularly in the Presidio, represent a significant piece of San Francisco's urban forest.

SAN FRANCISCO URBAN FORESTRY COUNCIL

The Urban Forestry Council is an advisory body for the Mayor, Board of Supervisors, and City departments on urban forestry issues. The Urban Forestry Council was established for the purpose of guiding the stewardship of San Francisco's trees by promoting a healthy and sustainable urban forest that benefits all San Franciscans, while ensuring public health and safety, and maximizing the full range of tree benefits into the future.

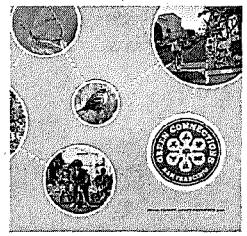
Related Plans & Documents

The Urban Forest Plan builds on several City focused on improving the city's ecological function, street design and mobility. These documents provide a foundation and starting point for the Urban Forest Plan. For a comprehensive list of Urban Forest related City policies, see **Appendix: Existing San Francisco Urban Forest & Greening Policies, Plans and Codes.**



URBAN FOREST PLAN

The 2006 Urban Forest Plan provided a framework and goals of maintaining, conserving, and expanding upon the existing urban forest in San Francisco. *Adopted 2006.*

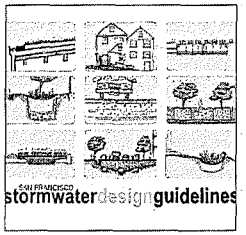


GREEN CONNECTIONS

The Green Connections Project identified a network of streets and paths that improve pedestrian and bicycle access to parks and open spaces. These 'green connectors' are prioritized for tree and landscape planting that support habitat creation and recreational opportunities. *Completed 2013.*

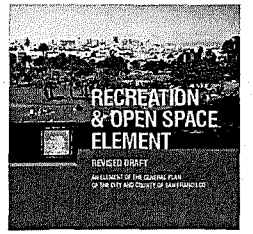
BETTER STREETS PLAN

A set of standards, guidelines, and implementation strategies to govern how the City designs, builds, and maintains its pedestrian environment. The plan outlines specific design guidelines for a variety of streets types. *Adopted 2010.*



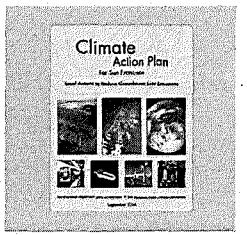
STORMWATER DESIGN GUIDELINES

The Stormwater Design Guidelines outline ways to incorporate on-site stormwater management using green infrastructure strategies that include trees and landscaping. *Adopted 2010.*



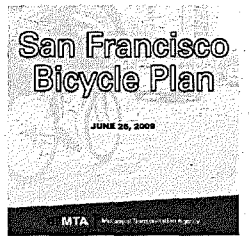
SAN FRANCISCO GENERAL PLAN

The General Plan's Urban Design and Recreation & Open Space Elements provide policy frameworks that support urban forestry and landscaping on the City's streets and in open spaces.



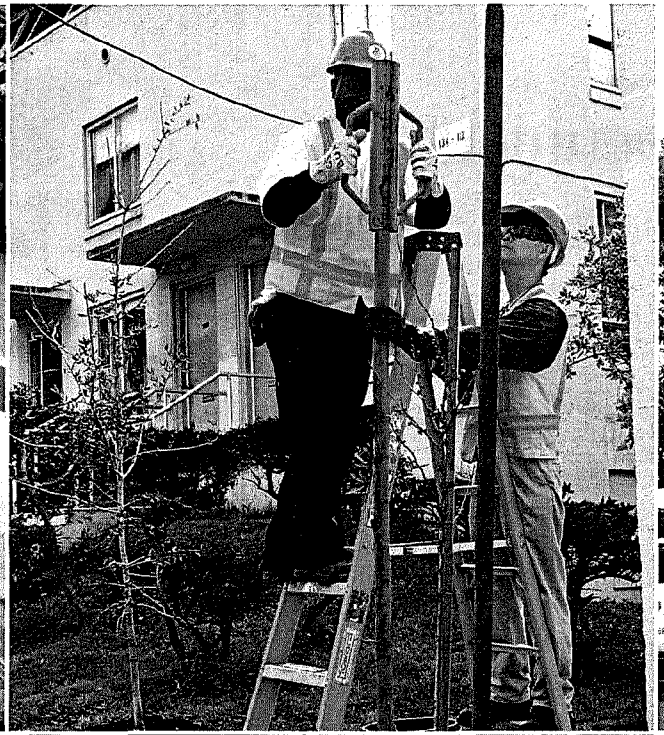
CLIMATE ACTION PLAN

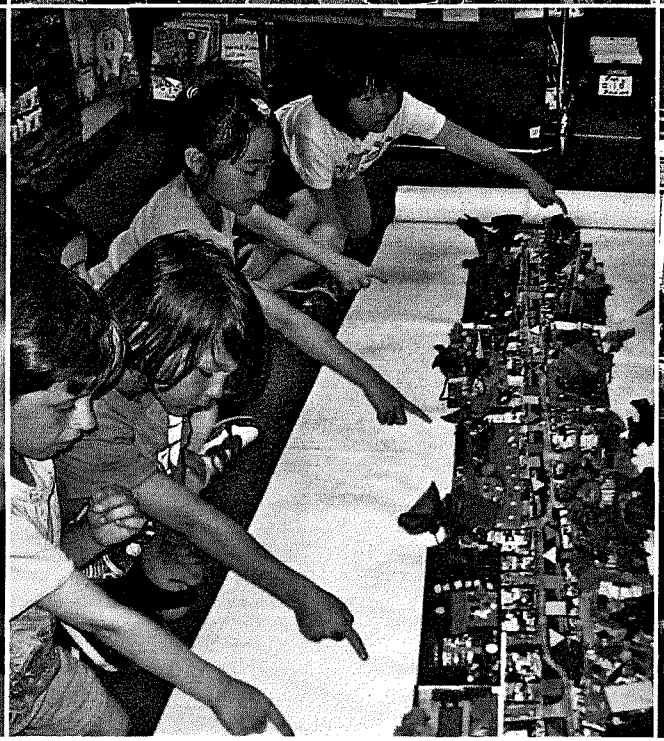
The Plan includes an inventory of San Francisco's greenhouse gases (GHGs) and set goals for GHG reduction for the city to meet. *Adopted 2004. Update expected in 2014.*

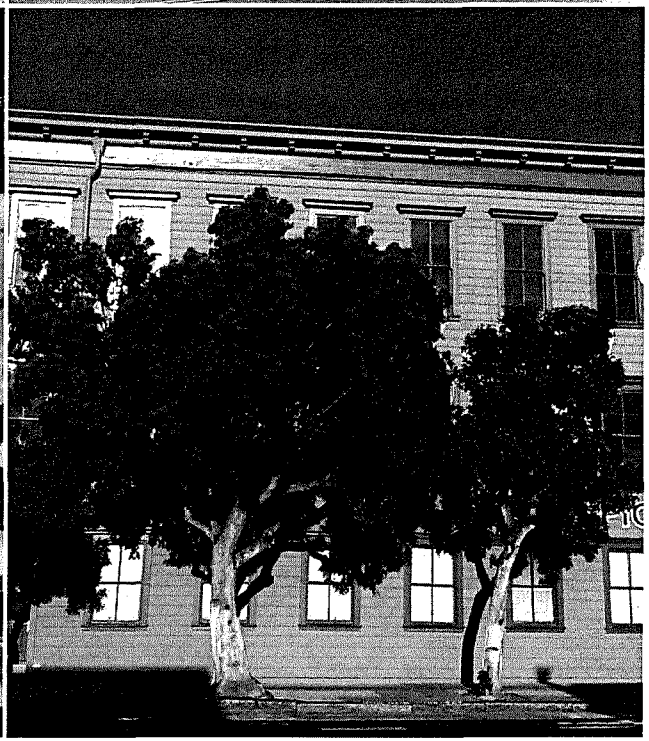


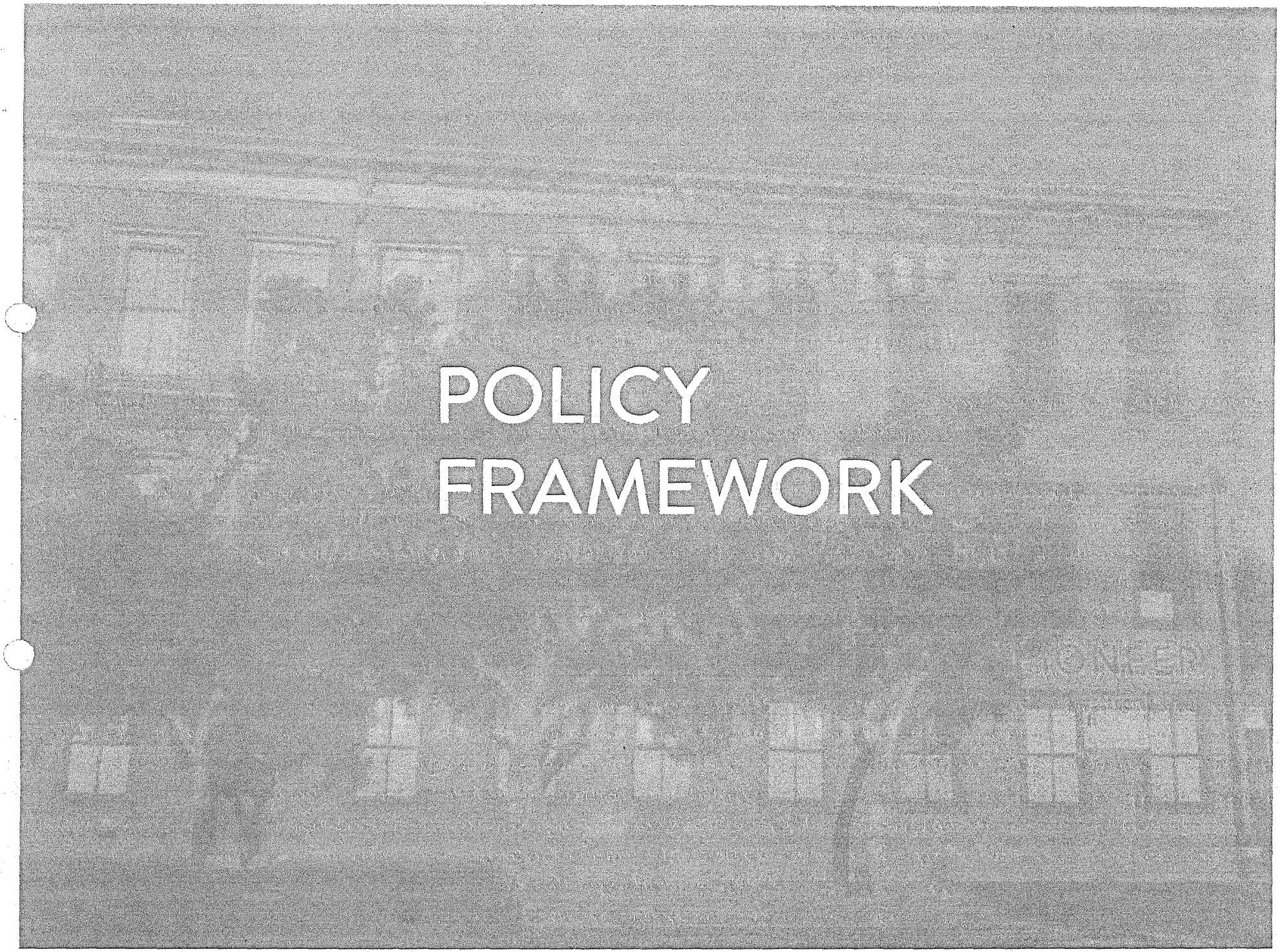
PEDESTRIAN & BICYCLE PLANS

The City's Bicycle Plan and WalkFirst strategy both identify priority bicycling and walking streets. Street trees have been proven to have traffic calming benefits and should be employed as part of strategies to create more bikable and walkable streets.








POLICY
FRAMEWORK

The Plan presents the following vision for San Francisco's urban forest:

URBAN FOREST VISION

Our urban forest

will be **a healthy, well-maintained** *and* **sustainably financed**

collection of

TREES & GREENERY

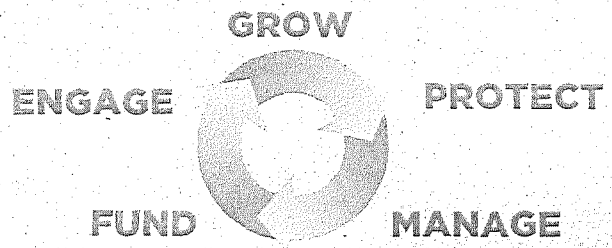
that improves the city's **ecological function**

& BRINGS ENORMOUS ***benefits*** TO THE PEOPLE OF

San Francisco.

PLAN GOALS

The Plan is based on the following five goals for the urban forest. Each goal is accompanied by a series of strategies and actions required to achieve it.



GOAL 1

GROW THE URBAN FOREST THROUGH NEW PLANTING TO MAXIMIZE THE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF TREES AND URBAN GREENING.

STRATEGIES

- PURSUE AN EXPANDED AND EQUITABLE DISTRIBUTION OF TREES AND GREENING THROUGHOUT THE CITY.
- MAXIMIZE BENEFITS OF THE URBAN FOREST – SOCIAL, ENVIRONMENTAL, ECONOMIC.
- PROMOTE A RANGE OF GREENING TOOLS IN THE PUBLIC RIGHT-OF-WAY.

GOAL 2

PROTECT THE URBAN FOREST FROM THREATS AND LOSS BY PRESERVING THE CITY'S EXISTING STREET TREES.

STRATEGIES

- STABILIZE THE URBAN FOREST BY ACHIEVING A NET ZERO LOSS OF TREES.
- REDUCE THE IMPACTS OF DEVELOPMENT ON THE URBAN FOREST.
- DEVELOP STRATEGIES TO COMBAT DISEASES AND PESTS.
- PROMOTE PROPER CARE AND MAINTENANCE OF STREET TREES.

GOAL 3

MANAGE THE URBAN FOREST THROUGH COORDINATED PLANNING, DESIGN AND MAINTENANCE TO ENSURE ITS LONG-TERM HEALTH AND SUSTAINABILITY.

STRATEGIES

- CREATE A COHESIVE MANAGEMENT PROGRAM FOR THE CITY'S STREET TREES.
- EMPLOY BEST MANAGEMENT PRACTICES IN STREET TREE MAINTENANCE TO CREATE A MORE COST-EFFICIENT AND EFFECTIVE PROGRAM.
- MANAGE AND CARE FOR STREET TREES THROUGHOUT THEIR ENTIRE LIFE-CYCLE.
- PLAN FOR THE LONG-TERM HEALTH AND BEAUTY OF THE URBAN FOREST.
- COLLECT AND USE DATA TO MANAGE AND MONITOR THE URBAN FOREST.
- IMPROVE COORDINATION AND COMMUNICATION BETWEEN AGENCIES, POLICY MAKERS AND THE COMMUNITY.

GOAL 4

FUND THE URBAN FOREST BY ESTABLISHING A LONG-TERM FUNDING STRATEGY FOR THE CITY'S TREES.

STRATEGIES

- SECURE FUNDING FOR TREE PLANTING, ESTABLISHMENT AND MAINTENANCE.
- SEEK PRIVATE FUNDING AND OTHER SOURCES FOR THE URBAN FOREST.
- CONSIDER NEW AND INNOVATIVE FUNDING SOURCES.

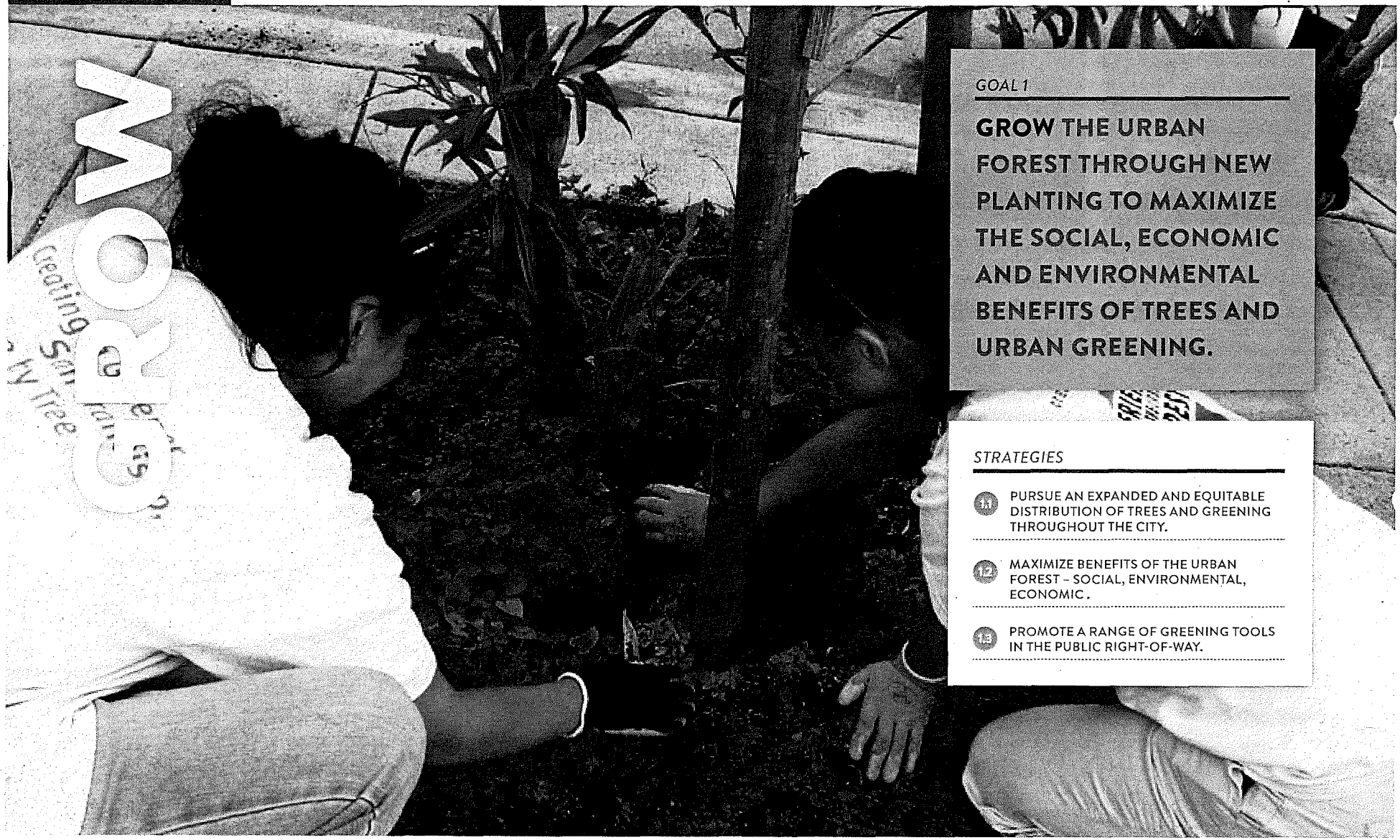
GOAL 5

ENGAGE RESIDENTS, PUBLIC AGENCIES, COMMUNITY GROUPS AND THE PRIVATE SECTOR IN CARING FOR THE URBAN FOREST AND DEEPENING THEIR CONNECTION TO NATURE.

STRATEGIES

- PROMOTE URBAN FOREST EDUCATION AND EXPERIENTIAL OPPORTUNITIES.
- ENCOURAGE PARTICIPATION IN THE PLANTING, ESTABLISHMENT AND MAINTENANCE OF TREES.
- RECOGNIZE TREES WITH SPECIAL CONTRIBUTIONS (ECOLOGICAL, HISTORICAL, SOCIAL OR AESTHETIC) TO SAN FRANCISCO'S LANDSCAPE.

URBAN FOREST GOALS



GOAL 1

GROW THE URBAN FOREST THROUGH NEW PLANTING TO MAXIMIZE THE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF TREES AND URBAN GREENING.

STRATEGIES

- 1.1 PURSUE AN EXPANDED AND EQUITABLE DISTRIBUTION OF TREES AND GREENING THROUGHOUT THE CITY.
- 1.2 MAXIMIZE BENEFITS OF THE URBAN FOREST – SOCIAL, ENVIRONMENTAL, ECONOMIC.
- 1.3 PROMOTE A RANGE OF GREENING TOOLS IN THE PUBLIC RIGHT-OF-WAY.

STRATEGY 1.1

Pursue an expanded and equitable distribution of trees and greening throughout the City.

1.1.1 **Continue to enforce existing requirements for street tree planting (Planning Code & Public Works Code).**

- ***Planning Code:* Section 138.1 requires street trees to be planted as part of new development projects.** The Code requires street trees for every 20' of building frontage for new construction projects, significant building expansions, paving of front setbacks or addition of a dwelling unit, garage or parking space. When trees are required but not permitted due to underground utilities or other conditions, in-lieu fees will be collected to fund tree planting in other areas.

- **Section 428 requires payment of in-lieu fees for tree planting to DPW's Adopt-A-Tree Fund in cases where planting requirements of Sec. 138.1 are waived by the Zoning Administrator.**

- ***Public Works Code: Article 16 (Urban Forestry Ordinance) outlines City requirements related to street tree procedures and care.*** The Code describes DPW's jurisdiction and oversight responsibilities of trees in the public right-of-way and other trees protected under DPW's jurisdiction, including: tree planting requirements and procedures, tree care requirements and responsibilities, tree removal procedures, and oversight of the landmark and significant tree programs.

1.1.2 **Pursue an expanded City sponsored street tree planting program.** As recommended in the MANAGE and FUND chapters, increased resources should be made available that would expand the existing limited capacity of the Department of Public Works to engage in larger scale street tree planting.

1.1.3 **Support Friends of Urban Forest's tree planting, stewardship and sidewalk garden programs.** Friends of the Urban Forest (FUF) is largely responsible for the planting and care of many of San Francisco's street trees. This important organization has excelled at involving communities in greening their neighborhoods. FUF's strong programs should continue to be supported by the City.

1.1.4 **Increase the number of street trees by half (50,000 new trees).** The Plan proposes increasing the number of street trees by half (50%) over the next 20 years. Planting an additional 50,000 new street trees (2,500 trees/year plus replacement trees) will grow our street tree population from 105,00 to 155,000 trees. Currently, an estimated 1,500 trees are planted each year by Friends of the Urban Forest (1,200 trees) and the Department of Public Works (375 trees). However, these include a portion of replacement plantings for trees removed or that have died and so do not represent a significant increase in forest canopy. Additional street trees are planted by property owners and through development requirements. A concentrated effort to add new street trees will help stem the decline of the urban forest while bringing highly visible greening benefits to the public and reducing inequities in tree cover between neighborhoods. Drought-tolerant tree species should continue to be prioritized. The proposed growth in street tree canopy requires the establishment of a sustainable maintenance funding program to ensure health and care of newly planted trees (see FUND chapter).

1.1.5 **Develop a Citywide Tree Canopy Coverage Goal for San Francisco.** San Francisco's tree canopy is one of the smallest of any major U.S. city (13.7%)[1]. The U.S. metropolitan canopy cover average is 33%.[2] While this Plan recommends an increase in street trees, it does not establish a citywide tree canopy coverage goal. As part of the Urban Forest Plan's Phases 2 & 3, a citywide canopy goal should be developed that addresses tree cover comprehensively on streets, parks and private properties. Creation of this goal will require community input, ecological analysis, and an inventory of allowable planting areas. The canopy goal should recognize trees may not be appropriate in all locations and that other forms of vegetation may be more suited to support other policy priorities such as habitat creation, neighborhood character and recreational needs.

1.1.6 **Develop a Citywide Street Tree Planting Strategy.** A cohesive strategy should be developed for the planting of new street trees in the City. The Strategy should aim to fill gaps in canopy cover, address aging tree population, and identify vacant and new

1 San Francisco Planning Department (2012). San Francisco Urban Tree Canopy Analysis.

2 U.S. Department of Agriculture Forest Service, Nowak & Dwyer. Connecting People With Ecosystems in the 21st Century: An Assessment of Our Nation's Urban Forests, Dwyer & Nowak (2000).
"American Forests, the nation's oldest nonprofit citizens' conservation organization, recommends an average 25 percent tree canopy for the dry west." (California Department of Forestry and Fire Protection, *California's Forests and Rangelands: 2010 Assessment* at p. 176).

planting spots. Core elements of a strategy should include the following:

- **Consider ecological and public health considerations related to air quality, stormwater, habitat and biodiversity when selecting and planting trees.**

- **Target planting where pedestrian and public realm improvements are prioritized such as those identified in WalkFirst.**

- **Re-stock all empty tree basins and other available planting spaces.** Available but empty tree basins and planter strips offer prime opportunities to increase tree stocking levels. These locations should be identified and targeted for tree planting. By filling these empty spaces, the benefits provided by trees can increase significantly.

- **Create new spaces for street trees, sidewalk gardens and other plantings.** Excess paving should be removed to allow installation of new tree basins and sidewalk gardens. Future streetscape projects should be designed for an increase in street trees. Excessively wide streets should be considered for the installation of plantable medians. In special cases, the conversion of streets into community maintained urban forest preserves may be possible (i.e. Cohen Alley's Tenderloin National Forest).

- **Outline a strategy for care and maintenance of newly planted trees.**

1.1.7 Continue to maintain and update List of Recommended Street Trees & Other Plantings. The City's list of Recommended Street Trees provides guidance to the public and City agencies on which trees are recommended for planting on San Francisco's streets. The list should also be expanded to include a discussion of various benefits provided by different trees. As part of the Green Connections Project, a city-wide Planting List is being completed that will include recommendations for both street trees and other landscaping in the public right-of-way. These lists should be updated annually based on updated performance information, species evaluations and consideration of benefits. Endorsement of these lists should take place through the Urban Forestry Council.

STRATEGY 1.2

Maximize benefits of the urban forest – social, economic and environmental.

1.2.1 Consider selecting and planting trees based on their ability to provide specific benefits. While urban trees have a number of benefits, the largest benefits to San Francisco should be captured and expanded upon. Consider performance-based tree selection and planting to target specific tree benefits in areas where they are needed most such as the following:

AIR QUALITY

1.2.2 Explore opportunities to use trees to mitigate air pollution. Evaluate potential for increased plantings near pollution sources, high-volume traffic corridors and along freeways. Select trees that are low emitters of volatile organic compounds (VOCs). Where space allows, medium to large-stature evergreen trees with large canopies and leaf surfaces should be selected.

STORMWATER

1.2.3 Help manage stormwater through increased use of trees and landscaping. Increasingly, trees and landscaping are being utilized as effective tools to manage stormwater. An important addition to traditional "grey infrastructure" (pipes and sewers), landscape-based solutions or "green infrastructure" uses plants and soils to manage the City's stormwater sustainably and cost effectively. Urban trees and landscaping capture rainfall on leaf surfaces and roots allowing for evaporation, storage and infiltration of stormwater into soil. A tree's ability to reduce stormwater runoff is largely related to the size of the tree and its canopy. Rainfall interception by trees helps reduce the speed and amount of stormwater entering collection and treatment facilities during large storm events. Trees and landscaping can also play a role in decreasing combined sewer discharges into the Bay and ocean.

Certain tree species perform better at reducing stormwater runoff than others. Estimates for the water a typ-

ical street tree can intercept range from 760 - 4,000 gallons/tree per year.[3] Large and medium broadleaf evergreen trees, large conifers and some deciduous trees with large leaf surface areas and a mature canopy typically demonstrate greater stormwater benefits. These trees should be considered for planting where space allows to maximize their benefits. Some large stature trees will not be appropriate as street trees due to their size and space requirements, but in those cases sidewalk gardens and medium stature trees can be utilized to maximize stormwater benefits. Recommendations for enhancing stormwater management through the urban forest are described below.

- Improve design of new tree wells to allow better infiltration of stormwater.
- Create sidewalk gardens and install sidewalk landscaping.
- Remove impermeable surfaces where possible.
- Conduct a study to determine which street tree species have the greatest runoff reduction capacity for San Francisco.

3 Stormwater, Trees, and the Urban Environment: A Comparative Analysis of Conventional Street Tree Pits and Stormwater Tree Pits for Stormwater Management in Ultra Urban Environments. Charles River Watershed Association (2009).

PUBLIC HEALTH

12.4 Target trees to achieve public health benefits, especially for children and seniors. Some strategies to improve public health through tree planting are described below.

Air quality and respiratory health can be improved by tree planting in:

- High-volume traffic corridors and freeways
- Areas with increased asthma rates

Trees have pedestrian safety and traffic calming effects by buffering of pedestrians from vehicles along:

- Higher-speed arterial streets that are also priority transit or walking streets

Mental health and physical activity are supported by trees in:

- Areas with limited access to parks and green space
- Areas with lower than average tree canopy

Shading and temperature control can be provided by trees in:

- Areas with higher risk of heat vulnerability

CARBON SEQUESTRATION & CLIMATE CHANGE

12.5 Maximize carbon storage potential of urban forest to combat climate change. Almost half of San Francisco's greenhouse gas emissions come from vehicles. Trees along city streets can provide a direct benefit to reducing San Francisco's climate impacts. As trees grow, they store carbon in woody tissues and soil. Healthy mature forests can sequester carbon for long periods acting as carbon "sinks." A variety of strategies should be considered to support the urban forest's ability to store greenhouse gases:

- Quantify carbon storage potential of City trees by species.
- Re-use urban wood from dead or removed trees to retain carbon storage capacity of woody biomass.
- Research Innovative tree farming/harvesting techniques that may increase carbon storage potential.
- Plant trees with high uptake of carbon including fast-growing species and those with significant biomass.

12.6 Consider adaptation to climate change in identifying a local tree species palette. As the climate changes, San Francisco may experience more extreme weather fluctuations that may result in increased fog and rain as well as intense periods of

dryness. These conditions could be exacerbated by local microclimates. Ongoing climate science research and local weather projections should be considered for their impact on the urban forest. Cities like Chicago have identified planting palettes as part of climate change adaptation. Test plantings of various tree species may be appropriate to determine suitability for San Francisco.

BIODIVERSITY & HABITAT

1.2.7 Use the urban forest to support local wildlife and provide habitat. Opportunities exist to incorporate trees and plantings on streets that provide higher ecosystem value and support wildlife. While many native trees provide above average benefits to local wildlife, they often do not make suitable street trees because of large or fragile structures and space requirements. Specific strategies include the following:

- Utilize plants and trees that promote key species habitat along the Green Connections network of key bicycle and walking streets linking open spaces.
- Consider planting streets buffering parks and Natural Areas with habitat supportive plantings where appropriate.
- Seek opportunities to create large planting strips on streets with wider sidewalks to mimic more natural landscape systems.
- Explore opportunities to integrate some local, regional and state native trees in medians or other larger planting areas where space allows.
- Removal and maintenance of street trees should comply with the Migratory Bird Treaty Act.

URBAN AGRICULTURE

1.2.8 Promote urban agriculture through the urban forest where possible. The Plan recognizes the importance of urban agriculture in promoting production of local food and fostering community cohesion. Fruit trees are generally not permitted as street trees due to safety, liability and nuisance concerns related to dropping fruit. However, fruit trees should be encouraged in strategic locations on public and private lands where fruiting trees may be allowed. Some City programs support the planting of fruit trees and the collection of fruit from neighborhood trees for distribution.

- **Identify locations for fruit trees and urban orchards.**
- **Support SF Environment's Urban Orchards Program and DPW's Urban Gleaning Program.**

LOCAL ECONOMY

1.2.9 Promote tree planting and maintenance to help create successful commercial districts and support local businesses. Trees and landscaping energize commercial districts by creating greener, more inviting streetscapes for residents, visitors and merchants. According to studies[4], tree-lined commercial streets naturally draw people to linger longer, return more often and purchase more goods at local businesses. Merchant needs for natural light and clear visibility of store signage must be recognized when maintaining existing trees and considering planting of new trees.

STRATEGY 1.3

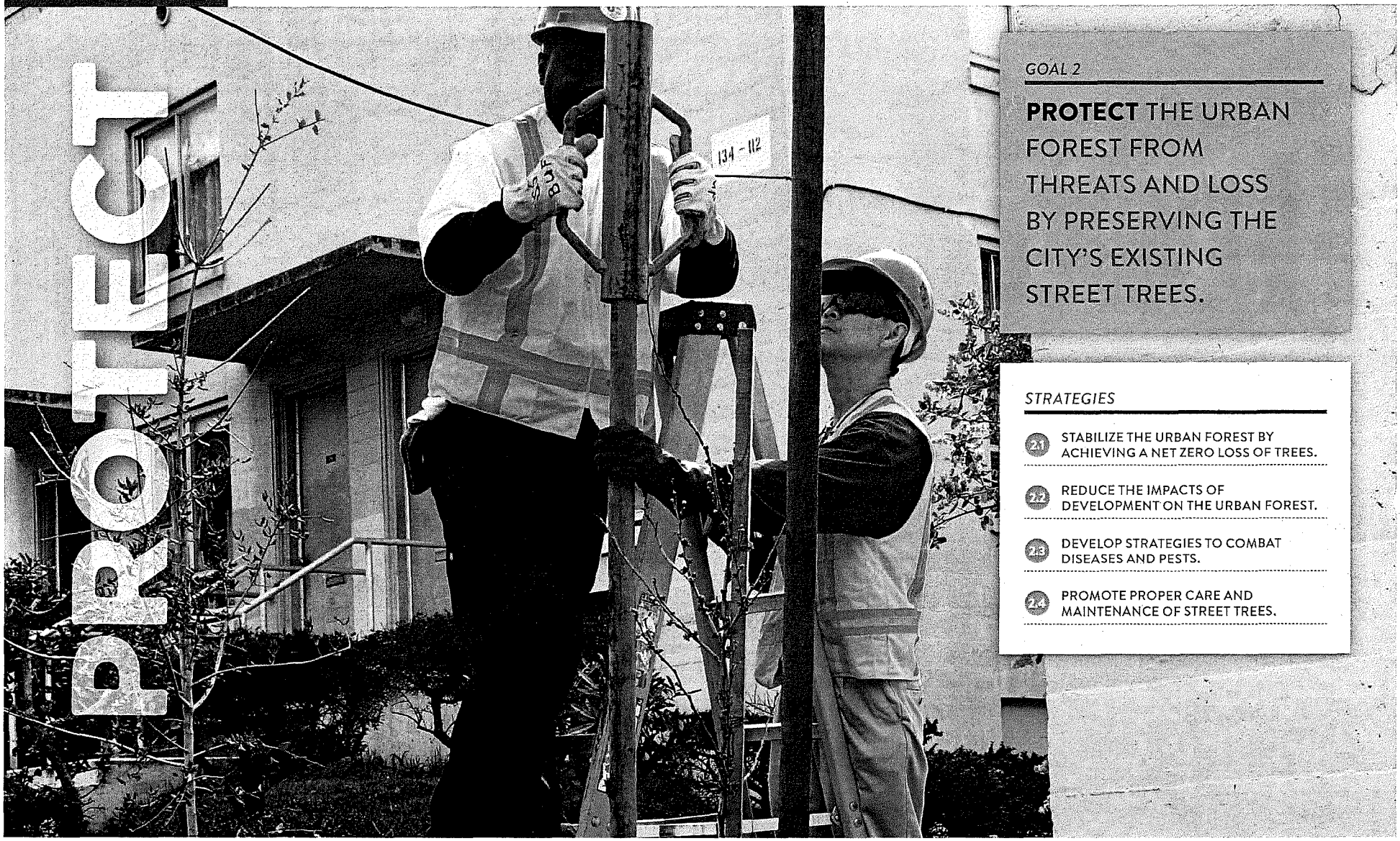
Promote a range of greening tools in the public right-of-way.

1.3.1 Utilize existing programs to expand greenery in the public right-of-way including the Sidewalk Landscaping Program (DPW), Pavement to Parks (Planning Dept), Green Infrastructure Program (SFPUC) and others. A variety of City programs exist to support the installation of landscaping and remove impervious surfaces in the public right-of-way. These provide important contributions to the City's urban forest. Funding and implementation of these programs should be expanded to maximize their reach.

4 Wolf, K.L. 1999. Nature and commerce: human ecology in business districts. In Kollin, C., ed. Building Cities of Green: Proceedings of the 1999 National Urban Forest Conference. Washington, DC: American Forests: 56-59.

GROW

URBAN FOREST GOALS



GOAL 2

PROTECT THE URBAN FOREST FROM THREATS AND LOSS BY PRESERVING THE CITY'S EXISTING STREET TREES.

STRATEGIES

- 2.1 STABILIZE THE URBAN FOREST BY ACHIEVING A NET ZERO LOSS OF TREES.
- 2.2 REDUCE THE IMPACTS OF DEVELOPMENT ON THE URBAN FOREST.
- 2.3 DEVELOP STRATEGIES TO COMBAT DISEASES AND PESTS.
- 2.4 PROMOTE PROPER CARE AND MAINTENANCE OF STREET TREES.

STRATEGY 2.1

Stabilize the urban forest by achieving a net zero loss of trees.

Aside from growing the urban forest through new planting, one of the biggest steps the City can take is to protect and stabilize our existing urban forestry assets. The urban forest has an estimated 4% annual mortality rate. This means thousands of trees die or are removed each year. Many are lost to age, disease, vandalism and illegal removal without permits. New tree planting in San Francisco has not historically kept pace with these losses resulting in a shrinking urban forest canopy. Efforts should be made to replace lost trees and expand tree planting whenever possible.

2.1.1 **Replace all dead or removed trees on streets on a 1:1 basis.** To stabilize existing tree resources, the City should plant replacement trees whenever trees are removed. If trees cannot be replaced in the same location, plantings should take place in available planting sites elsewhere on other streets.

2.1.2 **Improve enforcement of existing codes for tree protection including: Public Works Code (Article 16: Urban Forestry Ordinance) and Planning Code (Sec. 138.1 & 428). See Appendix for list of additional tree codes and policies.** The City should continue to enforce and look for ways to improve existing regulations governing tree maintenance, care and planting. The City should regularly track the enforcement of these codes and the agencies responsible for implementing them.

STRATEGY 2.2

Reduce impacts of development on the urban forest.

2.2.1 **Improve care and maintenance of street trees through a comprehensive management program.** (See MANAGE chapter).
Regular ongoing maintenance of the City's trees is one of the most important ways to protect and ensure their long-term health.

2.2.2 **Encourage developers to incorporate existing trees into building and site designs.** While street trees and significant trees (within 10' of the public right-of-way) are afforded certain protections, many trees on vacant or redevelopment sites are removed to allow for new development. Consideration should be given during review of building plans to the existing trees on the site, especially "significant" trees (20 ft or more in height, 15 ft or greater canopy width, and/or 12 inches or greater in trunk diameter). If trees are removed efforts should be made to harvest or re-use the wood if possible.

2.2.3 **Explore regulatory devices to increase protection of trees during permitting process for garages, curb cuts and driveways.** Installation of parking facilities on public and private development often requires the removal of street trees. These include trees of significant size that provide valuable public benefits and a mature canopy. In such cases, where a tree would be impacted, design alternatives such as off-set driveways or denial of a permit may be appropriate where existing trees would be removed or new trees cannot be planted.

2.2.4 **Require contractors to carry Tree Protection Bonds during construction projects.** Construction activities frequently result in accidental damage or loss of trees - including street trees. Development projects with the potential to disturb existing trees should be required to carry Tree Protection Bonds as insurance. Such bonds would allow recourse in the event that significant damage to trees occurs during the development process through fines, tree replacement or other measures.

2.2.5 **Improve process for approving Tree Protection Plans for construction projects.** Currently Tree Protection Plans are collected by the Planning Department. Review of these plans should take place with appropriate urban forestry staff. The inspection and enforcement of plans should be carried out. These plans include important provisions to protect trees such as protective barriers, construction exclusion zones, and the restriction of material and equipment storage within tree drip zones.

2.2.6 **Fully integrate DPW into the Building Permit and Project Tracking System (PPTS).** DPW should be fully integrated into the development review and building permit process. The inclusion of DPW into the Permit and Project Tracking System (PPTS) used by the Planning Department and Department of Building Inspection (DBI) will facilitate the effective review of planting issues (e.g. appropriate siting, interference from pre-existing infrastructure, pedestrian and vehicular safety) by staff at an early stage in the development review process. The current process requires more staff time than is necessary, causes undue delay to development projects, and has com-

plicated enforcement of the street tree requirements. DPW's integration in PPTS will allow for more robust implementation of tree requirements and monitoring of in-lieu fees required when street trees cannot be planted.

STRATEGY 2.3

Develop strategies to combat diseases and pests.

2.3.1 **Involve DPW early in the planning and design of projects affecting trees in the public right-of-way.** Streetscape, transportation and utility projects can have large impacts on existing street trees. To ensure an adequate level of protection and to determine what new trees and plantings may be appropriate, DPW should be an active participant in the planning and design of infrastructure changes related to the public right-of-way.

2.3.2 **Plant a variety of species to create a more resilient urban forest.** By growing and maintaining a species diverse urban forest, the City's trees will be more resistant to widespread infestation or fatality. Since pathogens and diseases typically affect a specific species, no single species or group of species should dominate the urban forest or a neighborhood. To support a more diverse urban forest, new species should be tested to determine their suitability for San Francisco.

2.3.3 **Monitor the urban forest for signs of emerging pests or disease.** The Urban Forestry Council's annual State of the Urban Forest Report should identify trends and mitigations for significant pests or diseases that may affect the urban forest.

2.3.4 **Require annual disease and pest training for City's urban forestry staff.** City urban forestry staff should undergo training on how to identify and report disease, pests and early indicators of harm when working on trees.

STRATEGY 2.4

Promote proper care and maintenance of street trees.

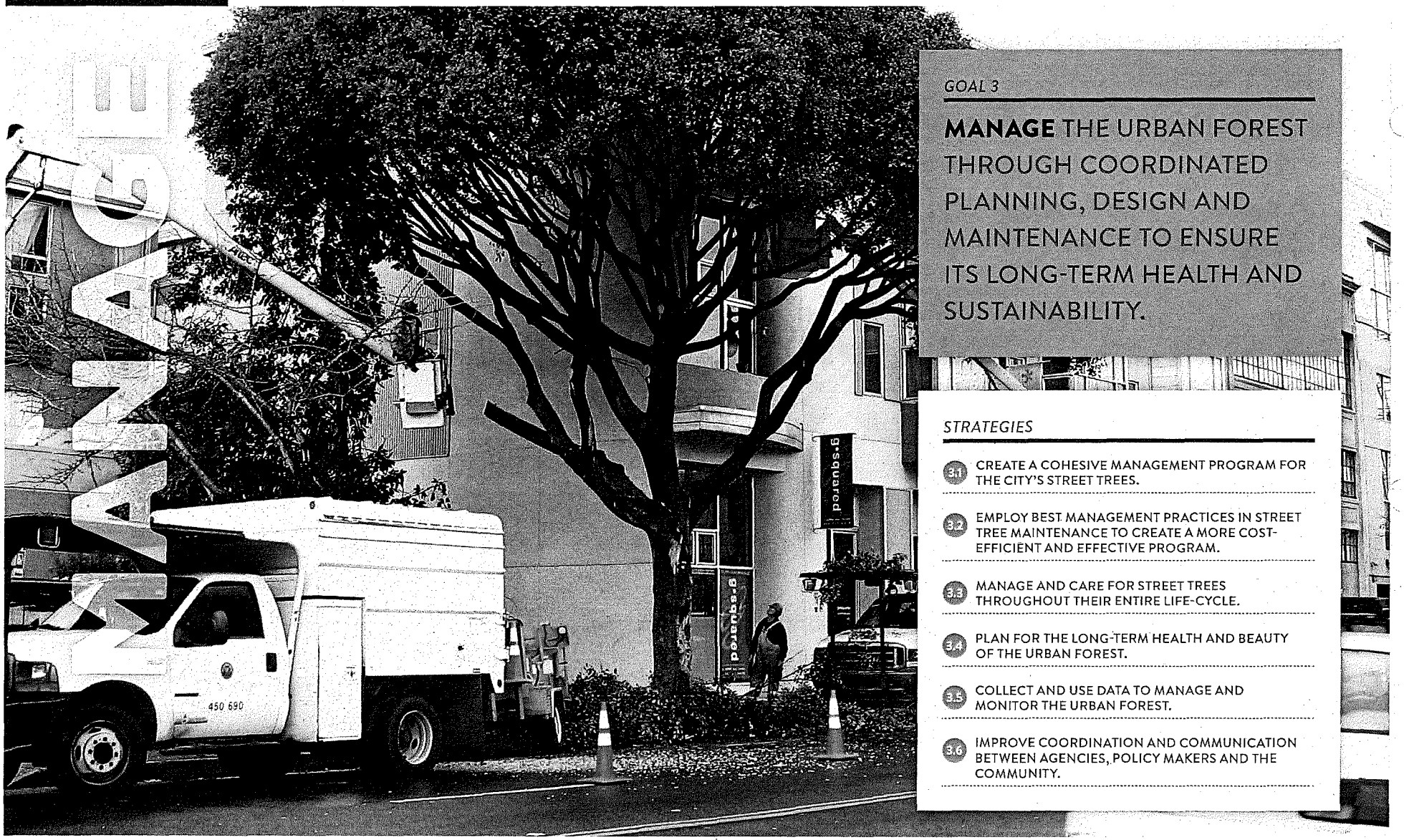
2.4.1 **Increase enforcement of the Urban Forestry Ordinance.** The City's Urban Forestry Ordinance outlines the requirements for tree care in the City. DPW should increase its ability to enforce these rules to ensure property owners and contractors properly care for street trees and significant trees. Additional staff resources would allow for more robust implementation of the ordinance and protection of the urban forest.

2.4.2 **Help facilitate audits of tree care by City agencies.** Reviews of tree care provided by City agencies and their contractors should be conducted to identify improvements and opportunities. Reviews could be conducted by an outside source or by a peer city's urban forestry staff. Funding should be secured to conduct this type of review.

2.4.3 **Educate the public on various aspects of tree care.** Educational opportunities through classes, publications, videos and on-line materials should be made available to the public regarding proper tree pruning techniques, standards and the identification of pests and disease. The City's Adopted Pruning Standards and tree selection guides should be made easily accessible.

PROTECT

URBAN FOREST GOALS



GOAL 3

MANAGE THE URBAN FOREST THROUGH COORDINATED PLANNING, DESIGN AND MAINTENANCE TO ENSURE ITS LONG-TERM HEALTH AND SUSTAINABILITY.

STRATEGIES

- 3.1 CREATE A COHESIVE MANAGEMENT PROGRAM FOR THE CITY'S STREET TREES.
- 3.2 EMPLOY BEST MANAGEMENT PRACTICES IN STREET TREE MAINTENANCE TO CREATE A MORE COST-EFFICIENT AND EFFECTIVE PROGRAM.
- 3.3 MANAGE AND CARE FOR STREET TREES THROUGHOUT THEIR ENTIRE LIFE-CYCLE.
- 3.4 PLAN FOR THE LONG-TERM HEALTH AND BEAUTY OF THE URBAN FOREST.
- 3.5 COLLECT AND USE DATA TO MANAGE AND MONITOR THE URBAN FOREST.
- 3.6 IMPROVE COORDINATION AND COMMUNICATION BETWEEN AGENCIES, POLICY MAKERS AND THE COMMUNITY.

STRATEGY 3.1

Create a cohesive management program for the City's street trees.

3.1.1 Adequately fund and establish the Department of Public Works' Bureau of Urban Forestry as the primary maintenance provider of ALL trees in the public right-of-way.

The establishment of a Citywide Municipal Street Tree Program would provide the City's trees with a higher level of care than the existing fragmented system. Maintenance responsibility for all City street trees should be standardized under the management of the Department of Public Works. Under such a program, property owners would be relieved of all responsibility for street tree maintenance, pruning, and tree-related sidewalk repair. Property owners who currently care for street trees will be relieved of their responsibilities and see their costs decline, and many others will receive street trees in front of their homes.

Street trees would receive regular maintenance (under a five-year pruning cycle) from arborists or other tree care professionals. Substantial cost efficiencies can be achieved through a programmed citywide maintenance program. Regular tree pruning would reduce safety hazards associated with unmaintained trees.

With such a maintenance program established, the City would also finally be able to substantially expand the urban forest. Approximately 50,000+ new street trees would be planted under a municipal street tree program. This proposal requires the establishment of stable funding stream as outlined in the **FUND chapter.**

STRATEGY 3.2

Employ best management practices in street tree maintenance to create a more cost-efficient and effective program.

3.2.1 Implement an efficient and cost-effective routine maintenance program for all City street trees. By assuming responsibility for all trees in the public right-of-way, DPW could implement the following best practices:

- **Proactive Pruning Cycle (Reduction from 12 years/tree to 5 years/tree).** Due to severe staffing a budget constraints, street trees are on a 12-15 year pruning cycle. DPW's current street tree work involves responding almost exclusively to service calls and emergencies. This is costly and inefficient. Routine maintenance is more efficient and cost effective. Professional standards recommend that trees be pruned on average every three-to-five years. This preventive maintenance approach translates into fewer emergencies, which are more labor intensive and therefore more costly than routine pruning. The City's risk would further decline with sufficient funding to perform routine inspections and keep sidewalks in good repair.

- **Block-Pruning Maintenance Approach.** Less costly and more efficient, block pruning could reduce DPW's per-tree maintenance cost by up to 50%. Block pruning targets staff, equipment and resources to maintain and prune a large number of trees at once. This method greatly reduces the time and expense required per tree pruned. This differs from the current inefficient approach of "spot" pruning where crews, due to limited resources, are only attending to individual trees on an emergency and service request basis. A comprehensive program would allow for staff to attend to both ongoing and high-risk pruning needs.

- **Structural Pruning & Early Tree Care.** A street tree's early years from 5 to 10 years of age are critical to the establishment of a healthy urban street tree structure and to ensure survival. In order to maximize proven urban forestry benefits (both biophysical and social), trees must reach maturity. Pruning young and established street trees can significantly reduce costs associated with maintenance and hazards down the line. A structural pruning program for young trees will promote healthy structure, extend life expectancy, and reduce future costs and liability.

- **Sidewalk Repair & Legal Liability.** A comprehensive maintenance program would involve the repair of sidewalk damage caused by street tree and root growth. Sidewalk repairs and basin widenings can help protect tree health while improving pedestrian safety. Under a comprehensive street tree program, the City would assume liability for claims associated with sidewalk trip and falls related to City maintained street trees. This would reduce risks and costs to private property owners. Repair of displaced pavement under a citywide program would also help reduce incidence of falls associated with sidewalks damaged by trees.

- **Risk Assessments/Management.** Trees should be regularly inspected (every 1-3 years) to identify trees with biggest risks to public safety and property damage.

3.2.2 **Develop a Street Tree Management Plan.** A management plan should be created to clearly outline DPW's planting and maintenance plans over the long-term. A management plan would enable DPW to outline a maintenance strategy, plan for the succession of trees, create planting plans, and identify capital funding needs.

3.2.3 **Test new technologies and techniques to improve street tree health and minimize utility conflicts.** A variety of new strategies have emerged to improve the health of street trees and minimize infrastructure conflicts in the urban environment. Some promising technologies to explore include: re-routing of sidewalks around trees; permeable concrete; root channels under sidewalks; suspended pavement systems; rubberized sidewalks; and "bridging" of sidewalks over root structures.

The City should install and test these to determine their applicability to San Francisco. Installation may require exemption from some existing standards and specifications. Projects should be monitored for success. Corresponding amendments to standards should be made if trials are found promising.

STRATEGY 3.3

Manage and care for street trees throughout their full life-cycle.

3.3.1 **Consider establishing a Street Tree Nursery.** A wide range of species of trees grow in San Francisco's unique climate. While this makes our urban forest special, it can also make finding certain species of trees challenging to find at commercial tree nurseries. The City and Friends of the Urban Forest have identified the potential for a Street Tree Nursery where trees could be grown locally and within our unique climatic conditions. The City of San Jose has a local tree nursery that supplies the city's urban forest with trees. A Street Tree Nursery is central to the full life-cycle management approach recommended by this Plan. A local nursery or several small facilities sponsored and run by the City and/or by community organizations would also provide valuable opportunities for job training and green jobs creation.

New tree planting is essential to a full life-cycle management approach. For actions related to tree planting, see GROW chapter.

3.3.2 **Continue Friends of the Urban Forest's (FUF) Early Tree Care Program.** All FUF planted trees receive tree pruning during their first five years to establish strong central leaders and reduce structural deficiencies after planting. Tree watering is the responsibility of property owners. This program is essential in helping establish fragile young newly planted trees.

3.3.3 **Plan phased removals of overmature trees and succession plantings.** Areas should be identified where aging trees may be required to be removed due to death or potential hazard. Succession plantings should be coordinated to retain no net loss to the urban forest.

3.3.4 **Make wood from removed street trees publicly available for re-use.** The beauty and value of our trees does not have to end once they have died or been removed. Wood from street trees, some of it over 100 years old, echoes the history of our city, the streets and the beauty of the tree itself. Trees removed due to death, hazard or by permits can live on as a valuable source of wood for re-use. Existing City policy and operations limit the ability to maximize re-use opportunities. This hinders the urban forest from achieving the full "cradle to grave" life-cycle management approach recommended in this Plan. An analysis and strategy should be developed to identify City policies, equipment needs, facilities and funding required to initiate an Urban Wood Re-Use Program. This would involve not only maximizing the chipping of wood for mulch, compost or fuel but also exploring opportunities to mill valuable wood for the creation of furniture, building materials and other artisan uses. An added benefit of re-using wood in products or lumber is the ability of finished wood products to act as a "carbon sink" by continuing to store greenhouse gases instead of releasing them back into the atmosphere during decomposition.

STRATEGY 3.4

Plan for the long-term health and beauty of the urban forest.

3.4.1 **Create a Parks & Open Space Urban Forest Plan.** This Urban Forest Plan (Phase 1) focuses primarily on the some of the City's most vulnerable trees - our street trees. A corresponding effort should be undertaken to develop a long-term policy vision and strategy for the urban forest in the City's parks and open spaces. Funding and staffing should be identified for the Urban Forest Plan (Phase 2: Parks & Open Spaces).

3.4.2 **Develop urban design strategies for trees in the public right-of-way.** Some of the most visually memorable streets and urban places are shaped by trees. Streets such as Dolores, Market and the Embarcadero employ limited and unique tree palettes to achieve dramatic effects. Consistency and variation in tree form, color and seasonal display can be used to create dynamic and harmonious streetscapes. Many of the city's neighborhoods and streets, however, feature less intentional plantings and an uncoordinated patchwork of trees. A study should be conducted that identifies urban forest design strategies and how to increase the public and private realm's capacity to accommodate more trees.

3.4.3 **Develop community tree plans for neighborhoods or major streets.** The City should engage neighborhoods in proactive planning for trees in their communities. Local urban forest plans at the scale of a commercial corridor or entire neighborhood can help identify a cohesive vision, planting/succession strategy and preferred tree palette for neighborhoods or major streets. Streetscape design projects should involve the community in selecting trees.

3.4.4 **Implement Better Streets Plan's street tree and planting guidelines.** The Better Streets Plan's recommendations regarding street tree location, stature, line-of-sight placement and installation of wider tree basins where sidewalks allow should be followed in all street design projects.

3.4.5 **Maximize trees and landscaping in new streetscape designs.** Streetscape design projects provide a great opportunity to help achieve urban forest canopy goals and create a cohesive streetscape. The potential for incorporating street trees and other landscaping should be maximized. Sidewalks should be widened where possible to provide more room for increased tree canopies. The Plan recognizes a standard row of trees may not be an appropriate design solution in every case. Existing trees, species palettes, sidewalk widths, utilities, ecological goals, pedestrian volumes, major views, architectural features, historic landscapes and sunlight exposure all must be considered in developing a street design. If approved street designs call for any tree removals, replacement plantings or in-lieu fees should be collected to prevent net tree loss.

3.4.6 **Develop recommendations for trees and greening on buildings & private property.** San Francisco's urban forest has the potential to expand by embracing a range of greening methods on public and private property, especially where trees may not be feasible due to narrow sidewalks, underground utilities and harsh growing environments. The Urban Forest Plan (Phase 3: Buildings & Private Property) is intended to advance a variety of greening opportunities including: green roofs, living walls, rooftop gardens, trees on private property, urban agriculture, sidewalk gardens and temporary greening projects like parklets. Since a single plan can not likely address all of these methods, the Urban Forest Plan (Phase 3: Buildings & Private Property) will include policies, recommendations and guidelines that advance a wide range of greening interventions.

STRATEGY 3.5

Collect and use data to manage and monitor the urban forest.

3.5.1 **Complete the Citywide Street Tree Census & Summary Report.** The City can not manage a resource for which it does not have accurate data. DPW and the Planning Department have conducted a partial Street Tree Census of 25,000 streets trees out of a total estimated 105,000 street trees. This inventory of street trees provides information essential to urban forest management in a centralized database. The data includes information on condition, location, species type, size. The full census should be completed and final database integrated into DPW's management system. Data should be made available to the public through the online Urban Forest Map, apps and other sources. Updates to the database should be performed based on maintenance performed and new planting and removal permits.

A final report summarizing the benefits and conditions of the City's street tree resource should be completed. A comprehensive street tree inventory will ensure that DPW obtains accurate data for all trees in the public right-of-way. Accurate data yields considerable efficiencies, facilitating block pruning and tracking of maintenance history, ultimately helping to manage costs.

3.5.2 **Perform an Urban Tree Canopy Analysis every five years.** An analysis of the City's tree canopy should be performed at regular intervals to track its size and growth or decline. Such an analysis provides valuable information on the City's progress towards meeting planting and canopy goals. Appropriate data such as aerial imagery, LiDAR data and other sources should be employed in the analysis. A corresponding report should be issued and reviewed by the Urban Forestry Council.

3.5.3 **Produce annual State of the Urban Forest Report.** The Urban Forestry Council's annual report is the primary document summarizing the current health and status of urban forestry in San Francisco. The report includes information about the following:

- annual plantings and removals
- emerging diseases and pests
- City pruning standards used by agencies maintaining trees
- quality of tree care provided by agencies or their contractors
- status of Plan implementation

The document requires the participation of various City agencies who manage and care for trees.

3.5.4 **Carry out an updated Citywide Urban Forest Analysis for all trees in San Francisco (streets, parks and private property).** The last citywide urban forestry analysis of the urban forest was performed in 2007 by the USDA Forest Service. A similar analysis should be performed using the Urban Forest Effects Model (UFORE). This tool and report helps managers and researchers quantify urban forest structure and its functions. The model calculates numerous attributes about the urban forest, including:

- Species composition
- Diameter distribution
- Tree health
- Species diversity
- Exotic vs. native species distribution
- Calculation of benefits

3.5.5 **Conduct focused local research on urban forest topics.** The Bay Area is home to a wealth of educational institutions that offer potential partnership opportunities for urban forest research. City agencies and the Urban Forestry Council should identify research topic areas (e.g. health and habitat of redwood stands in the city)and engage local universities or research organizations in projects and partnerships.

STRATEGY 3.6

Improve coordination and communication between agencies, policy makers and the community.

3.6.1 **Establish the Urban Forestry Council as the city's primary advisory body on urban forest issues.** The Urban Forestry Council is comprised of representatives from City agencies, nonprofits, field professionals and community representatives. This body provides the appropriate forum to discuss cross-cutting issues related to the urban forest. Its recommendations should provide guidance to the City on urban forest policy and management. Its primary tasks include the following:

- Facilitate coordination among urban forest stakeholders to improve forest management across the city.
- Track and report on the state of the urban forest, including management activities, resources allocated to management, and the health of the urban forest.
- Develop, review, and update best management practices (BMPs) – adopted tree care standards, tree selection guidelines, planting practices, young tree care, tree removal and tree protection plans.
- Help secure and encourage commitment of adequate resources for urban forestry programs.
- Review and make policy recommendations related to the urban forest.
- Review major infrastructure and development projects affecting trees.
- Highlight the value and importance of the urban forest though education and outreach.
- Identify and highlight important specimen trees through the Landmark Tree Program.

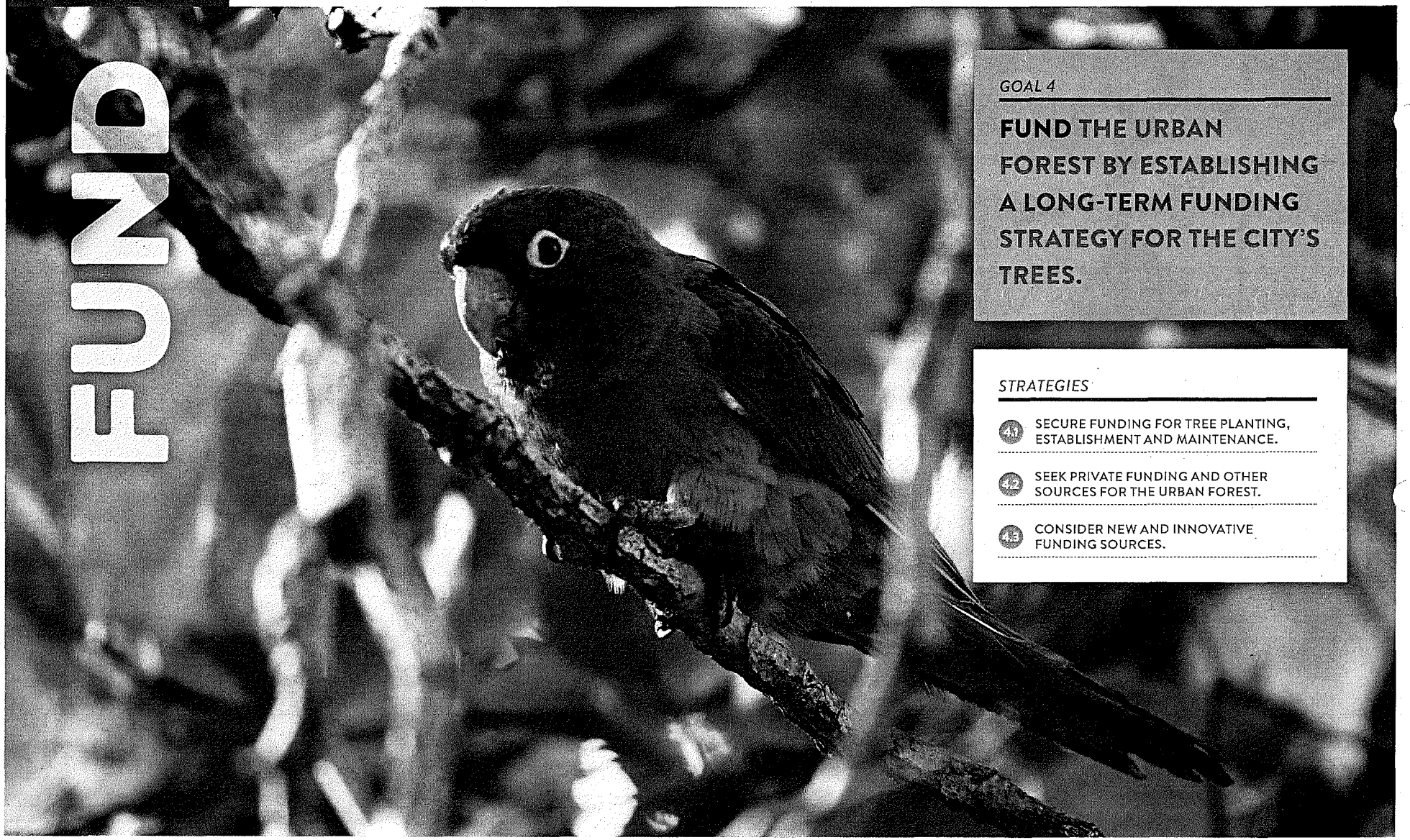
3.6.2 **Improve coordination and communication between public and private entities with major tree resources.**

MANAGE

Friends of the Urban Forest

URBAN FOREST GOALS

FUND



GOAL 4

FUND THE URBAN FOREST BY ESTABLISHING A LONG-TERM FUNDING STRATEGY FOR THE CITY'S TREES.

STRATEGIES

- 4.1 SECURE FUNDING FOR TREE PLANTING, ESTABLISHMENT AND MAINTENANCE.
- 4.2 SEEK PRIVATE FUNDING AND OTHER SOURCES FOR THE URBAN FOREST.
- 4.3 CONSIDER NEW AND INNOVATIVE FUNDING SOURCES.

FUND

STRATEGY 4.1

Secure dedicated funding for tree planting, establishment and maintenance.

4.1.1 **Pursue a dedicated long-term funding stream for street tree maintenance.** Funding for street and park tree maintenance has steadily declined over the years in the City's budgeting process. As a result, the number of street trees that are maintained regularly has also decreased. The City does not have the staff or resources to maintain its trees. Without funding to maintain street trees, DPW is transferring maintenance responsibility for thousands of street trees to fronting property owners. This approach is a last resort and will not result in a better standard of care for trees. Without a stable and dedicated funding stream for tree maintenance, the urban forest will not receive the adequate care it needs. A dedicated funding source should be pursued to fund an ongoing tree maintenance program in the City. The City conducted a Street Tree Financing Study[1] to identify potential funding sources for tree planting, establishment and maintenance. The Study outlines a number of potential tools including a parcel tax, assessment districts and general obligation bonds. These tools need further evaluation and consideration in selecting an appropriate funding strategy. Adequate resources should be identified to create a municipal street tree program in San Francisco whereby the Department of Public Works assumes maintenance responsibility for all of the city's street trees. Such a program would result in a better standard of care for trees and relieve property owners of the burden and expense of tree maintenance, tree-related sidewalk repairs and legal liabilities associated with street trees. Should a funding program proceed, a regular assessment (every 5 years) should be conducted to examine the effectiveness of the program in achieving Plan goals.

4.1.2 **Develop a cohesive funding program for tree planting.** Funding sources for tree planting have historically been more accessible than funds for maintenance. Therefore, different approaches should be sought for each. State and federal grants, local bonds, transportation sources, capital improvement funds, development impact fees are available to fund the planting and establishment of new trees. A comprehensive capital funding strategy should be created that is aligned with canopy goals. This will complement the establishment of a maintenance funding program guaranteeing newly planted trees to be maintained over the long-term.

4.1.3 **Better utilize existing funding sources to meet canopy and management goals.** Identify and create funding strategy to better utilize the following existing urban forest funding sources:

- Proposition K sales tax
- SFPUC Green Infrastructure and Low-Impact Development (LID)
- Public Benefits Impact Fees from community planning areas
- Carbon Fund
- In-lieu fees
- General Obligation Bonds (such as 2011 Streets Bond)
- Capital planning funds
- Additional sources as identified

4.1.4 **Improve process for collection of in-lieu fees.** Clarifying and improving the street tree enforcement process could improve the collection of in-lieu fees, thereby providing additional funding for the urban forest (Planning Code Sec. 138.1 & 428, Public Works Code).

STRATEGY 4.2

Seek private funding and other sources for the urban forest.

4.2.1 **Develop programs for gifting by charitable foundations, private companies, groups and individuals.** In cities such as Los Angeles and New York City, large-scale tree campaigns (i.e. Million Trees) have been largely financed through the donations of companies, businesses and individuals. Such donor strategies could play a critical role in San Francisco. Opportunities to engage charitable giving should be pursued.

STRATEGY 4.3

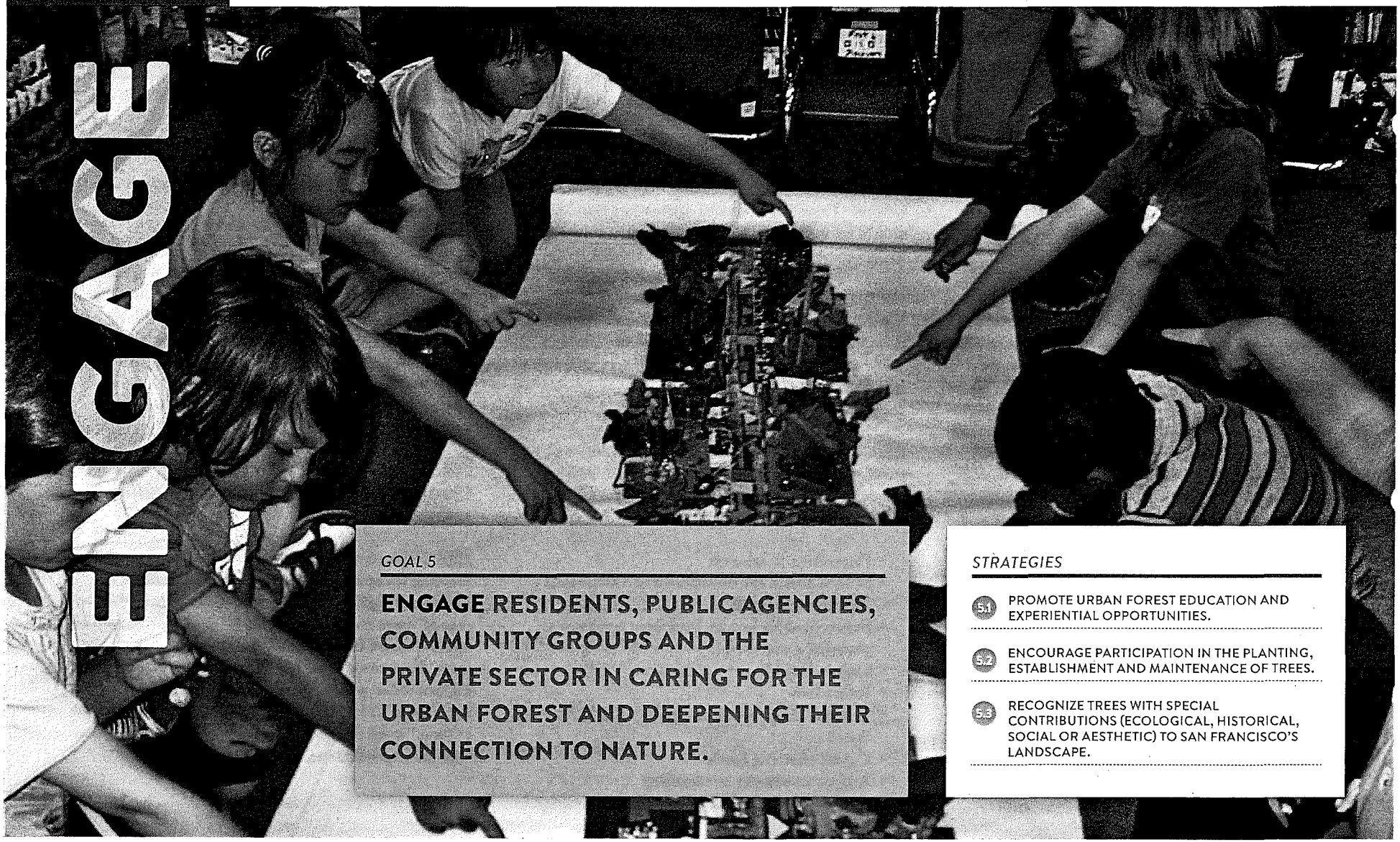
Consider new AND innovative funding sources.

4.3.1 **Explore non-traditional and technology driven funding techniques.** New funding models using web based and mobile device tools have introduced the concept of "crowd source" funding for public projects. This method allows residents and visitors to "text" or make small donations on-line for a specific project. This funding method or others like it may be applicable to the city's trees. Crowdsourcing allows residents and visitors to "text" small donations to fund specific needs such as care for a specific tree, watering, or tree planting.

1 AECOM (2012). *Financing San Francisco's Urban Forest: The Costs & Benefits of A Comprehensive Municipal Street Tree Program.*

URBAN FOREST GOALS

ENGAGE



GOAL 5

ENGAGE RESIDENTS, PUBLIC AGENCIES, COMMUNITY GROUPS AND THE PRIVATE SECTOR IN CARING FOR THE URBAN FOREST AND DEEPENING THEIR CONNECTION TO NATURE.

STRATEGIES

- 5.1 PROMOTE URBAN FOREST EDUCATION AND EXPERIENTIAL OPPORTUNITIES.
- 5.2 ENCOURAGE PARTICIPATION IN THE PLANTING, ESTABLISHMENT AND MAINTENANCE OF TREES.
- 5.3 RECOGNIZE TREES WITH SPECIAL CONTRIBUTIONS (ECOLOGICAL, HISTORICAL, SOCIAL OR AESTHETIC) TO SAN FRANCISCO'S LANDSCAPE.

ENGAGE

STRATEGY 5.1

Promote urban forest education and experiential opportunities.

5.1.1 **Conduct a citywide urban forest public outreach campaign.** A large-scale campaign designed to build support and awareness of San Francisco's urban forest would have a large benefit. Such a campaign could be used to educate the public about the urban forest, its benefits, maintenance needs and opportunities for participation. Other cities that have successfully increased funding for their urban forestry programs have relied upon public outreach as an essential tool for success.

5.1.2 **Improve ecological literacy of City agency staff and public decision makers.**

5.1.3 **Engage residents through new technologies, apps to help identify trees and tree issues.** Technology and the open data movement are allowing for increased interactions between the public and the collection and verification of data. Opportunities to engage the public in data collection and verification should be pursued.

5.1.4 **Educate the public on street tree selection, proper tree care, pruning and pests/diseases.** Educational materials and training programs should be made available to equip residents and property owners with basic skills in tree selection, care and maintenance.

5.1.5 **Partner with schools, universities and educational institutions to assist with urban forestry research and education.**

5.1.6 **Conduct outreach to small businesses and neighborhood commercial districts on the economic benefits of tree-lined commercial streets.**

STRATEGY 5.2

Encourage participation in the planting, establishment and maintenance of street trees.

5.2.1 **Support community tree planting, volunteer and urban forestry training programs.** The Department of Public Works' Community Clean Team, Street Parks Program and Arbor Day events provide opportunities to engage the public in urban forestry activities. In addition, Friends of the Urban Forest (FUF) is the primary community-based organization supporting tree planting in San Francisco. FUF's neighborhood planting programs, youth training, volunteer participation and Community Forester Program provide invaluable ways to engage the public in caring for the urban forest.

5.2.2 **Foster participation of the private sector by organizing corporate and university volunteer programs.**

5.2.3 **Develop strategies to support trees on private property.** Trees on private property account for significant number of the city's trees. Many of the City's largest trees can be found on private property where expanded growing spaces (i.e. backyards) allow for large canopy trees. The benefits of these trees extend beyond the property line. Neighbors, wildlife and other city residents all benefit from trees in our neighborhoods. Private properties also provide tremendous potential for expanding the City's tree canopy. Further consideration beyond the scope of this Plan should be given to programs and policies and incentives that support trees on private property and those who care for them such as:

- Grant or loan programs for large tree maintenance and care.
- Preservation of significant trees on private property.
- Private property tree planting programs.

STRATEGY 5.3

Recognize trees for their special contributions to San Francisco's landscape. (ecological, historical, social, or aesthetic)

5.3.1 **Continue the City's Landmark Tree Program to celebrate and protect notable trees.** Landmark trees are trees that have been designated by the Board of Supervisors as unique and special. It may be due

to the rareness of the species, their size or age, or extraordinary structure, or ecological contribution. In addition, historical or cultural importance can qualify a tree for Landmark Status. Property owners, the Board of Supervisors, Planning Commission, the Historic Preservation Commission, and/or directors of a City department may nominate trees on public or private land to protect and preserve their value and presence in the community under the San Francisco Landmark Tree Program.

S&R2 **Develop an Urban Forest Awards Program.** Offer annual awards to exemplary development projects that have either 1.) protected existing on-site trees OR 2.) incorporated new trees in exceptional ways into their designs.

S&R3 **Consider program to make benefits provided by trees visible to the public through signage or other means.** Consider signage for select trees to highlight benefits and other information (e.g. particularly important trees for stormwater management). Indicate: species, age, benefits provided (i.e. how much carbon stored, stormwater infiltrated, etc.).

IMPLEMENTATION

Implementation Strategy

Implementation of the Urban Forest Plan (Phase 1: Street Trees) will require the participation of various public agencies and key community partners. The following pages assign responsibility and a suggested timeframe for the Plan's strategies and actions. However, further detail may be required as individual items proceed further towards implementation.

AGENCY KEY

CBDS	Community Benefit Districts
DBI	San Francisco Department of Building Inspection
DPW	San Francisco Department of Public Works
FUF	Friends of the Urban Forest
PLANNING	San Francisco Planning Department
REC PARK	San Francisco Recreation and Parks Department
SFCTA	San Francisco Countywide Transportation Authority
SFMTA	San Francisco Municipal Transportation Agency
SFE	San Francisco Department of the Environment
SFPUC	San Francisco Public Utilities Commission
UFC	Urban Forestry Council

GOAL 1 GROW THE URBAN FOREST THROUGH NEW PLANTING TO MAXIMIZE THE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF TREES AND URBAN GREENING.

STRATEGIES	ACTIONS	TIMELINE	LEAD	PARTNERS
1.1 PURSUE AN EXPANDED AND EQUITABLE DISTRIBUTION OF TREES AND GREENING THROUGHOUT THE CITY.	1.1.1 Continue to enforce existing Code requirements for street tree planting.	ONGOING	DPW	PLANNING
	1.1.2 Pursue an expanded City sponsored street tree planting program.	0-5 YEARS	DPW	FUF, SFPUC, SFMTA
	1.1.3 Support Friends of Urban Forest's tree planting, stewardship and sidewalk garden programs.	ONGOING	DPW	DPW, SFPUC
	1.1.4 Increase the number of street trees by at least half (50,000 trees).	20 YEARS	DPW	PROPERTY OWNERS, FUF
	1.1.5 Develop a Citywide Tree Canopy Coverage Goal for San Francisco.	0-5 YEARS	PLANNING	DPW, REC PARK
	1.1.6 Develop a Citywide Street Tree Planting Strategy.	0-5 YEARS	DPW	PLANNING, FUF, UFC, SFE
	1.1.7 Continue to maintain and update list of Recommended Street Trees and Other Plantings.	ANNUALLY	DPW	UFC, FUF
1.2 MAXIMIZE BENEFITS OF THE URBAN FOREST – SOCIAL, ECONOMIC AND ENVIRONMENTAL.	1.2.1 Consider selecting and planting trees based on their ability to provide specific benefits.	0-5 YEARS	DPW	FUF, PLANNING, SFPUC
	1.2.2 Explore opportunities to use trees to mitigate air pollution.	0-5 YEARS	DPW	FUF, PLANNING, SFPUC
	1.2.3 Help manage stormwater through increased use of trees and landscaping.	ONGOING	SFPUC	DPW, FUF
	1.2.4 Target trees to achieve public health benefits, especially for children and seniors.	ONGOING	DPW	DPH
	1.2.5 Maximize carbon storage potential of urban forest to combat climate change.	ONGOING	ALL CITY	PLANNING, DPW, FUF, SFE
	1.2.6 Consider adaptation to climate change in identifying a local tree species palette.	ONGOING	UFC	DPW, FUF, REC PARK
	1.2.7 Use the urban forest to support local wildlife and provide habitat.	ONGOING	SFE & PLANNING	DPW, FUF, SFPUC, REC PARK
	1.2.8 Promote urban agriculture through the urban forest where possible.	ONGOING	DPW	SFE, FUF
	1.2.9 Promote tree planting and maintenance to help create successful commercial districts and support local businesses.	ONGOING	DPW	CBDS, FUF
1.3 PROMOTE A RANGE OF URBAN GREENING TOOLS IN THE PUBLIC RIGHT-OF-WAY AND ON BUILDINGS.	1.3.1 Utilize existing programs to expand greenery in the public right-of-way such as the sidewalk landscaping program (DPW), Pavement to Parks (Planning) and SFPUC Green Infrastructure Program and others.	ONGOING	DPW, PLANNING, SFPUC	FUF

GOAL 2 PROTECT THE URBAN FOREST FROM THREATS AND LOSS BY PRESERVING THE CITY'S EXISTING STREET TREES.

STRATEGIES	ACTIONS	TIMELINE	LEAD	PARTNERS
2.1 STABILIZE EXISTING URBAN FOREST BY ACHIEVING A NET ZERO LOSS OF TREES.	2.1.1 Replace removed or dead trees on streets on a 1:1 basis.	ONGOING	DPW	SFPUC
	2.1.2 Improve enforcement of existing codes for tree protection including: Public Works Code (Article 16) and Planning Code (Sec. 138.1 & 428).	ONGOING	DPW	PLANNING
2.2 REDUCE THE IMPACTS OF DEVELOPMENT ON THE URBAN FOREST.	2.2.1 Improve care and maintenance of street trees through a comprehensive maintenance program.	0-5 YEARS TO ESTABLISH PROGRAM	DPW	PLANNING
	2.2.2 Encourage developers to incorporate existing trees into building and site designs.	ONGOING	DPW	PLANNING
	2.2.3 Consider trees in the review of permits for garages, curb cuts and driveways.	ONGOING	DPW	PLANNING
	2.2.4 Require contractors to carry Tree Protection Bonds during construction projects.	0-5 YEARS	DPW	PLANNING, DBI
	2.2.5 Improve process for Tree Protection Plans required for construction projects.	0-5 YEARS	DPW	PLANNING, DBI
	2.2.6 Fully integrate DPW into the building permit and project tracking system (PPTS).	0-5 YEARS	PLANNING	DPW, DBI
2.3 DEVELOP STRATEGIES TO COMBAT DISEASES AND PESTS.	2.3.1 Involve DPW early in the planning and design of projects affecting trees in the public right-of-way.	ONGOING	DPW	SFCTA, SFMTA, PLANNING
	2.3.2 Plant a variety of species to create a more resilient urban forest.	ONGOING	DPW	FUF, SFPUC
	2.3.3 Monitor urban forest for signs of emerging pests or disease.	ONGOING	DPW	SFE
	2.3.4 Require annual disease and pest training for City's urban forestry staff.	ANNUALLY	DPW	SFE
2.4 PROMOTE PROPER CARE AND MAINTENANCE OF STREET TREES.	2.4.1 Increase enforcement of the Urban Forestry Ordinance.	0-5 YEARS	DPW	PLANNING
	2.4.2 Help facilitate audits of tree care by City agencies.	ANNUALLY	UFC	SFE, DPW. REC PARK, SFPUC, OTHERS
	2.4.3 Educate the public on proper tree care.	ONGOING	DPW	DPW, FUF, SFE

GOAL 3 MANAGE THE URBAN FOREST THROUGH COORDINATED PLANNING, DESIGN, AND MAINTENANCE TO ENSURE ITS LONG-TERM HEALTH AND SUSTAINABILITY.

STRATEGIES	ACTIONS		TIMELINE	LEAD	PARTNERS
3.1 CREATE A COHESIVE MANAGEMENT PROGRAM FOR THE CITY'S STREET TREES.	3.1.1	Adequately fund and establish the Department of Public Works' (DPW) Bureau of Urban Forestry as the primary maintenance provider or all trees in the public right-of-way.	0-5 YEARS	DPW	CITY HALL
3.2 EMPLOY BEST MANAGEMENT PRACTICES IN STREET TREE MAINTENANCE TO CREATE AN EFFICIENT AND COST-EFFECTIVE MAINTENANCE PROGRAM.	3.2.1	Implement an efficient and cost-effective routine maintenance program for all city street trees (3-5 year pruning cycle, block pruning, structural pruning, sidewalk repair, etc)	0-5 YEARS	DPW	-------
	3.2.2	Develop a Street Tree Management Plan.	0-5 YEARS	DPW	UFC, FUF
	3.2.3	Test new technologies and techniques to improve street tree health and minimize utility conflicts.		DPW	FUF
3.3 MANAGE AND CARE FOR STREET TREES THROUGHOUT THEIR FULL LIFE-CYCLE.	3.3.1	Consider establishing a Street Tree Nursery.	0- 5 YEARS	DPW	FUF, PLANNING
	3.3.2	Continue Friends of the Urban Forest's Early Tree Care Program.	ONGOING	FUF	-------
	3.3.3	Plan phased removals of overmature trees and succession plantings.	ONGOING	DPW	-------
	3.3.4	Make wood from removed street trees publicly available for re-use.	0-5 YEARS	DPW	-------
3.4 PLAN FOR THE LONG-TERM HEALTH AND BEAUTY OF THE URBAN FOREST.	3.4.1	Create a Parks & Open Space Urban Forest Plan.	0-5 YEARS	REC PARK	UFC, PLANNING, DPW, SFE
	3.4.2	Develop urban design strategies for trees in the public right-of-way.	0-5 YEARS	PLANNING	DPW
	3.4.3	Develop community tree plans for neighborhoods and major streets.	5-10 YEARS	DPW	PLANNING
	3.4.4	Implement Better Street Plan's street tree and planting guidelines.	ONGOING	DPW	PLANNING, FUF
	3.4.5	Maximize trees and landscaping in new streetscape designs.	ONGOING	DPW	PLANNING, SFMTA, SFCTA, SFPUC
	3.4.6	Develop recommendations for trees and greening on buildings & private property.	0-5 YEARS	PLANNING	DBI, DPW
3.5 COLLECT AND USE DATA TO MANAGE AND MONITOR THE URBAN FOREST.	3.5.1	Complete the Citywide Street Tree Census & Summary Report.	0-5 YEARS	DPW	PLANNING, FUF
	3.5.2	Perform an Urban Tree Canopy Analysis every five years.	EVERY 5 YEARS	PLANNING	DPW
	3.5.3	Produce annual State of the Urban Forest Report.	ANNUALLY	UFC	SFE
	3.5.4	Carry out updated Citywide Urban Forest Analysis (UFORE).	0-5 YEARS	UFC	SFE, PLANNING, DPW, REC PARK, SFPUC
	3.5.5	Conduct focused research on local urban forest topics.	ONGOING	UFC	SFE, PLANNING

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STRATEGIES	ACTIONS		TIMELINE	LEAD	PARTNERS
3.6 IMPROVE COORDINATION AND COMMUNICATION BETWEEN AGENCIES, POLICY MAKERS AND THE COMMUNITY.	3.6.1	Establish the Urban Forestry Council as the City's primary advisory body on urban forest issues. Primary tasks include: ◦ Coordinate grant funding opportunities related to urban forestry. ◦ Develop a strategic plan outlining major Council priorities and a workplan. ◦ Bring relevant agencies together to make policy recommendations. ◦ Evaluate major infrastructure and development projects affecting trees. ◦ (For additional duties, see Council bylaws).	ONGOING	UFC	SFE
	3.6.2	Improve coordination and communication between public and private entities with major tree resources.	ONGOING	UFC	FEDERAL, STATE, REGIONAL AND CITY AGENCIES

GOAL 4 FUND THE URBAN FOREST BY ESTABLISHING A DEDICATED FUNDING STREAM FOR THE CITY'S TREES.

STRATEGIES	ACTIONS		TIMELINE	LEAD	PARTNERS
4.1 SECURE FUNDING FOR TREE PLANTING, ESTABLISHMENT AND MAINTENANCE.	4.1.1	Pursue a dedicated long-term funding stream for tree maintenance.	0-5 YEARS	DPW	UFC, PLANNING, FUF, REC PARK, SFE
	4.1.2	Develop a cohesive funding program for tree planting.		DPW	UFC, PLANNING, FUF, SFE
	4.1.3	Better utilize existing funding sources to meet canopy and management goals.	ONGOING	DPW	PLANNING, SFPUC, SFCTA, SFE
	4.1.4	Improve process for collection of in-lieu fees.	ONGOING	DPW	PLANNING, DBI
4.2 SEEK PRIVATE FUNDING AND OTHER SOURCES FOR THE URBAN FOREST.	4.2.1	Develop programs for gifting by charitable foundations, private companies, groups and individuals.	0-5 YEARS	DPW	FUF, UFC
	4.2.2	Explore non-traditional and technology driven funding techniques (i.e. "crowdsourcing").	0-5 YEARS	DPW	UFC, PLANNING, SFE, FUF
4.3 CONSIDER NEW AND INNOVATIVE FUNDING SOURCES.	4.3.1	Explore non-traditional and technology driven funding techniques (i.e. "crowd sourcing").	0-5 YEARS	DPW	UFC, PLANNING, SFE, FUF

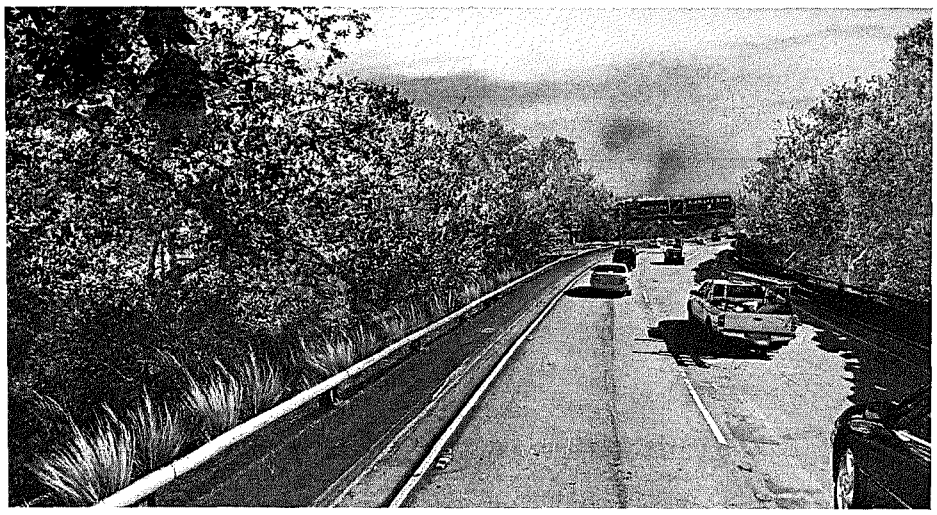
GOAL 5 ENGAGE RESIDENTS, PUBLIC AGENCIES AND THE PRIVATE SECTOR IN CARING FOR THE URBAN FOREST AND DEEPENING THEIR CONNECTION TO NATURE.

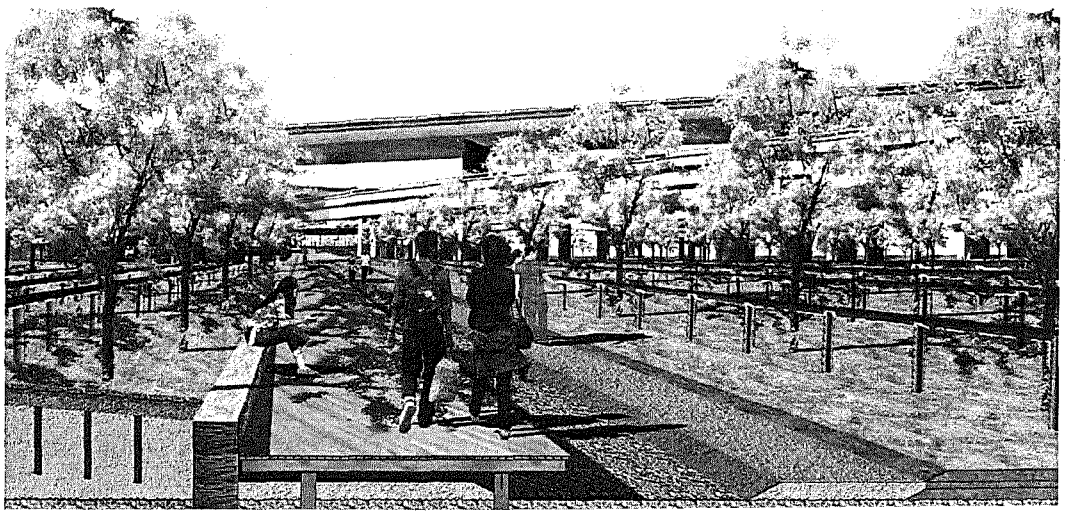
STRATEGIES	ACTIONS		TIMELINE	LEAD	PARTNERS
5.1 PROMOTE URBAN FOREST EDUCATION AND EXPERIENTIAL OPPORTUNITIES.	5.1.1	Conduct a citywide urban forest public outreach campaign.	0-5 YEARS	DPW & REC PARK	UFC, PLANNING, SFE, FUF
	5.1.2	Improve ecological literacy of City agency staff and public decision makers.	ONGOING	SFE	SFPUC, DPW, REC PARK, FUF
	5.1.3	Engage residents through new technologies to help identify trees and tree issues.	ONGOING	DPW	PLANNING, SFE, FUF
	5.1.4	Educate the public on street tree selection, proper tree care, pruning and pests/ diseases.	ONGOING	DPW	DPW, FUF
	5.1.5	Partner with schools, universities, and educational institutions to assist with urban forestry research and education.	ONGOING	PLANNING, UFC, DPW, REC PARK	-------
	5.1.6	Conduct outreach to small businesses and neighborhood commercial districts on the economic benefits of tree-lined commercial streets.	ONGOING	DPW	UFC, FUF, SFE
5.2 ENCOURAGE PARTICIPATION IN THE PLANTING, ESTABLISHMENT AND MAINTENANCE OF STREET TREES.	5.2.1	Support community tree planting, volunteer and urban forestry training programs.	ONGOING	DPW	FUF, UFC, SFE
	5.2.2	Foster participation of the private sector by organizing corporate and university volunteer programs.	ONGOING	FUF	DPW
	5.2.3	Develop strategies to support trees on private property.	0-5 YEARS	UFC	DPW, FUF, PLANNING
5.3 RECOGNIZE TREES FOR THEIR SPECIAL CONTRIBUTIONS TO SAN FRANCISCO'S LANDSCAPE (ECOLOGICAL, HISTORICAL, SOCIAL, OR AESTHETIC).	5.3.1	Continue the City's Landmark Tree Program to celebrate and protect notable trees.	ONGOING	UFC	SFE, DPW, BOARD OF SUPERVISORS
	5.3.2	Develop an Urban Forest Awards Program.	0-5 YEARS	UFC	SFE, DPW, PLANNING
	5.3.3	Consider program to make benefits provided by trees visible to the pubic through signage or other means.	0-5 YEARS	UFC	DPW, SFE, PLANNING, FUF

A FREEWAY FOREST?

Almost 50% of San Francisco's greenhouse gas emissions come from transportation sources. *50,000 Trees*, an intriguing proposal by landscape architect Sarah Moos addresses this problem by re-envisioning the I-280 & 101 freeway interchange as a vast urban forest designed to sequester high levels of vehicle emissions (CO_2) while reducing the freeway's visual, noise and air quality impacts. The project indicates an emerging urban forest along San Francisco's freeways could create a high performing carbon sequestering green spine that also produces lumber, green jobs and open space.

Images by Sarah M





APPENDICES

APPENDIX

Phase 2: Trees in Parks & Open Spaces

The Urban Forest Plan's Second Phase will address trees in the City's parks & open spaces. Major topics to be addressed in Phase 2 include the development of succession strategies for aging trees and funding recommendations. The section below provides an overview of urban forestry operations and planning in San Francisco's parks and open spaces to date.

RECREATION & PARKS DEPARTMENT

The City's Recreation and Parks Department (RPD) manages approximately 131,000 trees on 3,257 acres of park land, encompassing neighborhood parks, open space, and destination parks such as Golden Gate Park and McLaren Park.

In 1980, the Golden Gate Forest Management Plan was developed. This plan identified the existing forest resource within Golden Gate Park and makes recommendations for reforestation efforts to improve the health and age diversity of Golden Gate Park trees, with an eye to improving the range of tree ages and sizes for long term overall forest health. This management plan is being successfully implemented, as evidenced in the current approximate 7 to 1 ratio of trees planted to trees removed in Golden Gate Park. However, the Golden Gate Forest Management Plan does not provide guidance on tree care needs, such as pruning and removal.

The strong reforestation efforts within GGP have not extended to the neighborhood parks system, where fewer trees are planted than removed each year. Further, within golf course areas, few, if any, trees are planted to replace removed trees.

In 2010, RPD completed an Assessment of Urban Forestry Operations within Recreation and Park Department properties. This assessment identifies that the majority of park forestry management actions are reactive versus programmed and makes a recommendation to moved towards increasing programmed care to 50% of the overall management activities. By increasing programmed care, RPD forestry crews will be able to use resource more efficiently, improve service requests through ensuring these requests are made by trained forestry professionals, and ensure each tree within the parks system has a defined care schedule, whereby structural and health issues may be addressed earlier, when they are easier and less expensive to correct.

The Recreation and Parks Department has been a leader in identifying new funding mechanisms to support forestry work, though prioritization and inclusion of tree management resources within their bond funding programs. Bond funding has provided two infusions of funds to the park forestry program, once in 2008 and again in 2012, that provide resources for current, ongoing forestry work. This bond funding may help RPD transition to more programmed care, though these resources are finite. Ongoing, secure funding resources for forestry operations still need to be identified.

While not under the jurisdiction of the City of San Francisco, the Golden Gate National Recreation Area and Presidio represent a significant portion of San Francisco's urban forest. A brief summary of these areas is provided below.

GOLDEN GATE NATIONAL RECREATION AREA (GGNRA)

The Golden Gate National Recreation Area is the largest urban national park in the world, encompassing a total of 75,500 acres in San Francisco and Marin counties. GGNRA encompasses many forested and non-forested destination parks and open spaces in San Francisco, including Alcatraz, the Presidio, Fort Mason, the Maritime National Historical Park, Crissy Field, Fort Point, Baker Beach, China Beach, Lands End, Sutro Heights and the Sutro Baths, Ocean Beach and Fort Funston.

THE PRESIDIO

The Presidio is 1,491 acre National Historic Landmark located within GGNRA lands. It is managed by the Presidio Trust in collaboration with the National Parks Service and the nonprofit Golden Gate Parks Conservancy.

Maintenance of the approximate 70K trees is guided by the "Vegetation Management Plan," adopted in 2001. This Plan identifies a Historic Forest Management Zone, which contributed significantly to the Presidio's National Historic Landmark status.

Natural regeneration in the Presidio's forested areas has been limited and without intervention the aging forest will decline. The Vegetation Management Plan seeks to improve the health and biological diversity of the Historic Forest areas, through rehabilitation and planting efforts with an eye to improving the size diversity, age ranges, and density of forested areas, while maintaining wind breaks, vistas, natural habitat, and historic character.

** Additional GGNRA lands encompass important portions of San Francisco's Urban Forest, Including Land's End, Fort Funston and Fort Mason. Future chapters of the urban forest plan should collaborate with the National Parks Service to improve the functionality and health of these forested areas.

APPENDIX

Phase 3: Trees on Private Property & Greening Buildings

The Third Phase of the Urban Forest Plan will consider unique issues related to trees on private property. In addition, mention should be made of the growing body of design and planning work related to urban greening on public and private buildings such as green roofs, walls and living architectural strategies.

TREES ON PRIVATE PROPERTY

Trees on private property account for significant portion of the San Francisco's trees. Many of the city's biggest trees are found on private property where expanded growing spaces (i.e. backyards) allow for the growth of large canopy trees. The benefits of these trees extend far beyond the property line. Neighbors, wildlife and other city residents all benefit from trees in our neighborhoods and the myriad benefits and ecosystem services they provide. The city's privately held properties hold great potential for increasing the size of the urban forest through new planting. Phase three of the Urban Forest Plan should consider programs, policies and incentives that support trees on private property and the property owners who care for them. In addition, programs and guidelines that support alternative greening tools for private property such as green roofs and vertical gardens should be pursued

Support for property owners in caring for trees on private property
While large trees provide some of the biggest benefits, they can be particularly challenging to maintain by property owner. Potential hazards and the high-cost of pruning large trees can create hardships for property owners. Grant or loan programs may be appropriate to lessen the burden of caring for large trees on private property, especially where a hardship can be demonstrated.

Mature & Significant Trees
The Public Works Code (Article 16) requires property owners who remove "significant" trees within 10 feet of the public right-of-way on private property to replace them or pay an lieu-fee. This protection is designed to recognize the public benefit these trees provide given their location adjacent to pedestrian activity and sidewalks. While these may be the most visible trees, the majority of trees on private property do not have any protections. Incentives and other policies should be considered for supporting significant trees on private property.

Species Considerations
The importance of unique or rare species inlcuding native species on private property should be highlighted.

Backyard & Private Property Tree Planting Program
Private land provides tremendous potential for expanding the urban forest. While most community-driven and City sponsored planting activities focus on public property and streets, opportunities to expand and encourage new plantings on private property.

Educational Campaign
Create an educational campaign aimed at communicating the benefits of trees on private property. Provide assistance selecting obtaining trees on private property to help meet citywide canopy coverage goals.

GREENING BUILDINGS & LIVING ARCHITECTURE

San Francisco's urban forest has great potential to expand by embracing alternative methods to green our streets, buildings and public spaces, especially where trees planting is not feasible due to narrow sidewalks, underground utilities, lack of space and harsh growing environments. The Planning Department is developing policies and incentives to advance alternative greening opportunities in the built environment including: green roofs, living walls, rooftop gardens, urban agriculture and temporary greening projects like parklets. In some instances green roofs and walls can be a lower cost option yet share all of the same benefits of trees including: providing habitat, improving air quality, mitigating heat island effects, capturing storm water, sequestering carbon, and creating beauty. Most of these alternative greening measures are maintained by private property owners..

APPENDIX

Glossary

The following glossary is provided to clarify terms used in the Plan document.

Tree:
Any large perennial plant having a woody trunk(s), branches, and leaves. Trees also shall include palm trees (Source: Public Works Code, Article 16).

Urban forest:
The collection of trees and other vegetation found along San Francisco's streets and within the built environment (Source: Urban Forest Plan – Phase 1: Street Trees, pg.4).

Street tree:
Any tree growing within the public right-of-way, including unimproved public streets and sidewalks (Source: Public Works Code, Article 16).

Understory (including 'other vegetation' and 'greening' and 'landscaping'):
Lower-level plantings located in sidewalk planters, such as grasses, shrubs, hedges, and the like (Source: Better Streets Plan, 2010).

Ecological function:
The term "ecological function" is used in the Plan to refer to the capacity of street trees to provide a variety of ecosystem services, including but not limited to: filtering air pollution, absorbing greenhouse gases, reducing stormwater runoff and providing wildlife habitat. It is understood that different tree species have varying capacities to provide more or less of one service or another.

APPENDIX

Existing San Francisco Urban Forest & Greening Policies, Plans, and Codes

The policies and documents that are relevant to the Urban Forest can be grouped into several general categories: Forestry Planning, Forestry Management and Forestry Assessment & Monitoring. Below is a summary of the most significant existing policies, plans and codes that affect our urban forest.

URBAN FORESTRY PLANNING

SOURCE	*REFERENCE*	*BRIEF*
THE URBAN FORESTRY ORDINANCE	ARTICLE 16 OF THE PUBLIC WORKS CODE	Describes DPW's jurisdiction and oversight responsibilities of trees in the public right-of-way and other trees protected under DPW's jurisdiction, including: tree planting requirements and procedures, tree care requirements and responsibilities, tree removal procedures, and oversight of the landmark and significant tree programs.
THE URBAN FOREST PLAN	ENV. CODE, CHAPTER 12, SEC. 1204	Identifies that the Urban Forestry Council (UFC) is responsible for the creation of the Urban Forest Plan.
	PWC, ARTICLE 16, SEC. 803 (A)(5)	Identifies that the UFC should support DPW in the maintenance of an UF Management Plan.
	PWC, ARTICLE 16, SEC. 813	Notes the Urban Forest Management Plan should be adhered to. It names a document called "The Trees of San Francisco," adopted on April 16, 1991.
	URBAN FOREST PLAN (ADOPTED 2006)	The existing Plan approved and adopted by the Urban Forestry Council in 2006.
	URBAN FORESTRY COUNCIL RESOLUTION NO. 006-07-UFC (PASSED MARCH 2007)	Designates that the UFC will works with the Planning Department to complete the UF plan.
RECOMMENDED STREET TREE LIST	ENV. CODE, CHAPTER 12, SEC. 1206	Within the section on "Best Management Practices" the UFC is directed to help with species selection.
	PWC, ARTICLE 16, SEC. 803 (A)(3)	Directs the UFC to recommend appropriate species of trees to be plant
BETTER STREETS PLAN	ADOPTED 2010, PLANNING CODE, SEC. 138.1.	Includes recommendations for streetscape design including street tree siting and location. Requirements for street tree planting and other streetscape amenities contained in Planning Code, Sec. 138.1.
RECREATION & OPEN SPACE ELEMENT	SAN FRANCISCO GENERAL PLAN	The Element recommends maintenance and expansion of the City's urban forest including: systematic inventory, planting program, wood waste management, interagency coordination and public information.

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Urban Forestry Planning *continued...*

STREET TREE ACTION PLAN	STREET TREE ACTION PLAN (ADOPTED IN 2004 BY UFC)	Recommendations to increase the number of existing street trees by 100K trees total over a 20 year period, at which time all available street tree planting locations would be filled. Trees were to be maintained by DPW, who's planting and maintenance budget would increase. The plan also called for lowering the tree maintenance cycle from an average of 7 years to 3 years.
SIGNIFICANT NATURAL RESOURCE AREAS MANAGEMENT PLAN	SAN FRANCISCO PARKS & RECREATION DEPARTMENT (2006)	The Plan identifies management strategies for trees within designated Natural Areas.
GOLDEN GATE PARK MASTER PLAN	SAN FRANCISCO PARKS & RECREATION DEPARTMENT (1998)	The Plan includes a Forestry Management section outlining recommendations for park trees.
SAN FRANCISCO SUSTAINABILITY PLAN	PARKS, OPEN SPACE AND STREETSCAPES SECTION (ADOPTED IN 1996)	Identifies a long term objective of increasing the number of street trees by 50K trees; a short term 5-year objective is to increase the number of street trees by 4K trees a year. There an additional objective to focus on biodiversity with streetscape planting.

URBAN FORESTRY MANAGEMENT

SOURCE	*REFERENCE*	*BRIEF*
THE URBAN FORESTRY ORDINANCE	ARTICLE 16 OF THE PUBLIC WORKS CODE	Describes DPW's jurisdiction and oversight responsibilities of trees in the public right-of-way and other trees protected under DPW's jurisdiction, including: tree planting requirements and procedures, tree care requirements and responsibilities, tree removal procedures, and oversight of the landmark and significant tree programs.
PLANTING STREET TREES	PWC, ARTICLE 16, SEC. 806(A)(1)	Procedures for departmental planting of street trees.
	PWC, ARTICLE 16, SEC. 806(B)(2)	Procedures for non-departmental planting of street trees.
	DPW ORDER #169,946	Noted on SFDPW's website: Tree basins will be located in compliance with [this] order."
	DPW ORDER #178,631	Street tree planting guidelines: general requirement and minimum restrictions. Describe minimum tree size, basin size, proximity to infrastructure, etc.
	PLANNING CODE, SEC. 138.1 (C) (1)	Requires street trees for every 20' of frontage as part of development projects. When trees are required but not permitted due to conflicts, in-lieu fees will be collected to fund tree planting in other areas.
	PLANNING CODE, SEC. 428	Requires payment of in-lieu fees for tree planting to DPW's Adopt-A-Tree Fund in cases where planting requirements of Sec. 138.1 are waived by the Zoning Administrator.

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Urban Forestry Management *continued...*

MAINTAINING STREET TREES	PWC, ARTICLE 16, SEC. 805 (A-B)	Describes general tree maintenance responsibilities of private property owners and DPW.
	PWC, ARTICLE 16, SEC. 805 (C)	Street tree establishment and replacement of dead trees.
	PWC, ARTICLE 16, SEC. 805 (E)	Departmental relinquishment of street tree maintenance.
	PWC, ARTICLE 16, SEC. 808	Protection of trees and landscape materials
	PWC, ARTICLE 16, SEC. 811	Describes criminal, civil, and administrative penalties for violating of the UF Ordinance.
	FINANCING SAN FRANCISCO'S URBAN FOREST: COSTS AND BENEFITS OF A COMPREHENSIVE MUNICIPAL STREET TREE PROGRAM (2012).	Identifies potential funding opportunities for a fully municipally maintained Street Tree program. Analyzed DPW current maintenance structure and program.
REMOVING STREET TREES	PWC, ARTICLE 16, SEC. 806(A)(2-5)	Procedures for departmental removal of street trees, including appeals process.
	PWC, ARTICLE 16, SEC. 806(B)(3)	Procedures for non-departmental removal of street trees, including application fees and appeals process.
THE ADOPTED PRUNING STANDARDS	ENV. CODE, CHAP. 12, SEC. 1206	Describes the required development of these standards, identifying that the UFC was responsible for this work. These standards apply to all trees on public land (including street trees)and provide guidance for good maintenance of trees on private land
	PWC, ARTICLE 16, SEC 805 (A)	Notes that DPW will make pruning standards available to the public.
	URBAN FORESTRY COUNCIL RESOLUTION NO. 007-06-UFC	Urban Forestry Council Resolution No. 007-06-UFC – (passed in June 2006) Approves the Adopted Pruning Standards. SFE published an easy-to-use booklet on the Standards that we have provided to other City agencies for distribution.
PINE PITCH CANKER	URBAN FORESTRY COUNCIL RESOLUTION NO 004-10-UFC (ADOPTED MARCH 2010)	Recommended adoption of the Pitch Canker Task Force management recommendations for trees infected by pine pitch canker. (Details contained within position paper they revised in September 2001.)
HAZARD TREE AND HAZARD TREE ABATEMENT	PWC, ARTICLE 16, SEC. 809	Notification, abatement, and enforcement procedures for hazard trees.
LANDMARK TREE PROGRAM	PWC, ARTICLE 16, SEC. 810	Describes the nomination, review, and designation process, along with penalties for violation.
	ENV. CODE, CHAPTER 12, SEC. 1203	Directs UFC to establish criteria, propose administrative procedures, and a tree removal appeal process for landmark trees.
SIGNIFICANT TREE PROGRAM	PWC, ARTICLE 16, SEC. 810A	Describes criteria for trees that are automatically protected under Significant Tree designation (trees within 10' of the public right-of-way that meet certain size thresholds) and additional consideration that will be taken into account for tree removal applications.
SAN FRANCISCO TREE DISPUTE RESOLUTION ORDINANCE	PWC, ARTICLE 16.1	Describes procedures, standards to use to make determinations and possible restorative actions, and liabilities for disputes regarding trees on private property.

FORESTRY ASSESSMENT AND MONITORING

SOURCE	REFERENCE	BRIEF
THE ANNUAL URBAN FOREST REPORT	ENV. CODE, CHAPTER 12, SEC. 1209	Directs the UFC to produce a report by September 1st of each year on the state of the urban forest, which reviews forestry management operations of the past year. It also directs all city agencies and nonprofits that receive public funding to supply reporting information to the UFC by June 30th of each year.
	PWC, ARTICLE 16, SEC. 803(A)(2)	Directs the UFC to prepare an annual report detailing the state of the urban forest.
STREET TREE INVENTORY	PWC, ARTICLE 16, SEC 805	Establishes that DPW will use their best efforts to maintain an inventory of trees under their jurisdiction.

APPENDIX

Urban Tree Canopy Analysis

Prepared by San Francisco Planning Department in 2012

BACKGROUND

In preparation for the San Francisco Urban Forest Plan (2013), the Planning Department performed an Urban Tree Canopy (UTC) Analysis using aerial imagery and additional data sets to determine a canopy estimate for the City & County of San Francisco. This analysis estimated San Francisco's tree canopy at 13.7%. This number supersedes a previous canopy estimates of 11.9% (USDA Forest Service, 2007) and 16.1% (Center for Urban Forest Research, 2007). Given the differing methodologies used to arrive at these numbers it is difficult to draw conclusions regarding urban forest growth or decline based on a comparison between varying canopy estimates[1]. The current analysis establishes a baseline and methodology from which future canopy analyses can be conducted and compared over subsequent years to track San Francisco's urban forest growth or decline over time.

METHODOLOGY

The methodology used in this analysis was developed based on similar studies in other cities and the availability of relevant data within San Francisco. The process is outlined and described below.

Step 1: Distinguish different types of vegetation. Tree canopy was selected from an aerial photo by translating the image into vegetation layers using three major data sources. Multispectral Digital Orthophoto Quarter Quads (DOQQs) or aerial photos that were flown in June of 2010 (selected to match available LiDAR data) were obtained from the U.S. Department of Agriculture's Aerial Photography Field Office through their National Agriculture Imagery Program (NAIP). These one meter resolution orthophotos were combined with a commercial Light Detection and Ranging (LiDAR) dataset a height above ground, ten foot resolution raster purchased from Pictometry International Corp and flown in June of 2010. Additionally, building footprint data derived from the Pictometry data above were also used to create three vegetation layers – 1.) trees, 2.) intermediate vegetation and 3.) grass. The process was as follows.

Step 2: Create Vegetation Layers (Grass, Intermediate, Trees). The 2010 six inch LiDAR surface was reclassified according to height above ground using the Spatial Analysis extension of ArcMap 10.0. The data were divided into three classes according to height above ground: 1) below one foot, 2) from one foot to eight feet, and 3) over eight feet. The following classes were created to account for all imagery in the photo based on height:

CLASS 1	*Less than 1'*	Grass, pavement, soil, open water.
CLASS 2	*1' - 8'*	Transitional layer, shrubs, cars.
CLASS 3	*More than 8'*	Trees, buildings.

This data set includes everything in the city, so all things were classified. For example, along with trees, bushes and grass, buildings (Class 3), cars (Class 2) and sidewalks (Class 3) were also included. This raster was subsequently converted into three multipart polygon shapefiles representing the three classes. A vegetation layer was created next.

1 The United States Department of Agriculture, Forest Service (2007) derived an estimated citywide canopy percentage (11.9%) from a random selection of 200 field plots within the city that were then used to extrapolate a citywide canopy cover estimate. The Center for Urban Forest Research used aerial imagery to derive a canopy estimate (16.1%). The wide range led the Planning Department to conduct a more recent analysis (2012) using a combination of citywide aerial imagery and LiDAR data to calculate a current canopy estimate (13.7%).

Using the DOQQs, a Normalized Difference Vegetation Index (NVDI) was created. Using the Map Algebra calculator in the Spatial Analysis extension, the following equation was performed on Band-1 (red) and Band-4 (infrared).

$$NVDI = \frac{Infrared\ Band - Red\ Band}{Infrared\ Band + Red\ Band}$$

The NVDI calculation results in a value from -1 to 1, with a value of >0.2 mainly representing vegetation. The resulting raster was reclassified with 1 representing "no vegetation" and 2 representing "vegetation". This reclassified raster was then turned into a vegetation polygon shapefile, and intersected with the Class 1, Class 2, and Class 3 to create polygon shapefiles for "Trees," "Intermediate," and "Grass". Other datasets (blocks, lots, building footprints, streets, sidewalks, water, etc.) were used along with an eyeball analysis to separate discrete layers. The vegetation polygon shapefile was then combined with existing datasets, including streets, blocks, building footprints, and water layers to create discrete landscape layers.

Step 3: Calculate Citywide Tree Canopy. The "tree" polygon vegetation layer created in Step 2 was utilized to derive a percentage of the San Francisco covered by the canopy of trees (leaves, stems, branches). Tree canopy was calculated by dividing the total area of the tree layer by the total area of the city. The calculated is shown below.

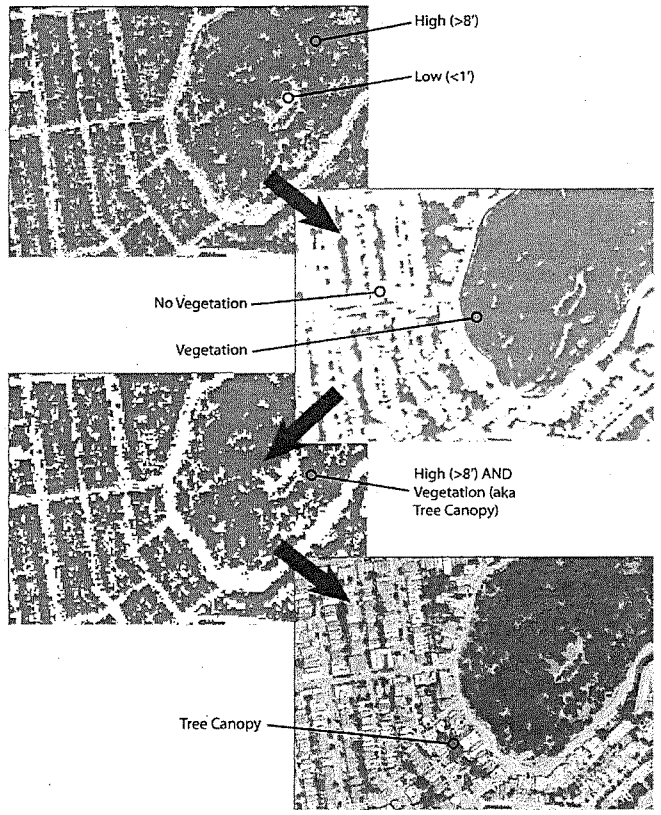
$$\frac{Total\ urban\ tree\ canopy}{Total\ area\ of\ city} = \%\ \text{TREE CANOPY COVER}$$

$$\frac{4{,}148\ acres\ tree\ canopy}{30{,}178.4\ acres\ city\ land} = 13.7\%\ \text{TREE CANOPY COVER}$$

Step 4: Calculate Tree Canopy by Neighborhood. Tree canopy coverage for individual neighborhoods was determined by dividing total tree canopy by standard Planning Department neighborhood boundaries to arrive at percentage canopy per neighborhood (see map 2).

IDENTIFYING VEGETATION LAYERS

Vegetation layers were selected by combining infrared orthophotos with LiDAR height above ground data to identify and select tree canopy.

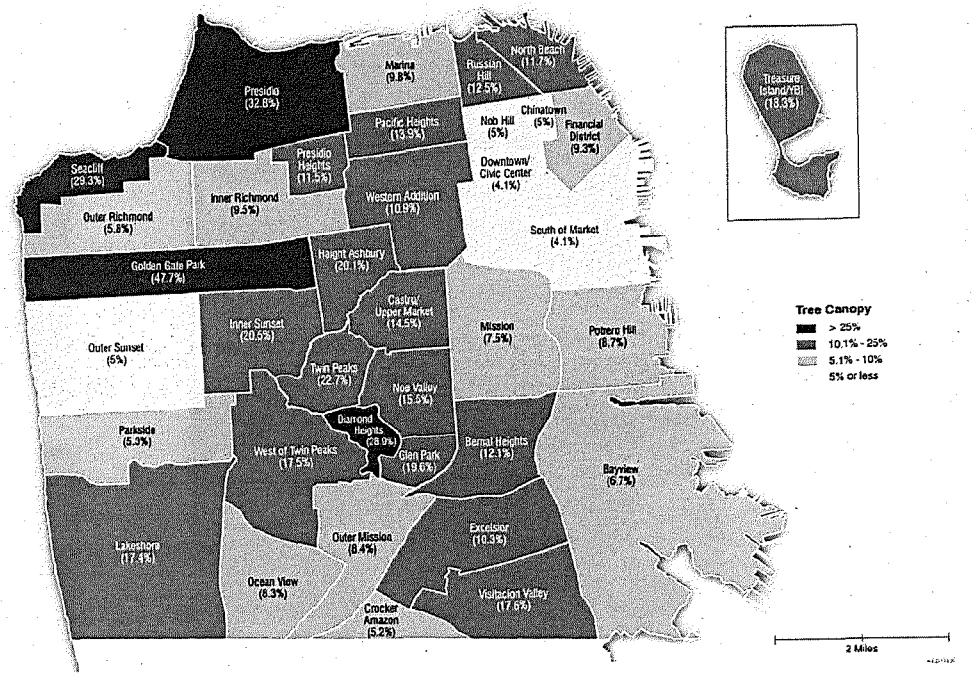


Notes on the Analysis & Considerations for Future Analyses. San Francisco's urban tree canopy should continue to be monitored at regular intervals (e.g. every five years) utilizing similar methods to the one described here[1]. These analyses will be useful to forest managers, planners and community groups in assessing the City's progress on meeting its urban forestry goals, effectiveness of management programs and identifying areas for urban forest growth.

1 Considerations must be made regarding the availability of useful and timely data. Because of limited funding for this analysis, low-cost multispectral imagery from the NAIP program was used in conjunction with LiDAR data purchased under current City contracts and licensing with Pictometry Corp. There is no guarantee that NAIP will have 2015 imagery available or that the City will have purchased the required LiDAR data needed to perform this analysis exactly the same as described here in the future. Similar datasets, certainly, could be obtained however, resulting in increased costs for a future analysis.

DIGITIZED SAN FRANCISCO TREE CANOPY

SAN FRANCISCO TREE CANOPY BY NEIGHBORHOOD

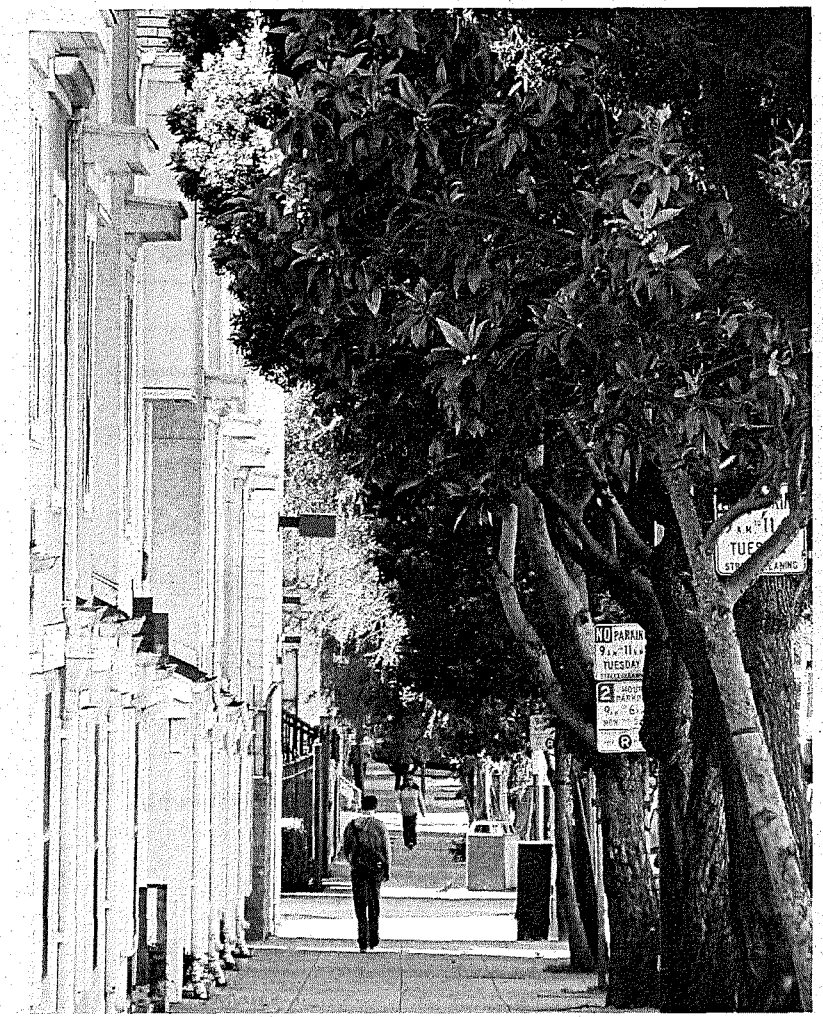


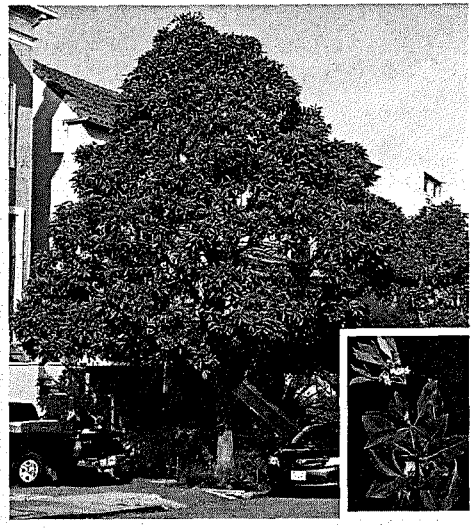
Maps by Michael Webster, SF Planning Dept. (2012)

APPENDIX

Most Common San Francisco Street Trees

San Francisco's street trees are selected for many reasons including their ability to thrive in the city's different microclimates, shape, height, and tendency to flower or change color. These pages feature some of the most commonly planted street trees in San Francisco.

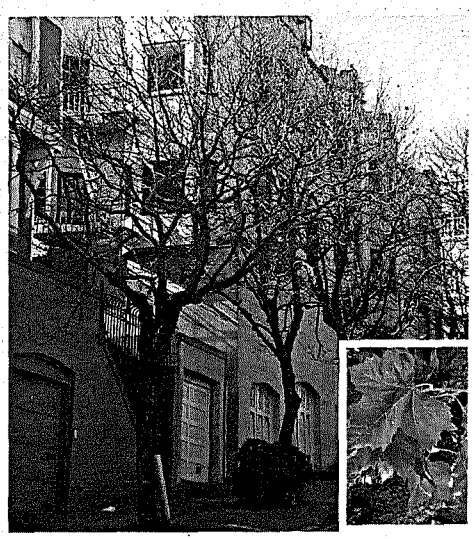




1 Brisbane Box

Lophostemon confertus

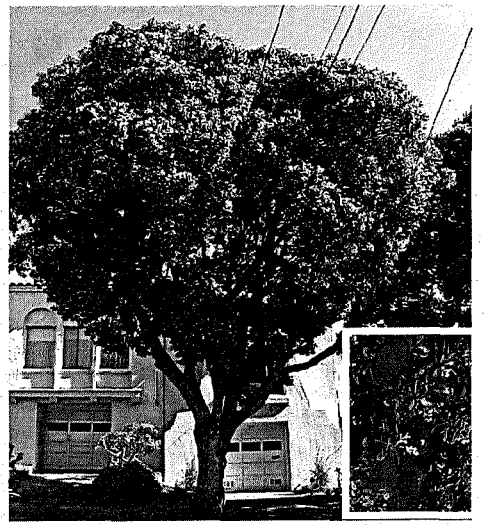
Lophostemon confertus is a tree native to Australia that does well in San Francisco's similar Mediterranean climate. It is a great street tree due to its disease and pest resilience, high tolerance for smog, drought, and poor drainage, as well as needing only moderate-to-light upkeep.



2 Sycamore, London Plane, others

Platanus x hispanica

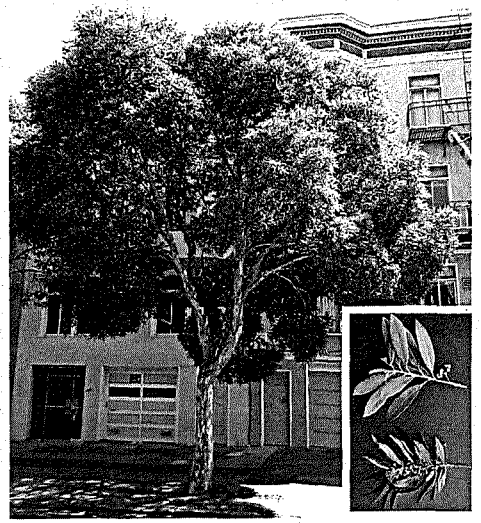
This beautiful, hardy species is well adapted to harsh urban conditions, making it a very common San Francisco street tree. It is a fast growing tree up to 50' tall with a spreading form with up to 40' of canopy cover.



New Zealand Christmas Tree

Metrosideros excelsa

Metrosideros excelsa brightens San Francisco's streets with its blood red flowers blooming in multiple cycles throughout the year. It is an excellent choice for coastal neighborhoods as it tolerates prevailing winds and is disease and pest resistant.



Swamp Myrtle, Small-Leaf Tristania

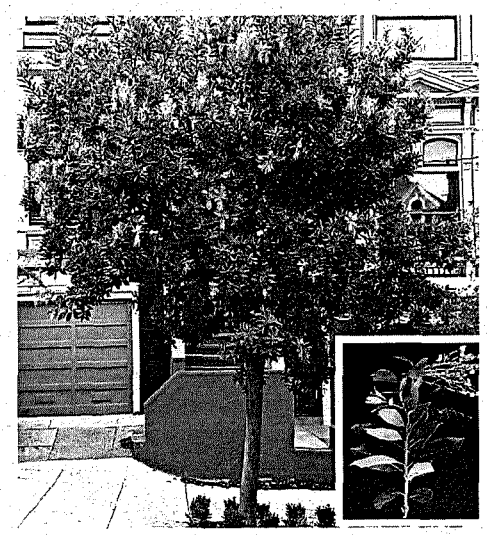
Tristaniopsis laurina

Native to eastern Australia, this species of tree develops into a formal looking shape along city streets with a dense canopy. It is a tough, low-maintenance tree that blooms small yellow, fragrant flowers in April-June.

Ornamental Cherry, Kwanzan Flowering Cherry, others

Prunus serrulata

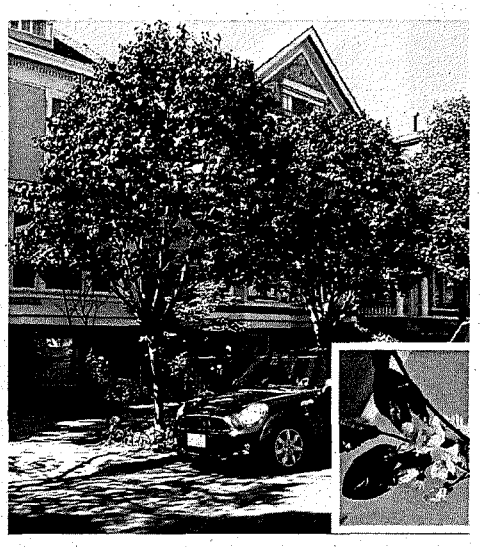
Prunus serrulata is a cultivar of the Japanese native cherry trees. The beautiful flowers color the streets in March-April. They are not only enjoyed by San Franciscans, but birds and bees as well.



Strawberry Tree

Arbutus 'marina'

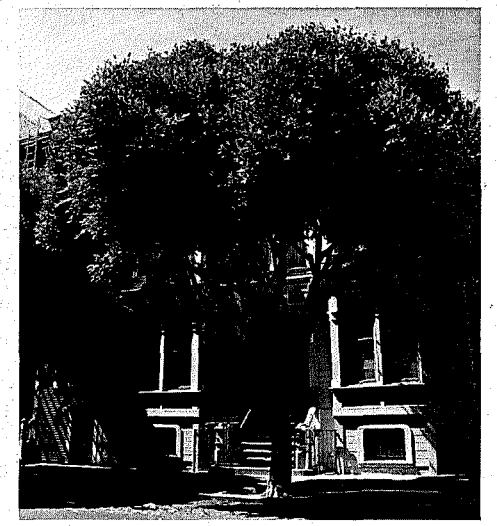
Arbutus 'marina' brings striking colors to San Francisco trees with its attractive flowers and bright berries. It requires little care but does not tolerate strong winds.



Cherry Plum, Purple Leaf Plum, others

Prunus cerasifera

The *Prunus cerasifera* is one of the first trees to bloom in the spring with light pink, fragrant flowers that attract bees. The burgundy or purple-green foliage brings unique colors to street trees in the city.



Laurel Fig, Chinese Banyan, others

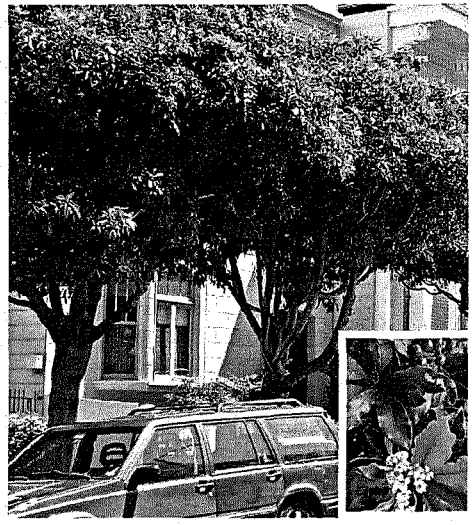
Ficus nitida

The *Ficus nitida* is a dense shade tree, perfect for sites with wide medians and large courtyards. The dense rounded canopy spreads with age, providing great shade for sunny San Francisco days.

Southern Magnolia, Samuel Sommer Magnolia, others

Magnolia grandiflora

Native to the SE United States, these trees bloom spectacular, long-lasting white, fragrant flowers and attractive foliage that make this a very popular street tree. There are also smaller, slow-growing varieties that are appropriate for beneath overhead wires.



Victorian Box

Pittosporum undulatum

Pittosporum undulatum are native to Australia and are valued for their foliage and form when allowed to branch naturally. Their creamy white flowers are very fragrant, similar to orange blossoms, most noticeable in the evenings. They also attract birds and bees.

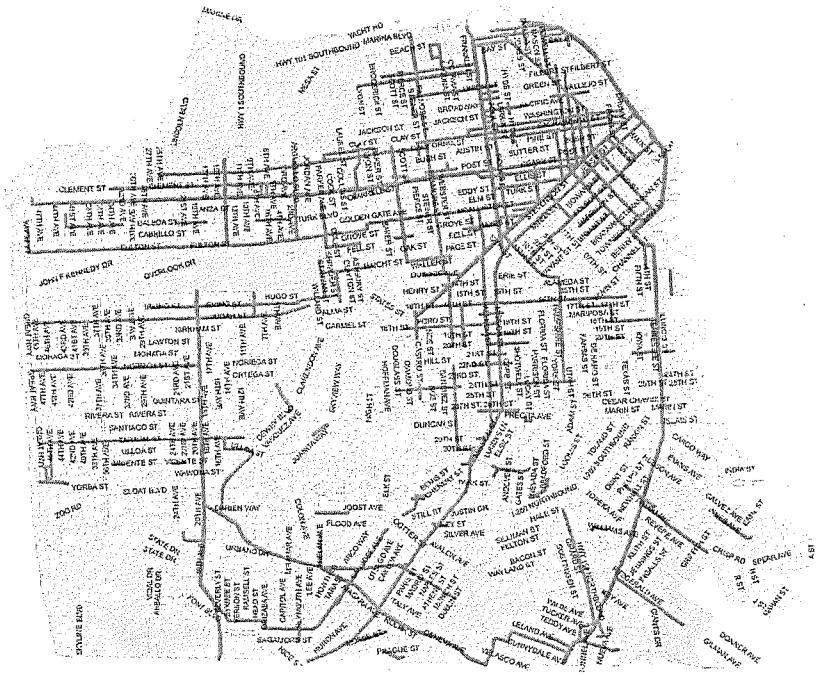
APPENDIX

Supporting Maps & Data

WALKABILITY + PEDESTRIAN SAFETY

Pedestrian Framework Map: Streetscape Streets

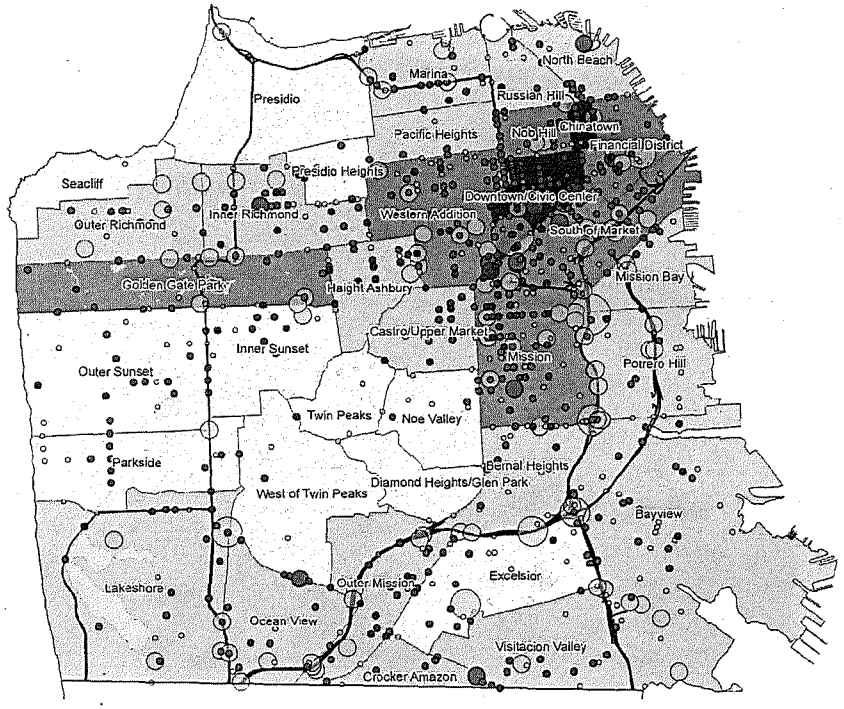
The Pedestrian Framework of San Francisco displays key walking streets within the city that could be prioritized for increased street tree planting or restocking of empty tree basins.



San Francisco Planning Department | WalkFirst

Locations of Severe and Fatal Traffic Injuries: Pedestrians, Cyclists, & Drivers

Street trees can act as buffers between vehicle traffic and pedestrians and bicyclists. Street trees can also be employed as a traffic calming strategy to improve safety and slow vehicles.



San Francisco Department of Public Health

ECOLOGY + HABITAT

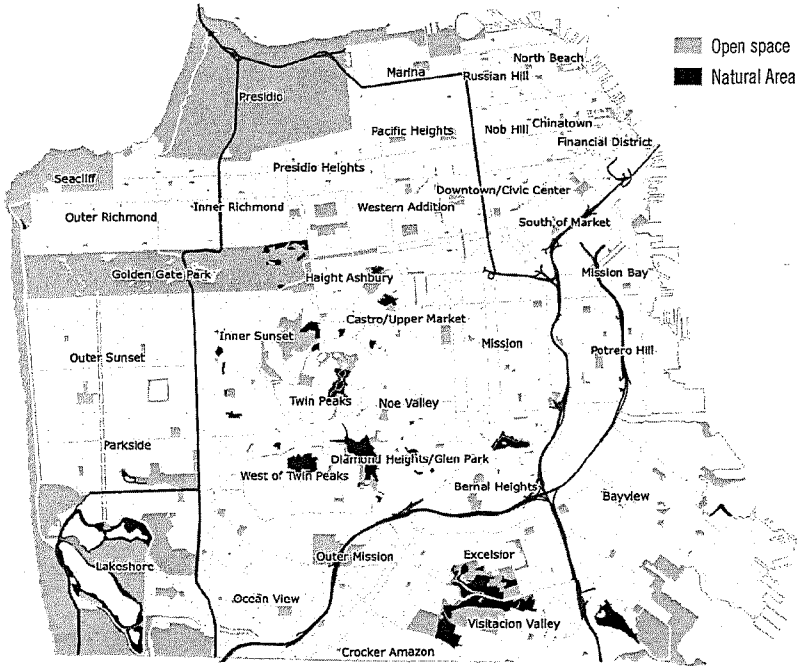
Urban Bird Refuge

The Planning Department's *Standards for Bird-Safe Buildings* identify areas of the city where the presence of birds may require certain building treatments to ensure bird safety. These refuge areas also point to areas where trees can support wildlife such as birds.

San Francisco Planning Department

Open Spaces & Natural Areas

Public open space refers to lands that are publicly owned, publicly used, and publicly accessible. The Recreation & Parks Department has identified 32 "Natural Areas" that contain remnants of San Francisco's historic landscape and natural heritage and support an array of native habitats and species.

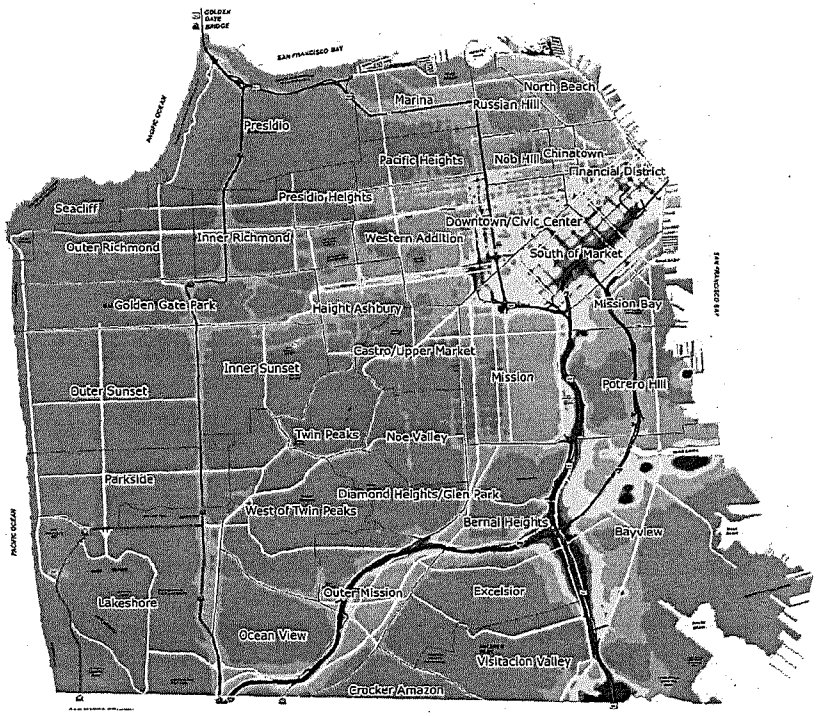


San Francisco Department of Public Health

AIR QUALITY

Particulate Matter Concentration

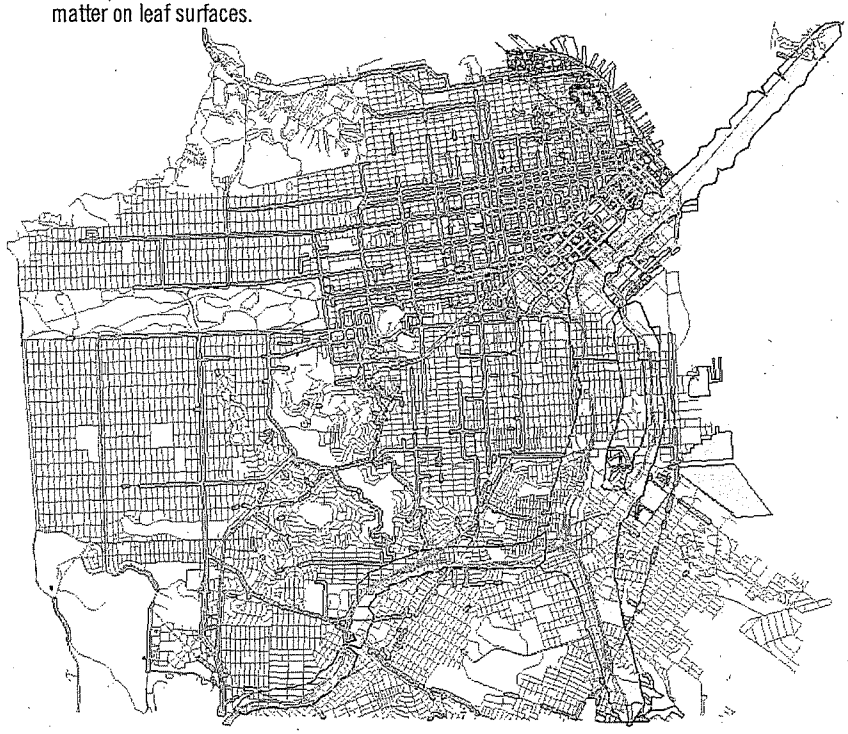
This map displays the location of particulate matter pollution within San Francisco such as areas with a high intensity of vehicle traffic. Trees in these areas can help improve air quality by intercepting airborne particles.



SF Department of Public Health | Bay Area Air Quality Management District

Air Pollution

Air pollution sources in San Francisco are largely tied to the vehicle network. Trees can help improve air quality in affected areas by absorbing gaseous pollutants (carbon dioxide, sulphur dioxide, and nitrous oxide) and by capturing airborne particulate matter on leaf surfaces.

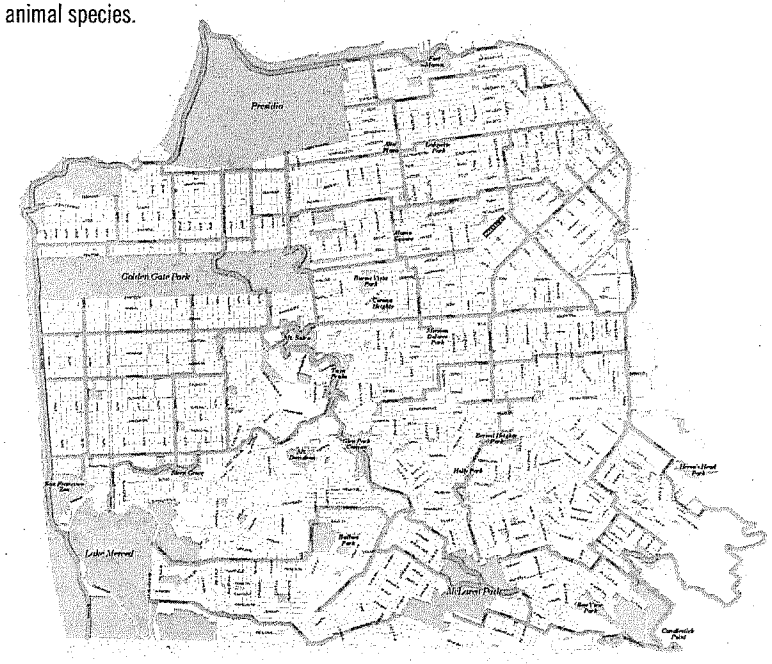


San Francisco Planning Department

ECOLOGY + HABITAT

Green Connections Network

The Green Connections Project aims to increase access to parks, open spaces, and the waterfront through a network of 'green connectors' – city streets that will be upgraded over the next 20 years to create safer and more pleasant travel to parks by walking, biking, and other forms of active transportation. Associated planting recommendations for these routes aim to support wildlife by creating more habitat within the city. Each route is identified with a local plant or animal species.

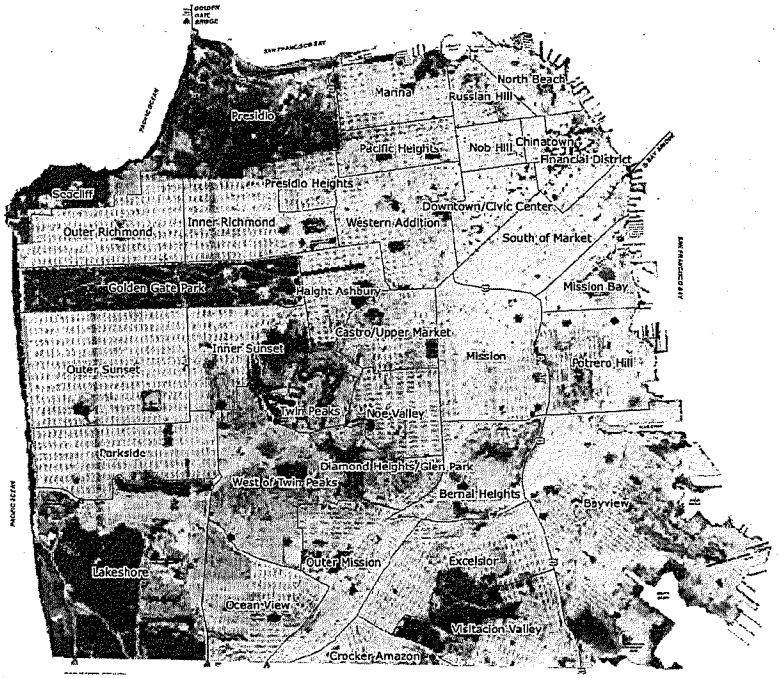


San Francisco Planning Department

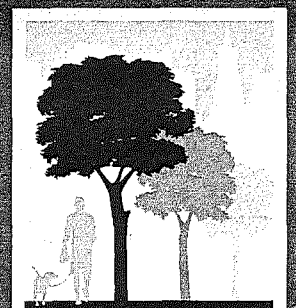
WATER

Impervious Surfaces

This map identifies areas with higher concentrations of paved or impervious surfaces are located (shown in lighter color). These areas are prone to the urban heat island effect and creation of stormwater runoff. Trees in these areas can contribute to the enhanced ecological function of the city by reducing these impacts.



USGS Seamless Server | 2006 National Land Cover Database



SAN FRANCISCO

URBAN FOREST PLAN

HTTP://URBANFOREST.SFPLANNING.ORG

BOARD of SUPERVISORS

City Hall
Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 554-5227

MEMORANDUM

TO: Jonas Ionin, Acting Commission Secretary, Planning Commission
Phil Ginsburg, General Manager, Recreation and Parks Department
Deborah Raphael, Director, Department of the Environment

FROM: Andrea Ausberry, Assistant Clerk, Land Use and Economic Development Committee, Board of Supervisors

DATE: January 16, 2015

SUBJECT: LEGISLATION INTRODUCED

The Board of Supervisors' Land Use and Economic Development Committee has received the following proposed legislation, introduced by Supervisor Wiener on December 16, 2014:

File No. 141264

Ordinance amending the General Plan by amending Policy 3.6 of the Recreation and Open Space Element to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees); affirming the Planning Department's determination under the California Environmental Quality Act; and making findings of consistency with the General Plan, and the eight priority policies of Planning Code, Section 101.1.

If you have any additional comments or reports to be included with the file, please forward them to me at the Board of Supervisors, City Hall, Room 244, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102.

c:
Sarah Ballard, Recreation and Parks Department
Margaret McArthur, Recreation and Parks Department
Guillermo Rodriguez, Department of the Environment

From: Board of Supervisors (BOS)
To: Wiener, Scott; Kim, Jane (BOS); Cohen, Malia (BOS); Ausberry, Andrea
Subject: File 141264 FW: Land Use Hearing: Street Trees
Date: Thursday, January 22, 2015 1:07:40 PM

From: Patricia De Fonte [mailto:patricia_defonte@yahoo.com]
Sent: Wednesday, January 21, 2015 3:44 PM
To: Board of Supervisors (BOS); Ney Street Neighborhood Watch
Cc: Dan Flanagan; Swae, Jon (CPC)
Subject: Land Use Hearing: Street Trees

Dear Supervisors Weiner, Kim and Cohen,

The members of Ney Street neighborhood watch have planted over 200 sidewalk trees in the last two years with Friends of the Urban Forest and we also planted almost 30 trees in the median of Alemany Blvd between Lyell and Congdon Streets in the Excelsior District.

We could have planted MANY more trees if the City would take responsibility for the care of street trees.

Living near both the 280 freeway, we need as many trees in the ground as possible to abate the relentless noise and air pollution we are subjected to in this blue collar working class neighborhood.

I hope that you will allow the Friends of the Urban Forest and John Swae of the Urban Forest Plan to continue to do their good work in greening our City, and let the aging and/or lower income population of the Excelsior feel free to commit to putting a tree in their front yard without the stress and worry of future high costs of maintenance.

I cannot attend the hearing on Monday, Monday, January 26, 1:30pm at City Hall Room 263 to speak in favor the New Forest Plan, and hope that the Land Use Committee will give serious thought to the tens of thousands of San Franciscans who live in the Southern reaches of the City, surrounded by freeways, with streets completely devoid of trees for blocks and blocks.

Help FUF, the Urban Forester and local residents continue to do their good work of planting trees by agreeing to take on maintenance in the future.

Patricia De Fonte
Ney Street Neighborhood Watch
130 members and growing
When We See Something We Say Something (and plant a tree!)

Please excuse typos - I am usually doing 4 things at once.

BOARD of SUPERVISORS

City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
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NOTICE OF PUBLIC HEARING

BOARD OF SUPERVISORS OF THE CITY AND COUNTY OF SAN FRANCISCO

LAND USE AND ECONOMIC DEVELOPMENT COMMITTEE

NOTICE IS HEREBY GIVEN THAT the Land Use and Economic Development Committee will hold a public hearing to consider the following proposal and said public hearing will be held as follows, at which time all interested parties may attend and be heard:

Date: **Monday, January 26, 2015**

Time: **1:30 p.m.**

Location: **Committee Room 263, located at City Hall**
1 Dr. Carlton B. Goodlett Place, San Francisco, CA

Subject: **File No. 141264.** Ordinance amending the General Plan by amending Policy 3.6 of the Recreation and Open Space Element to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees); affirming the Planning Department's determination under the California Environmental Quality Act; and making findings of consistency with the General Plan, and the eight priority policies of Planning Code, Section 101.1.

In accordance with Administrative Code, Section 67.7-1, persons who are unable to attend the hearing on this matter may submit written comments to the City prior to the time the hearing begins. These comments will be made as part of the official public record in this matter, and shall be brought to the attention of the members of the Committee. Written comments should be addressed to Angela Calvillo, Clerk of the Board, City Hall, 1 Dr. Carlton Goodlett Place, Room 244, San Francisco, CA 94102. Information relating to this matter is available in the Office of the Clerk of the Board. Agenda information relating to this matter will be available for public review on Friday, January 23, 2015.

Angela Calvillo
Clerk of the Board

DATED: January 14, 2015
PUBLISHED /POSTED: January 16, 2015

BOARD of SUPERVISORS

City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 544-5227

LAND USE & ECONOMIC DEVELOPMENT COMMITTEE
NOTICE REVIEW

Legislative File No. 141264

General Plan Amendments - Urban Forest Plan (Phase 1: St. Trees)

Initial: DM Initial: DS 1/13/15

Date: January 9, 2015

Publishing Logistics

Hearing Date: Jan. 26
Notice Must be Submitted: Jan. 14
Notice Will Publish: Jan 16.

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NOTICE OF PUBLIC HEARING BOARD OF SUPERVISORS OF THE CITY AND COUNTY OF SAN FRANCISCO LAND USE AND ECONOMIC DEVELOPMENT COMMITTEE MONDAY, JANUARY 26, 2015 - 1:30 PM COMMITTEE ROOM 263, CITY HALL 1 DR. CARLTON B. GOODLETT PLACE, SAN FRANCISCO, CA

NOTICE IS HEREBY GIVEN THAT the Land Use and Economic Development Committee will hold a public hearing to consider the following proposal and said public hearing will be held as follows, at which time all interested parties may attend and be heard: **File No. 141264.** Ordinance amending the General Plan by amending Policy 3.6 of the Recreation and Open Space Element to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees); affirming the Planning Department's determination under the California Environmental Quality Act; and making findings of consistency with the General Plan, and the eight priority policies of Planning Code, Section 101.1. In accordance with Administrative Code, Section 67.7-1, persons who are unable to attend the hearing on this matter may submit written comments to the City prior

to the time the hearing begins. These comments will be made as part of the official public record in this matter, and shall be brought to the attention of the members of the Committee. Written comments should be addressed to Angela Calvillo, Clerk of the Board, City Hall, 1 Dr. Carlton Goodlett Place, Room 244, San Francisco, CA 94102. Information relating to this matter is available in the Office of the Clerk of the Board. Agenda information relating to this matter will be available for public review on Friday, January 23, 2015. Angela Calvillo, Clerk of the Board

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Publication	$251.25
NetTotal	$226.12

NOTICE OF PUBLIC HEARING BOARD OF SUPERVISORS OF THE CITY AND COUNTY OF SAN FRANCISCO LAND USE AND ECONOMIC DEVELOPMENT COMMITTEE MONDAY, JANUARY 26, 2015 - 1:30 PM COMMITTEE ROOM 263, CITY HALL 1 DR. CARLTON B. GOODLETT PLACE, SAN FRANCISCO, CA

NOTICE IS HEREBY GIVEN THAT the Land Use and Economic Development Committee will hold a public hearing to consider the following proposal and said public hearing will be held as follows, at which time all interested parties may attend and be heard: **File No. 141264.**Ordinance amending the General Plan by amending Policy 3.6 of the Recreation and Open Space Element to reflect the adoption by reference of the Urban Forest Plan (Phase 1: Street Trees); affirming the Planning Department's determination under the California Environmental Quality Act; and making findings of consistency with the General Plan, and the eight priority policies of Planning Code, Section 101.1. In accordance with Administrative Code, Section 67.7-1, persons who are unable to attend the hearing on this matter may submit written comments to the City prior to the time the hearing begins. These comments will be made as part of the official public record in this matter, and shall be brought to the attention of the members of the Committee. Written comments should be addressed to Angela Calvillo, Clerk of the Board, City Hall, 1 Dr. Carlton Goodlett Place, Room 244, San Francisco, CA 94102. Information relating to this matter is available in the Office of the Clerk of the Board. Agenda information relating to this matter will be available for public review on Friday, January 23, 2015. Angela Calvillo, Clerk of the Board