



Canyon Enhancement Planning Guide

San Diego Canyonlands | www.sdcanyonlands.org

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Our Mission

The mission of San Diego Canyonlands (SDCL) is *to promote, protect and restore the remaining natural habitats in San Diego County's canyons and creeks, by fostering education and ongoing community involvement in stewardship and advocacy, and by collaborating with other organizations.*

Learn more about our programs at www.sdcanonlands.org.

Purpose of This Guide

This ***Canyon Enhancement Planning Guide*** (CEP Guide) is designed to help community stakeholders facilitate a proven canyon enhancement planning process that – when implemented canyon-by-canyon - implements a regional vision to integrate our natural open spaces with the fabric of San Diego's urban environment. This visionary concept and goals include: physical and visual canyon access, restoration, preservation, environment-based education and ecologically sensitive recreation.

In addition to a Master Permit currently being pursued by SDCL with the help of the City of San Diego Park and Recreation Department's Open Space Division, the CEP Guide should be a resource to cut time, cost and red tape for comprehensive canyon-enhancement planning and for implementing individual canyon projects. Its purpose is to maximize efficiency and the level of coordination between canyon stewardship ("friends") groups and various City departments and other stakeholders.

We hope you put this guide to work to protect and enhance *your* local canyon!

Note on Pilot Project

The information included in this guide is based on experiences gained during the CEP pilot project in City Heights, a process that is still underway. Consequently, certain portions of this guide will be more comprehensive than others. The guide will be updated as SDCL and its collaborators progress with CEP. In the meantime, CEP has proven to be a thorough and successful form of community planning, and there is more than sufficient information and instruction on how to begin and accomplish the first critical steps of the process (building local support and mapping existing conditions). Please don't hesitate to begin implementing CEP in your targeted canyon!

If you have any questions or concern, please don't hesitate to contact SDCL Executive Director Eric Bowlby at eric@sdcanonlands.org.

Acknowledgements

The individuals and organizations listed below contributed significantly to the production of this Canyon Enhancement Planning Guide.

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Organizations

The San Diego Foundation
Citizens for Coordinate Century 3 (C-3)
San Diego Civic Solutions
San Diego Canyonlands

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Price Charities
REI Foundation
Individual Donors of San Diego Canyonlands

Statement of Regulatory Compliance

Projects in open spaces will often impact sensitive habitat and other environmentally sensitive lands such as steep hillsides. The lands are regulated and protected by agencies and regulations. Compliance with the California Environmental Quality Act (CEQA) is essential and requires documented analysis of potential environmental impacts and a public review process.

Some projects, particularly restoration projects, may be exempt from CEQA requirements but a checklist of environmental analysis is still required by the City's Development Services Department (DSD). Sensitive habitats are also regulated by several agencies which may require permits from the U.S. Fish and Wildlife Service, California Regional Water Quality Control Board, California Department of Fish and Game and the U.S. Army Corp of Engineers. The City DSD requires Site Development Permits for many activities including some that might be exempt from CEQA. The Park and Recreation Department requires a Right of Entry Permit process for specific project areas on City land.

At the time of this writing, SDCL is working with the City of San Diego Park & Recreation Department Open Space Division to obtain a "Master Permit" for Canyon Enhancement Planning that will streamline the process for environmental review and permitting for related projects that are consistent with the goals of this CEP Guide.



Figure 1. A "before" and "after" diagram showing the steep, eroded condition of a trail segment identified for enhancement during CEP (between Manzanita Canyon and Azalea Park, City Heights). A group of several collaborators helped make this happen, including Ranger Sue Pelley, KTU+A's John Holloway and Urban Corps. CEP works!

Applicable General Plan Objectives

The goals of Canyon Enhancement Planning conform to objectives adopted in the City of San Diego 2008 General Plan, the most relevant listed below.

Conservation Element B.1 *“Protect and conserve the landforms, canyon lands, and open spaces that: define the City’s urban form; provide public views/vistas; serve as core biological areas and wildlife linkages; are wetlands habitats; provide buffers within and between communities; or provide outdoor recreational opportunities.”*

Conservation Element B.1.c *“Protect urban canyons and other important community open space including those that have been designated in community plans for the many benefits they offer locally, and regionally as part of a collective citywide open space system.”*

Urban Design Element A.1 *“Preserve and protect natural landforms and features. (a) Protect the integrity of community plan designated open spaces. (b) Continue to implement the MSCP to conserve San Diego’s natural environment and create a linked open space system. Preserve and enhance remaining naturally occurring features such as wetlands, riparian zones, canyons, and ridge lines.”*

Urban Design Element A.2 *“Open Space Linkages - Use open space and landscape to define and link communities.”*

Urban Design Element A.3 *“Design development adjacent to natural features in a sensitive manner to highlight and complement the natural environment in areas designated for development.”* Additional details pertaining to canyon views, grading, visual and physical access are provided in UD-A.3.a-g.

Recreation Element F.2.d *“Preserve open space along lakes, rivers, and creek beds for passive public recreation uses that are consistent with MSCP preservation goals.”*

Other important canyon issues (e.g. erosion, invasive plant species, access, etc.) are addressed throughout the Plan’s Conservation Element (CE), including discussions and policies in sections on Open Space and Landform Preservation (CE-B), Water Resources Management (CE-D), Urban Runoff Management (CE-E), Biological Diversity (CE-G), and Environmental Education (CE-N).



Figure 2. A completed mural of the City Heights Urban Wilderness Trail map, located along Jamie’s Way, a segment of streetscape targeted for enhancement during the CEP process as a “canyon corridor” to connect Manzanita and Hollywood Canyons. Photo: Dennis Wood.

Background: The Canyons

Brief History

Due to its unique topography, the city of San Diego is home to approximately 200 urban canyons. Because of their steep hillsides and rushing streams during winter storms, many canyons were left undeveloped or were only partly developed as the urban area grew up around them, primarily on the flat, more easily developable mesa tops (Figure 3). One only needs to think of all the San Diego neighborhoods that have “Mesa” or “Heights” in their names, including Clairemont Mesa, Mira Mesa, Otay Mesa, Serra Mesa, Kearny Mesa, Normal Heights, University Heights, City Heights, etc.



Figure 3. An aerial view of San Diego showing some of the over 200 urban canyons. The majority of development occurred on the more easily developable (flat) mesa tops.

Grading for development along the canyon rims and construction of infrastructure inside the canyons disrupted their natural qualities and left them in a degraded condition. The canyons were also convenient places to place linear infrastructure such as roads, power lines and gravity-fed sewer lines that took advantage of the existing canyon network (Figures Figure 4 through Figure 6). In particular, the design of the city’s drainage infrastructure – a system that requires gravity and connectivity –also capitalized on the existing canyon network, since it was expedient to funnel storm runoff from the roads, sidewalks, rooftops and other impermeable surfaces through the canyons and out to the coastal waters.

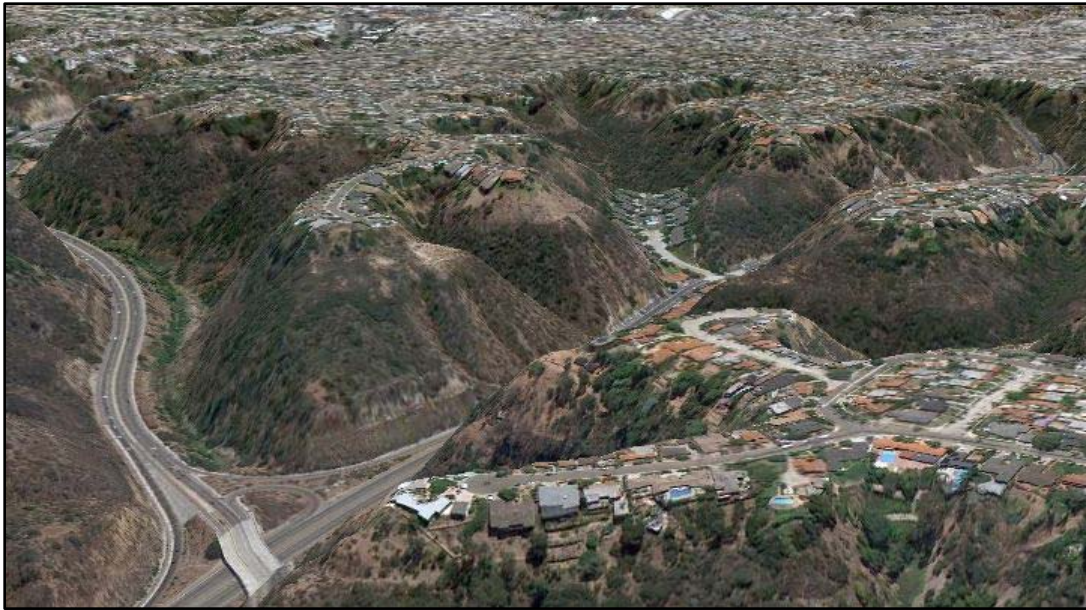


Figure 4. A Google Earth view of Talmadge Canyon (Kensington-Talmadge) showing Montezuma (left) and Fairmount Ave (left to right). As the city grew along the flat mesas tops, the canyons provided a convenient place for roads and gravity-fed drainage infrastructure that took advantage of the naturally existing network. Some canyons areas were completely developed (middle of figure).



Figure 5. Winter rain flowing down Upas Street and into Florida Canyon (North Park). Winter rains have to find a way off the developed, impervious mesas. The city's storm water system uses the canyons as a drainage network.



Figure 6. Running water in Switzer Canyon (North Park) during a winter rain. Note the green sewer manhole cover at the top left of the photograph.

The resulting degradation to the canyons has resulted in their attraction for problems like invasive weeds that choke out the remaining native ecosystem, illegal dumping, homeless encampments and other illicit activities that further erodes their qualities as safe and enjoyable open space (Figure 7).



Figure 7. Swan Canyon (City Heights) in 2008. The focused development on San Diego's flatter areas left the canyons relatively undeveloped but not untouched. The resulting degradation and neglect is a legacy that dozens of local volunteer groups – and CEP - aim to reverse.

The Importance of Canyons

Nevertheless, San Diegans love their urban canyons! Dozens of volunteer groups and hundreds of individuals have been working since the late 1990's to reclaim their local urban canyons to transform them into valuable community assets. Today it is widely recognized that these remaining islands of urban open space and steep hillsides are the DNA of San Diego's unique character and help distinguish San Diego from other coastal cities. The canyons serve to define neighborhoods and provide a framework for a unique urban setting (they bisect literally every neighborhood in the city), with localized opportunities for residents and visitors to escape to nature and enjoy hiking, jogging and other passive recreation activities. They lend visual relief and a much-cherished aesthetic element to urban neighborhoods (as opposed to having only the option of staring at endless swaths of concrete and other artificial structures). Access to nature provides a boost to our quality of life as urban dwellers, and studies show the positive impact nature has on the mental, physical and emotional wellness of humans.



Figure 8. Switzer Canyon (North Park), looking west from 30th Street towards San Diego's downtown skyline. Restored/enhanced urban canyons are invaluable community and ecological assets.

Aside from the physical, mental and other immediate benefits the canyons provide to humans, they also contain habitat that harbors important wildlife, including many endangered and threatened species. Many canyons are protected by the City's "Multi-Habitat Planning Area" (MHPA), adopted as its commitment to San Diego County's unique "Multiple Species Conservation Plan" (MSCP), a commitment to species conservation as our urban area grows into the future (as it inevitably will). Our canyons also serve as valuable *green infrastructure* that works to cool the urban environment, filter the air, and capture and filter pollutants out of our urban storm-water runoff, before it reaches coastal waters. Consequently, the ecological health of an inland canyons and creeks impacts areas downstream.

The Importance of Planning

Since the late 1990’s, environmental groups such as The Sierra Club and San Diego Canyonlands have worked to establish neighborhood-based volunteer groups to adopt and steward their nearby canyons. The San Diego Foundation and other philanthropic organizations and individuals funded these programs over the last twelve years. The City of San Diego’s Open Space Division has coordinated with these “friends-groups” to maintain the canyons; important work that improves their wildlife values and makes them safe, clean, enjoyable places to see and visit. Formal and informal educational programs developed for urban youth utilize nearby neighborhood canyons as “nature classrooms” to connect youth that may otherwise remain deprived of nature and its wonderful benefits.

However, a lot of work remains. Although many canyons are becoming cleaned of trash and the like, and wildlife habitat is recovering in small native restoration areas, there are still vast weedy areas choked with invasive weeds, eroded hillsides and incised, eroding streambeds. Also, safe access and trail improvements are needed, particularly in canyons overrun by a bird’s nest of redundant social trails that simultaneously fragment important habitat and make for a confusing canyon experience. Convenient pedestrian connections through canyons could link schools, neighborhoods, active parks, other canyons and community activity centers. Opportunities for viewpoints and “pocket parks” along canyon rims are rich. Potential environmental impacts should be taken into consideration. This all requires proper *planning* of these canyon enhancements. *Canyon Enhancement Planning* has proven to be a thorough and effective method of community planning (Figure 9).

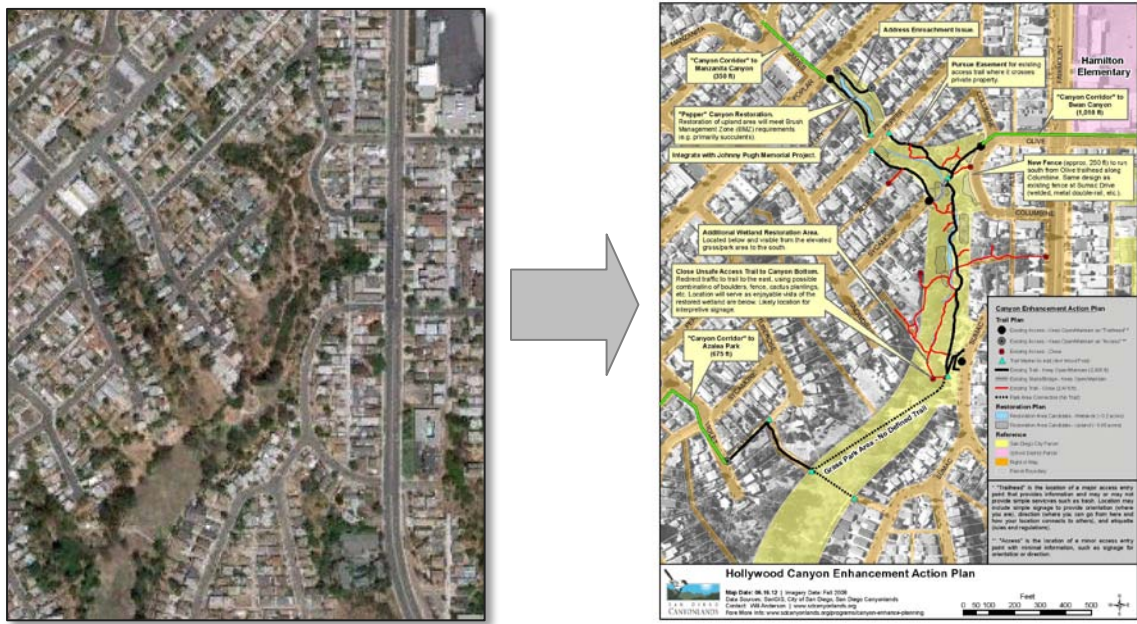


Figure 9. Canyon Enhancement Planning engages the community to create a “Enhancement Action Plan” for the canyon in question (here, Hollywood Canyon in City Heights), to formalize access and a trail network (maintain some, close others), determine areas needing improvements to address safety and erosion (e.g. steps or switchbacks), plan restoration areas, and identify other enhancement projects that may or may not require permitting or funding.

Background: Canyon Enhancement Planning

“Canyonlands” White Paper (2006) & Dedication (2007)

In 2006, local members of C-3, Civic Solutions and The Sierra Club Canyons Campaign (now San Diego Canyonlands) developed a White Paper for San Diego’s canyons entitled [Canyonlands: The Creation of a San Diego Regional Canyonlands Park](#). The document outlined a series of goals and action items to ensure the conservation and enhancement of San Diego’s canyons as valuable community assets (Figure 10). Subsequent to this white paper, the City’s Park and Recreation Department reported that over 16,000 acres of City-owned open space was considered ripe for *dedication*, a special status whereby City land is assigned protection as park/open space. Following this report, City Council ratified state legislation in 2007 that resulted in the dedication of approximately 6,600 acres of City-owned land to protect for future generations to come.¹

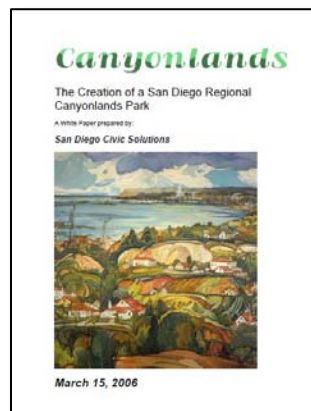


Figure 10. The 2006 Canyonlands White Paper.

CEP Committee (2009)

In 2009, San Diego Canyonlands, a then newly formed non-profit organization (a spinoff of The Sierra Club’s Canyons Campaign, dedicated to the protection and restoration of San Diego’s unique urban canyons), established a Canyon Enhancement Planning (CEP) Committee, an expanded team of landscape design and urban planning visionaries that aims to implement the action items laid out in the 2006 Canyonlands white paper. The CEP Committee’s goals are *to promote visual and physical canyon access, connections into communities, restoration, conservation, environment-based education, and ecologically sensitive recreation*.²

In addition to its work towards protecting additional City open space as *dedicated* land, the committee quickly began work implementing its [Canyon Enhancement Planning \(CEP\) pilot project in four canyons of City Heights](#), beginning with Manzanita Canyon and continuing with Swan, Hollywood and 47th Street canyons.

¹ At the time of this writing, San Diego Canyonlands is shepherding the public review process of a proposal to dedicate approximately 10,000 more acres. For more info, visit: <http://www.sdcanyonlands.org/park-dedication>.

² A list of CEP Committee members can be found in the Acknowledgements section of this guide.



Figure 11. Some members of the CEP Committee at one of its monthly meetings (left to right: Kevin Johnston, Laura Ball, Vicki Estrada, Tom Huffman, Anthony Bernal, Dick Rol, Chris Zirkle and Will Anderson). A list of members can be found in the *Acknowledgements* section of this guide.

City Heights Pilot Project (2009)

[The CEP pilot project in City Heights' canyons](#) has proven to be a successful method for a community to plan, obtain funding for and begin implementation of canyon enhancements. At the time of writing, and as a result of CEP efforts there, SDCL and its collaborators are completing Enhancement Action Plans for the four canyons and have already begun implementing newly planned enhancements, including 4+ miles of formal, safe trails and canyon access (recognized by the City), 14+ acres of wetland and upland restoration, way-finding signage that incorporates the work of local artists, and planning for "canyon corridors" that will connect the four canyons across the urban streetscape in the "City Heights Urban Wilderness Trail" (Figure 12). The California Strategic Growth Council awarded SDCL a grant in April 2012 that will fund most of the enhancements there.

One of the main purposes of having a comprehensive plan is to help stakeholders obtain any necessary permissions and assistance from jurisdictional authorities (primarily the City) and to help obtain any necessary project funding. It should be noted, however, that not all of the planned enhancements require funding. The majority of enhancement work - including most habitat restoration and trail maintenance/improvements – can and will be done almost entirely with volunteer labor and support.

The CEP Guide (2012)

This *Canyon Enhancement Planning Guide* is the culmination of the experiences gained during SDCL's CEP pilot project in City Heights. **This process is still underway.** Consequently, portions of this guide may be more comprehensive than others, but SDCL will update the document as it moves forward with the process.

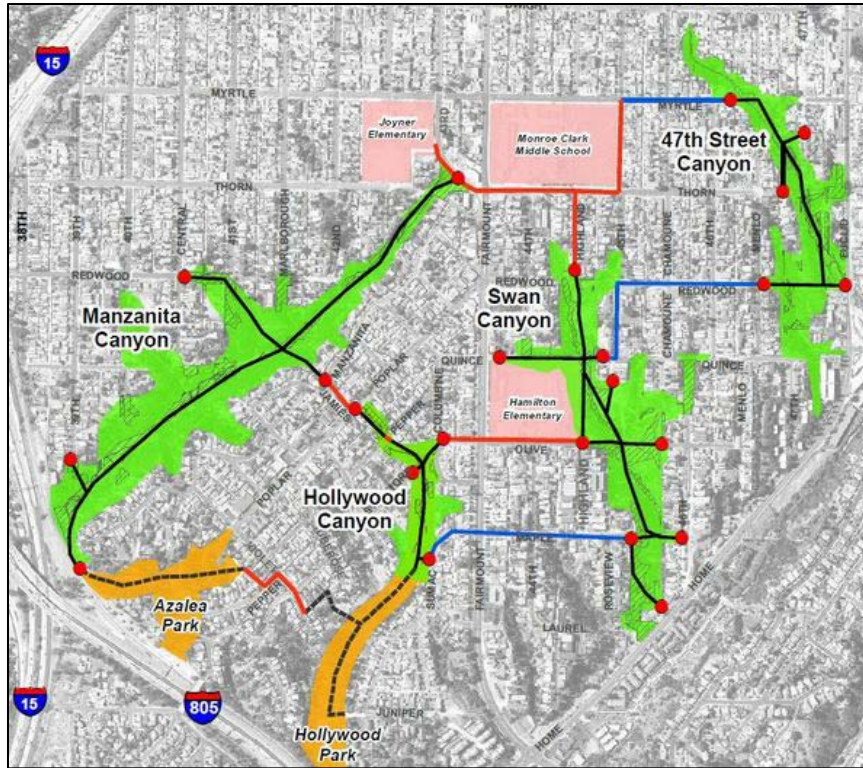


Figure 12. Map depicting the “City Heights Urban Wilderness Trail” that is connecting 90 acres of canyon space (four canyons). This is one of the many exciting projects identified during the CEP pilot project in City Heights. There are countless other similar opportunities to connect urban canyons throughout San Diego.

In concert with other SDCL publications, including the *Canyon Friends Group Handbook: How to Create a Friends Group For Your Local Canyon*, and the *Canyon Habitat Restoration 101 Manual*, the *CEP Guide* should serve as a resource to cut time, cost and red tape for comprehensive canyon enhancement planning and for implementing the resulting individual canyon projects, including habitat restoration, trail improvements, signage, and “canyon corridors” that link nearby canyons.

It is intended for community stakeholders (including individual residents, canyon “friends” groups, other stewardship and community groups, etc.), and is designed to help them facilitate a systems approach to enhance their local urban canyon (that is, to apply a proven planning formula that can be implemented canyon-by-canyon).

The canyons serve our *green infrastructure* benefits well, including cleaning/filtering urban storm-water runoff, performing flood and erosion control, filtering the air, combating the urban heat island effect, protecting biodiversity, providing wildlife corridors, providing an important, local human connection to nature, including connections to and between neighborhoods, schools and community and activity centers. The overall vision of Canyon Enhancement Planning is that the natural open spaces in urban San Diego are preserved, restored, maintained, accessible, safe and enjoyable. By using this guide, you will be implementing a *regional* vision that integrates San Diego’s natural open spaces within the fabric of the urban environment.

Summary of CEP Steps

This Canyon Enhancement Planning process is best understood when approached as four (4) steps, summarized below:

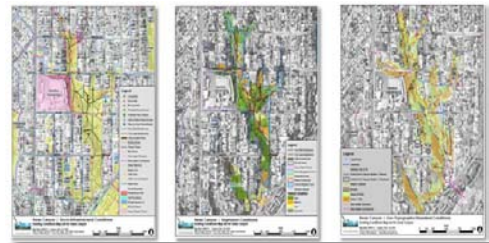
Step 1: Build Local Support for the Canyon by Creating a “Friends” Group

The first and most crucial step in Canyon Enhancement Planning is the creation of a sustainable “Friends” group that adopts a particular canyon or creek, and demonstrates an active, long-term commitment to stewardship of the area, and an interest in enhancing it.



Step 2: Map Existing Conditions

The CEP process requires a set of planning tools, in this case maps! A set of “existing conditions” maps provides a wealth of helpful information about the targeted canyon that is crucial for careful consideration and successful planning during subsequent stakeholder workshops aimed at creating a Canyon Enhancement Action Plan.



Step 3: Hold Stakeholder Planning Workshops & Create a Canyon Enhancement Action Plan

Once conditions mapping is completed it’s time to assemble a group of stakeholders and begin hosting planning workshops aimed at creating a comprehensive Enhancement Action Plan for the canyon.



Step 4: Seek Necessary Permits & Funding & Execute Action Plan Projects

Once the Action Plan is completed, stakeholders can begin pursuing any necessary enhancement project permits and funding and begin performing work to enhance access and trails, restore degraded habitat, and accomplish other enhancements.



Step 1: Build Local Support for the Canyon by Creating a “Friends” Group

The first and most crucial step in Canyon Enhancement Planning (CEP) is the creation of a sustainable “Friends” group that adopts a particular canyon or creek, and demonstrates an active, long-term commitment to stewardship of the area.

The first crucial step of CEP is to build a sustainable stewardship group for a canyon or creek area that stewards the canyon or creek area to regularly remove trash and invasive plants, plant natives in small restoration projects, etc. This is because the majority of enhancement projects that are identified during the CEP process may likely be performed by volunteers. Furthermore, an application for any necessary project funding is more likely to be successful if it demonstrates active and sustained community stewardship of the area (after all, grants are investments and their investors want to know their funding will be well spent). SDCL has been building local “friends” groups for over twelve years and acts as a hub of information and support for community members who wish to build a group for their canyon. Consult the free SDCL publications [Canyon Friends Group Handbook: How to Create a Friends Group for Your Local Canyon](#) and [Canyon Restoration 101 Manual](#) (available online) for more information.

There are many compelling reasons for citizens to engage in and support canyon stewardship and enhancement:

- **Protection:** Because stewardship groups perform advocacy to protect their canyon from development, roads and other threats.
- **Nature Education:** Because the canyons are a convenient *nature classroom* for kids and adults alike, and are necessary to instill a stewardship ethic for the natural world.
- **Employment Opportunities:** in restoring habitat and enhancing visual and physical access to canyons.
- **Enhanced Recreation** and access to nature and parks, without having to leave the urban area.
- **Solutions to Environmental Challenges** and rebuilding our green infrastructure.
- **Sustaining Biodiversity & Wildlife**, endangered species conservation, and rich biodiversity within the urban environment.
- **Improving Water Quality** by filtering urban runoff before it reaches the coast.
- **Helping Solve Flood & Erosion Control** problems.
- **Increased Safety** in the canyons and positive, non-competitive, alternative activities for youth.

The establishment of Friends Groups for individual canyons builds local ownership/stewardship and community pride. Once the Friends Group and broader community transform their neighborhood canyon from a neglected, dangerous place into an enjoyable “escape to nature”, opportunities to use the canyon for environment-based education and nature exploration arise. Friends Groups for dozens of canyons throughout the city and county have been established over the years - some have even existed for decades! [Click here](#) to find a map of San Diego watersheds, canyons and Friends Groups.



Figure 13. Results of the efforts of the Friends of Swan Canyon (City Heights). Community stewardship can transform entire hillsides from degraded dump sites into beautiful canyon habitat.

Related SDCL Publications

San Diego Canyonlands provides services for Canyon Friends Groups to help them function effectively, efficiently, and sustainably to achieve their canyon enhancement goals. Another SDCL publication - the [Canyon Friends Group Handbook: How to Build a Friends Group For Your Local Canyon](#) – outlines the specific steps needed to build a new group. The *Handbook* is available free online at SDCL’s website and should be used in concert with this *CEP Guide*. Anyone can build a friends group!

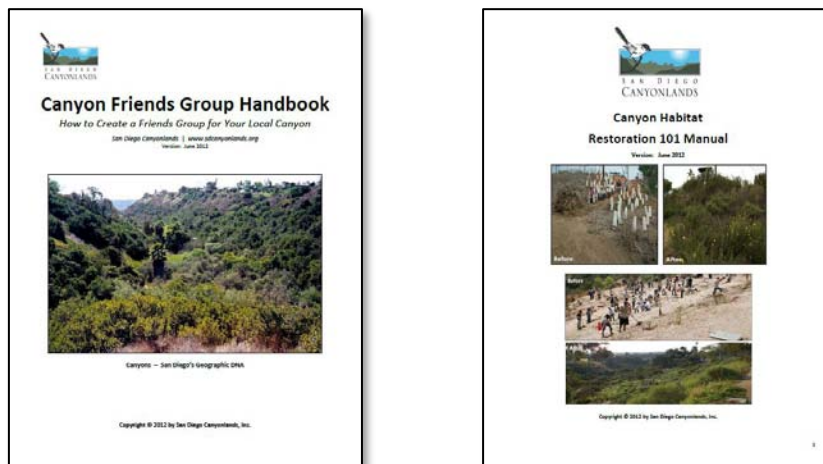


Figure 14. This *CEP Guide* is designed to be used in conjunction with other SDCL publications, including the *Canyon Friends Group Handbook: How to Create a Friends Group For Your Local Canyon* and *Canyon Habitat Restoration 101 Manual: A Guide for Canyon “Friends”* (click graphics for download link).

Step 2: Map Existing Conditions

The CEP process requires a set of planning tools, in this case maps! A set of “existing conditions” maps provides a lot of helpful information about the canyon in question that is crucial for careful consideration and successful planning in subsequent stakeholder workshops aimed at creating a Canyon Enhancement Action Plan.

Once a sustainable stewardship group has been established for a canyon or creek area and has shown a commitment to long-term stewardship of the area and an active interest in enhancing the canyon, it’s likely an appropriate time to begin the comprehensive planning process, starting with the creation of a set of maps that depict the existing: (1) socio-infrastructurel, (2) vegetation/habitat, and (3) geo-topographic conditions of the canyon (Figure 15). These maps are then used as the primary planning tools during stakeholder planning workshops aimed at creating an Enhancement Action Plan for the canyon.

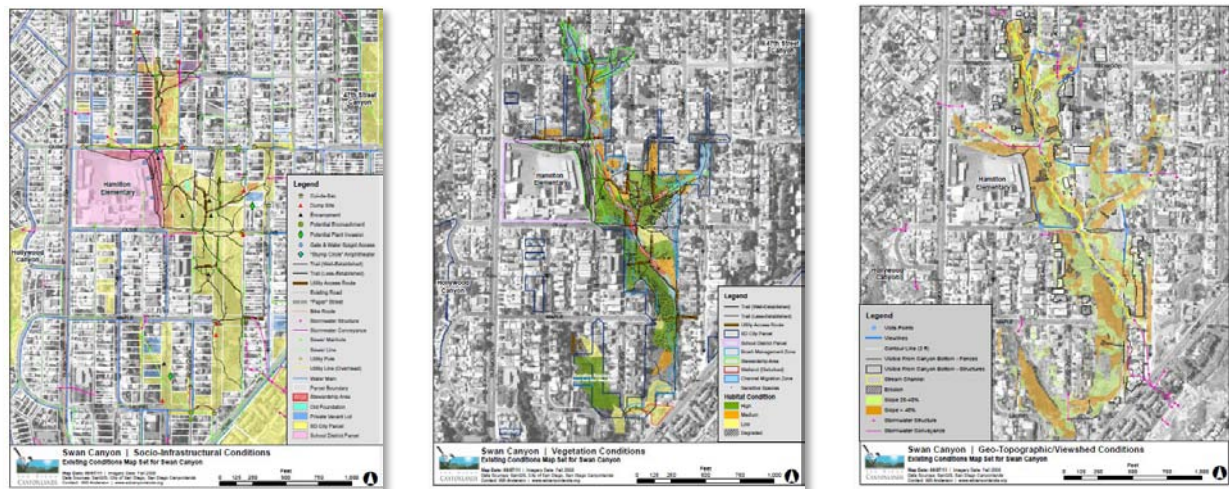


Figure 15. A set of existing conditions maps for Swan Canyon in City Heights. From left to right: socio-infrastructure, vegetation/habitat conditions, geo-topographic conditions.

The process of mapping the existing conditions in urban canyons is evolving with the evolution of accessible advances in Geographic Information Systems (GIS), including free software applications and online applications that are accessible to the general layperson like Google Earth, Google Maps and Bing Maps. Also, the availability of geographic data (that is, data that has a location associated with it) is providing further empowerment to the general public. Public organizations like the San Diego Association of Governments (SANDAG, the regional planning authority) and SanGIS serve as data clearinghouses for local GIS information that can be accessed and used by the public for planning and other purposes. Finally, the advent of many smartphone applications (“apps”) is also opening doors to the power of field GIS to the general public.

The map examples included in this CEP Guide were created using a combination of public data from SanGIS, SANDAG, USGS and data collected in the field (canyon area) using handheld GPS units (Trimble Juno SB) and industry GIS software (ESRI ArcGIS Desktop v.10.0 and ArcPad v10.0). The majority of fieldwork was performed by San Diego State University Geography students who volunteered as interns

with SDCL, although critical review of GIS data and map products throughout the information gathering and map drafting process were conducted by planning, GIS, ecology and landscape architecture professionals. This provided opportunities to solicit professional advice and network to find new/alternative sources of information.

We recommend that you contact the Geography, Biology, Horticulture and other relevant departments at local universities and community colleges to find out about whether they offer any programs where local students earn college credit for volunteering or serving as interns on local restoration/mapping projects. If funding allows, you can also contact professional planning/GIS consultants (who may volunteer their services and expertise) or San Diego Canyonlands to learn about opportunities with them. SDCL has developed a successful GIS mapping internship program that could assist your group with its GIS mapping needs (Figure 16).



Figure 16. San Diego Canyonlands has developed a successful GIS mapping internship program in which local university students perform the bulk of fieldwork required to produce existing conditions maps while simultaneously gaining valuable experience in applied GIS using standard industry software and hardware.

Helpful Tips

- Because these datasets may be incomplete or out-of-date, data acquired from public and other sources should always be “ground-truthed” (verified) in the field.
- The various types of data/information of canyon conditions can be assembled into maps as required. The maps used as examples in this section are instructive – the various data may be assembled/packaged for the purpose. In fact, conditions mapping is an iterative process that requires data collection, drafting and the use field maps with previously collected data.
- For purposes of data quality and consistency, data collectors should build and use a standardized geodatabase structure during field data collection and processing. Figure 17 provides a list of feature classes (shapes), their pre-assigned attribute (using domains), and valid domain values.
- Regardless of who creates the existing conditions maps, it is important that they include standard information, including a title, date, list of data sources, contact information, scale bar, compass rose (north arrow), legend, and possibly datum/projection information (see maps as examples).
- Information on canyon resources not appropriate for maps (e.g. list of plant species observed, notes on access points, etc.) may be compiled into textual descriptions that the map references.



CEP Existing Conditions Mapping
 List of Feature Classes, Their Domains & Valid Values
 Contact: Will Anderson will@sdcanyonlands.org
 Updated: 07.02.12

Feature Class	Attribute Domain(s)	Domain Valid Values	Feature Class	Attribute Domain(s)	Domain Valid Values
Trails (Line)	Trail Category	Wide Well Est Well Est Less Est Paved Stairs OTHER	Wetland (Polygon)	Wetland	Facultative Obligate Mix Fac/Obl
	Tread	Dirt Mulch Mix Dirt/Mulch/Veg Compressed Veg Paved OTHER		Notes	[text 50 characters]
	Notes	[text 50 characters]	Vegetation (Polygon)	Vegetation Condition	High 75+ Medium 50-75 Low 25-50 Degraded 0-25
Fences (Line)	Fence Material	Wood Chainlink BrickBlockCement Guardrail OTHER		Vegetation Community	11200 Disturbed Wetland 11100 Eucalyptus Woodland 11300 Disturbed Habitat 13200 Non-Vegetated Channel 29000 Acacia Scrub 32510 Coastal Sage Scrub 37200 Chamise Chaparral 37900 Scrub Oak Chaparral 37G00 Coastal Sage-Chaparral Scrub 42200 Non-Native Grassland 63310 Southern Willow Scrub OTHER
	Fence Height	< 3 ft 3-6 ft >6 ft	Notes		[text 50 characters]
	Notes	[text 50 characters]	Sensitive Species (Point)	Species	Wart-Stemmed Ceanothus SD Barrel Cactus Snake Cholla SD Thorn Mint SD Ambrosia Variagated Dudleya Palmer's Ericameria Willow Monardella Encinitas Coyote Bush Dense Reed Grass Slender-Pod Jewelflower Short-Leaved Dudleya Sticky Dudleya Small-Leaved Rose Scrub Oak Mission Manzanita Ramona Ceanothus OTHER-KNOWN OTHER-NEED VERIFY
Line (Line)	Line Category	Unmapped Drain OTHER			Notes
	Notes	[text 50 characters]	Polygon (Polygon)	Polygon Category	Cobble/RipRap Structure Stewardship Site OTHER
Point (Point)	Point Category	Potential Access Dump Site Encampment Recreation Site Potential Encroachment Cul-de-sac Potential Plant Invasion Utility Pole Bee Hive Sign-Trail Sign-Rules/Regs Sign-Other OTHER		Notes	[text 50 characters]
	Notes	[text 50 characters]	Erosion (Polygon)	Erosion Type	Bank/Channel Gully Sheet/Rill Unknown - Needs Verification
	Erosion (Polygon)	Erosion Concern		Yes No Unknown - Needs Verification	Notes
Notes		[text 50 characters]			

Figure 17. A list of nine (9) feature classes used by SDCL staff during GIS fieldwork, including associated attributes, assigned domains and valid values. Using this or a similar domain design in a geodatabase helps streamline the data collection process and ensure accuracy/consistency throughout the fieldwork and processing stages.

#1 - Socio-Infrastructural Conditions

Maps of socio-infrastructural conditions include details about social and infrastructural use of the canyon area. Information includes – but is not limited to - land ownership, infrastructure (sewer, water, storm water, electrical, gas), existing trails (authorized and unauthorized, if there has been any determination), unofficial recreational sites, unauthorized use sites (such as private encroachment on public lands), unauthorized dumping sites, and SDG&E and other easements. The following list includes the relevant geographic data that should be included in the socio-infrastructural conditions map, while Figure 18 and Figure 19 provide examples of socio-infrastructural conditions maps.

Public Data

Sources: [SanGIS](#), [SANDAG](#), [USGS Seamless Server](#), City of San Diego Park and Recreation [Open Space Division](#), [SDSU Geography Department](#). Note: As with all data acquired from another source, features should be verified in the field.

Ownership/Control/Rights

- Parcel Boundaries.** To understand ownership/control of canyon and nearby area.
- Publicly Owned Parcels.** Identify owner/manager (e.g. Open Space, Community Parks, School District, etc.). Useful to identify stakeholders and managing authorities as collaborators and notification/approval of proposed projects. Also important to flag/label schools, libraries, recreation center, and other community spaces. Also serves as good/familiar reference information.
- Zoning.** Verify publicly-owned canyon area as open space. Not necessary to depict.
- Right-Of-Ways** (“Paper Streets”). Managed by Transportation Division. Restrictions on planting and other projects apply.
- Utility Access Paths (Easements).** Available from City Open Space Division. Often serve as good trail segments that don’t require any improvements.
- Brush Management Zone.** Available from City Open Space Division. Good for identifying restoration opportunities, since planting restrictions apply.

Infrastructure

- SDG&E Utilities.** Include underground electrical, overhead electrical and underground gas lines. For security concerns, SDG&E is reluctant to provide gas line data. Company will want to know where any digging will occur so they can access whether or not they have infrastructure there and provide guidance accordingly. When working in any of the individual areas and once a work area is defined, call DigAlert at 811 at least 48 hours prior to digging. Overhead lines can be determined visually. Gas lines can often be approximated using gas line markers (though this data will be incomplete).
- Water Main Lines.** Planting protocols (species/buffers apply. A leak may explain nearby erosion and/or vegetation conditions.
- Sewer Main Lines.** Planting protocols (species, buffers) apply. A leak may explain nearby erosion and/or vegetation conditions.
- Sewer Manholes.** Helpful for reference/orientation while in the field. Planting protocols (species, buffers) apply. A leak may explain nearby erosion and/or vegetation conditions.
- Drain Structures.** Mostly storm water inlets and outfalls. Layer is often incomplete, need to ground-truth to identify missing features. Helpful for reference/orientation in the field. Planting protocols (species, buffers) apply. A leak may explain nearby erosion and/or vegetation conditions.

- Drain Conveyances.** Often incomplete, need to ground-truth to identify missing features (sometimes above-ground). Helpful to identify sources of erosion. Planting protocols (species, buffers) apply. A leak may explain nearby erosion and/or vegetation conditions.
- Roads & “Paper Streets”.** Symbolize paper streets differently than existing. “Split” edit to retain names/labels but change color, etc. Helpful for orientation and to flag canyon areas under Transportation Dept. management (right of ways).
- Transit Stops.** If applicable/nearby. Useful to understand canyon in context of transportation network, particularly other pedestrian opportunities.
- Bike Routes.** If applicable/nearby. Useful to understand canyon in context of transportation network, particularly alternatives to automobiles.
- Trail Plan (County General Plan).** If applicable/nearby. Useful to understand canyon in context of comprehensive trail plan.
- Trails(?)** The City managing department may already possess an inventory of existing trails of the canyon, although it may not be current enough for CEP purposes. These will not be “officially approved trails but provides important data when considering current access trends and opportunities for restoration. SDCL recommends trail data is collected in the field.
- Reference - Aerial Photo.** Useful for orientation, but not always required. USGS Seamless Server is a good resource for imagery.
- Reference - Labels.** It’s important to label roads, schools, libraries, community center, parks, other canyons, etc, for reference/orientation purposes.

Field Data

Area Use

- Illegal Dump Sites.** Locations repeated illegal dumping. Useful for planning restrictive measures (e.g. boulders, split rail fence, plants, etc.).
- Encampments.** Locations of repeated encampments (evidenced by warming/cooking fire, shelter, bedding). Useful for planning restrictive measures (reporting, trimming vegetation, etc.).
- Recreation Sites.** Persistent, less evidence as encampments, but possibly more use (popular “hangouts”). May be location of illicit or acceptable activities. Good to know location for planning to encourage/discourage. Point.
- Possible Enroachment.** May be obvious in the field, or identified when comparing fence and parcel layer (careful of data inaccuracy). Useful to have option to address by reporting, communicating with owner, etc. Contact the City Code Enforcement Department to ascertain whether there are any known encroachment issues.
- Stewardship Sites.** Examples include native plant restoration site, etc. Polygon or point. Useful to understand areas given special attention and community investment.
- Vacant Privately-Owned Lots.** Adjacent to canyon. Select candidates from parcel layer using aerial at desk, then ground-truth. Polygons. Useful to know of undeveloped area owned by private individual, for possible acquisition/donation or contact for nearby proposed enhancement project(s) (e.g. invasive plant removal, trail easement, native planting, etc.).

Trails and Access

- Existing Trails.** All trail segments (authorized and unauthorized). Perhaps the most important data set to collect for this map. Important to distinguish between ‘well-’ and ‘less-established’ (determined by tread type, not a function of vegetation overgrowth). Important to understand access and use, areas of habitat fragmentation, possible causes of erosion, and options to choose for inclusion/exclusion in formal trail network. Also serve as excellent reference layer for subsequent fieldwork. Lines.
- Fences.** In/near canyon area only. Once complete, use with parcel layer to determine any possible encroachment areas (point layer). Useful to understand access as well as use by canyon rim owners. Lines.
- Existing/Potential Canyon Access.** Where canyon space meets developed street/alley/park or other public area. Points. Important to understand options to choose for inclusion/exclusion in formal trail network and as areas to monitor in possible trail use count/study.

Miscellaneous

- Utility Poles.** Those located in or adjacent to the canyon area. Use to create overhead utility line layer. Planting protocols (species, buffers) apply. May indicate location of buried linear infrastructure. Point.
- Utility Lines.** After collecting utility poles in field, annotate on field map (connect the dots) then digitize at desk. Lines. Planting protocols (species, buffer) apply. Also may highlight possible easement area (possibly trail option), contact relevant utility for more information.
- Cul-de-Sacs.** Use road layer and aerial to identify candidates, then ground-truth. Point. Useful to distinguish where developed street ends and “paper” streets begins. May prove good candidates for vistas, access, etc.
- Misc. Safety Issues.** Important to note. Examples include deep eroded chasms, dangerous/dilapidated structures, etc. Point.

Other

- Other data as necessary and appropriate.**

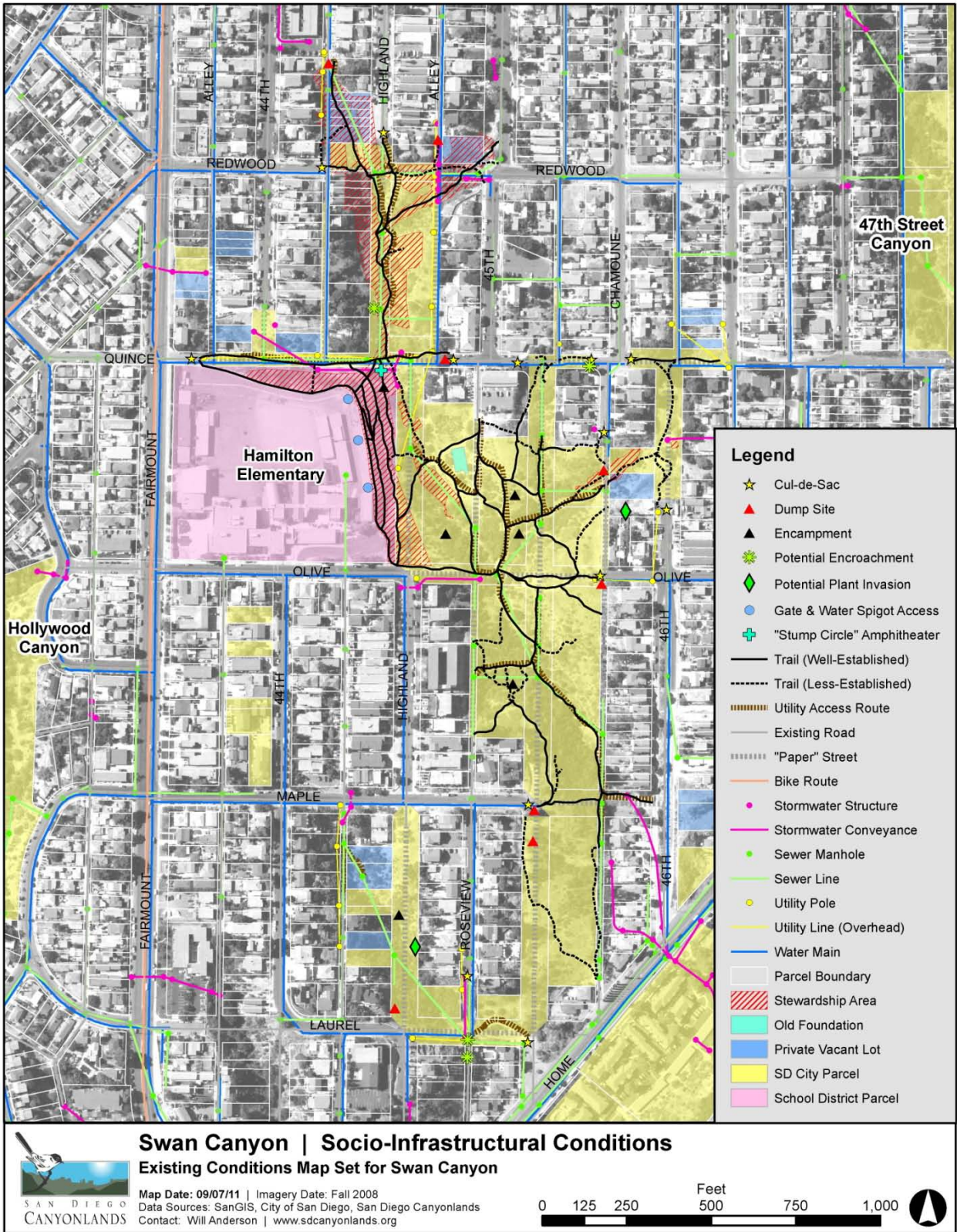


Figure 18. Example of a socio-infrastructure conditions map of Swan Canyon (City Heights).

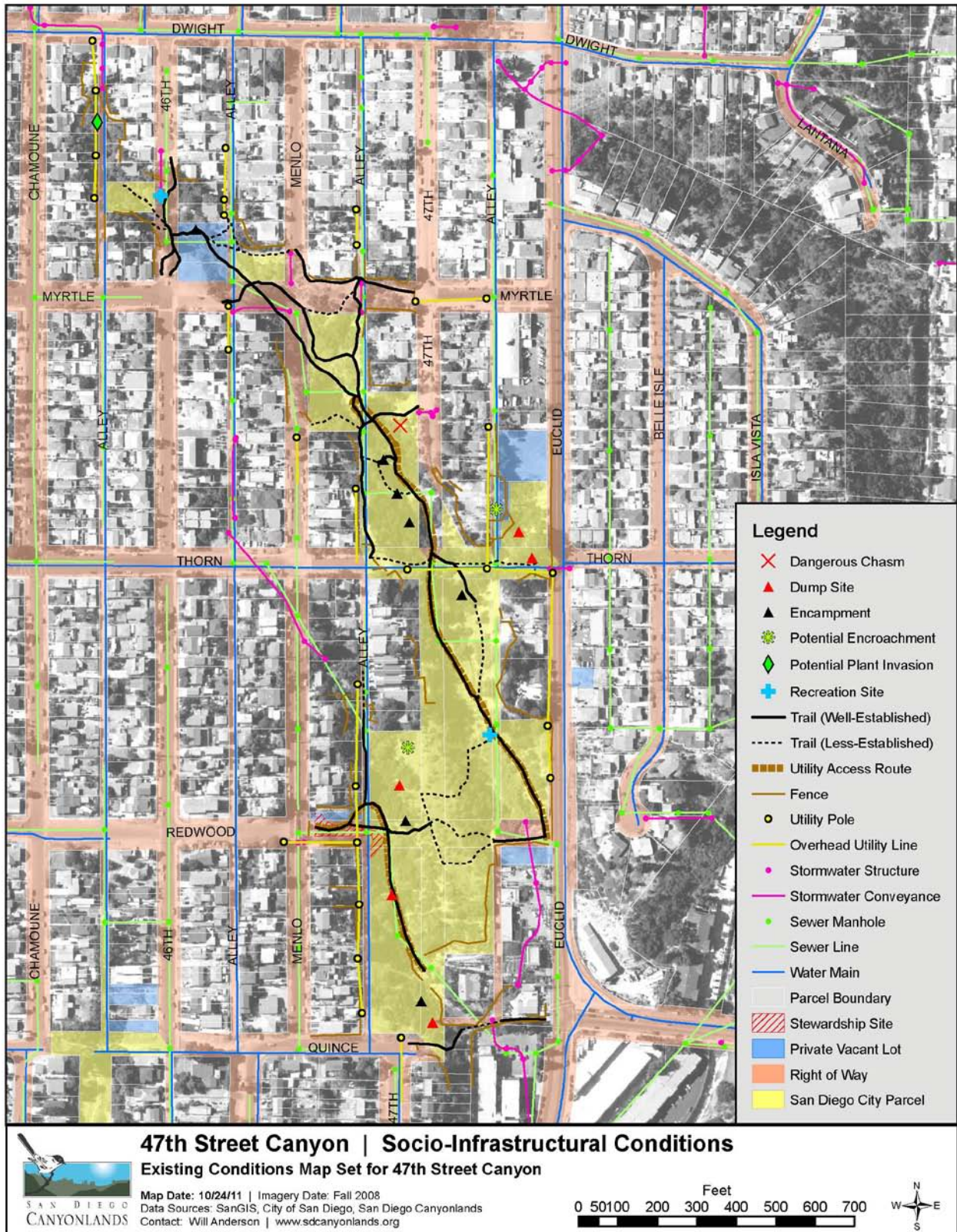


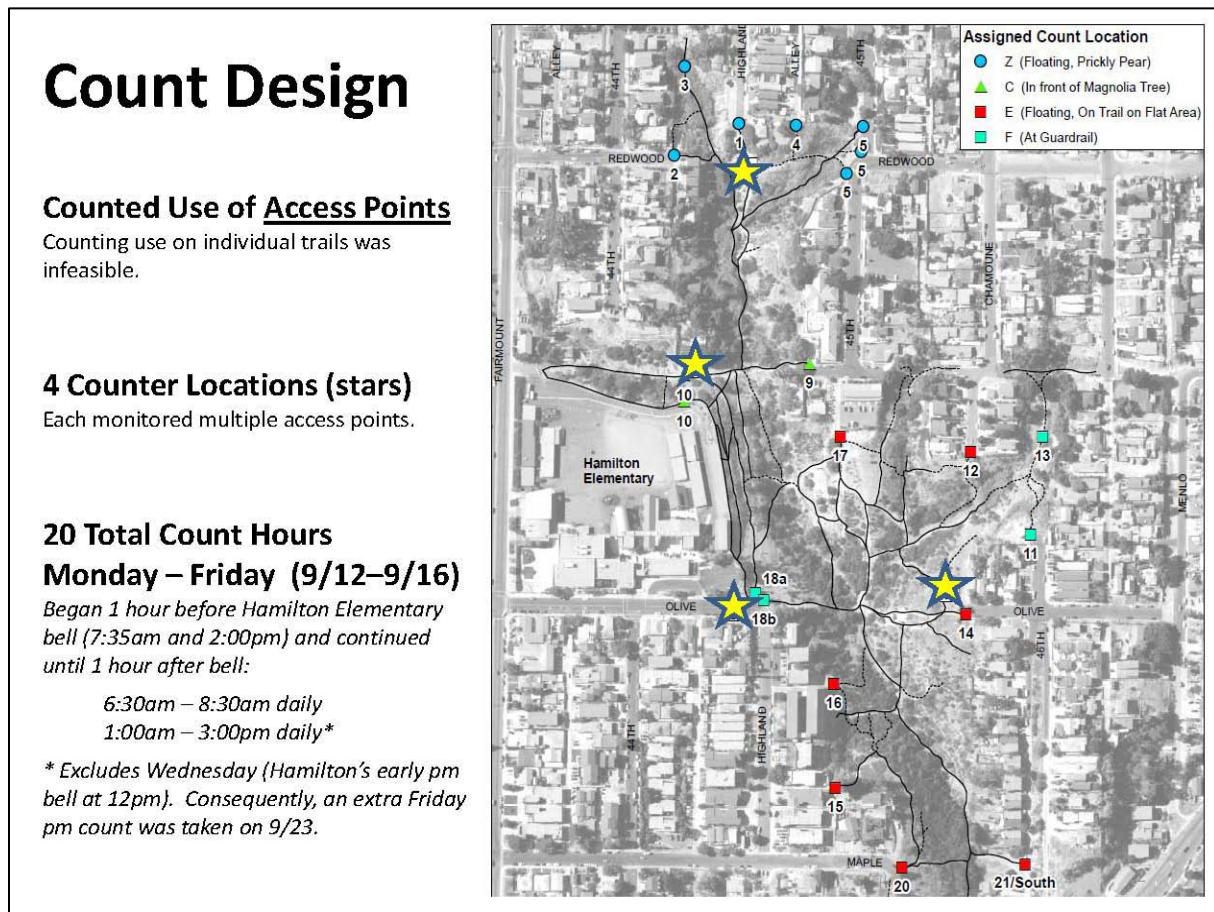
Figure 19. Example of a socio-infrastructure conditions map of 47th Street Canyon (City Heights).

Additional Use Information

In addition to mapping the existing socio-infrastructural conditions, it may also be helpful or even necessary to collect information on how the community accesses the canyon and uses the existing trails and areas, by conducting a trail user count of the canyon. This is particularly true for canyons that have a “bird’s nest” of duplicative/redundant trails and access points, a case where identifying the best segments and access in the action plan without this information could prove to be overly challenging, and anecdotal evidence from residents and others is insufficient.

Furthermore, when it comes time to gain approval from the appropriate City department(s), it is helpful to be able to clearly demonstrate community use of a particular trail or access point that has been identified to keep and/or enhance in the Enhancement Action Plan. For example, many access points are located on “paper streets” extending from dead-end *cul-de-sacs* down into the canyon and require approval from the Transportation division.

SDCL has developed a method for gaining baseline data of trail use, based on the number of users that pass through a given canyon access point (counting use on individual trail segments is usually unfeasible). The method also collects demographic data, is fairly simple and can be performed by volunteers. The following graphics provide a summary of the trail user count method applied to Swan Canyon (City Heights), while Figure 20 provides a map of results.



Trail User Count Sheet

Canyon: _____ Date: _____ Day of Week: _____ Count Start Time: _____ am/pm Count End Time: _____ am/pm

Counter Name: _____ Counter Location (Letter on map): _____

Weather Conditions (Circle): Clear & Sunny Partly Cloudy Overcast Rain-Light Rain-Heavy Wind-Light Wind-Heavy Approximate Temperature: _____

Other Notable Conditions: _____

		Access # _____	Access # _____	Access # _____	Access # _____
Males	Pre-School, Elementary & Middle School				
	High School				
	Adult (18-60)				
	Senior (60+)				
Females	Pre-school, Elementary & Middle School				
	High School				
	Adult (18-60)				
	Senior (60+)				
Bicycles					
Strollers					
Dogs (accompanied)					
Origins and Destinations:					

Results Summary

	Total Users	Total Males	Total Females	Males				Females			
				Younger than High School	High School	High	Seniors (65+)	Younger than High School	High School	High	Seniors (65+)
6:30-8:30am	163	81	82	38	3	34	6	43	14	21	4
1:00-3:00pm	263	178	85	80	30	68	0	32	9	44	0
TOTAL	424	257	167	118	33	100	6	75	23	65	4

- 12 accompanied dogs

- 0 bicycles, 0 strollers

Results Summary

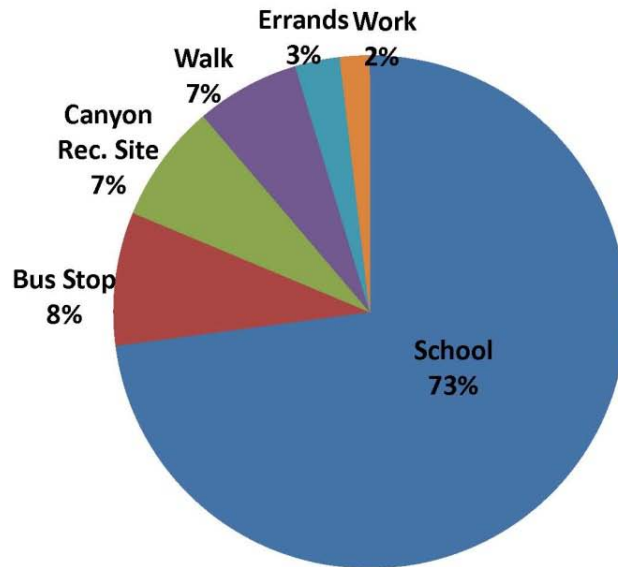
Primary Use At:

- Quince East (#9)
- Quince West (#10)
- Olive East (#14)
- South end of 45th Alley (#17)
- Corner of Olive/Highland (#18a/18b)

Access #	TOTAL	Males	Females
1	-	-	-
2	-	-	-
3	2	2	-
4	-	-	-
5	4	3	1
9	61	48	13
10	55	42	13
11	2	2	-
12	10	5	5
13	2	2	0
14	87	37	50
15	9	9	-
16	6	4	2
17	27	11	16
18a	33	25	8
18b	120	61	59
20	-	-	-
21 / South	6	6	-

5

Results – Origins & Destinations



7

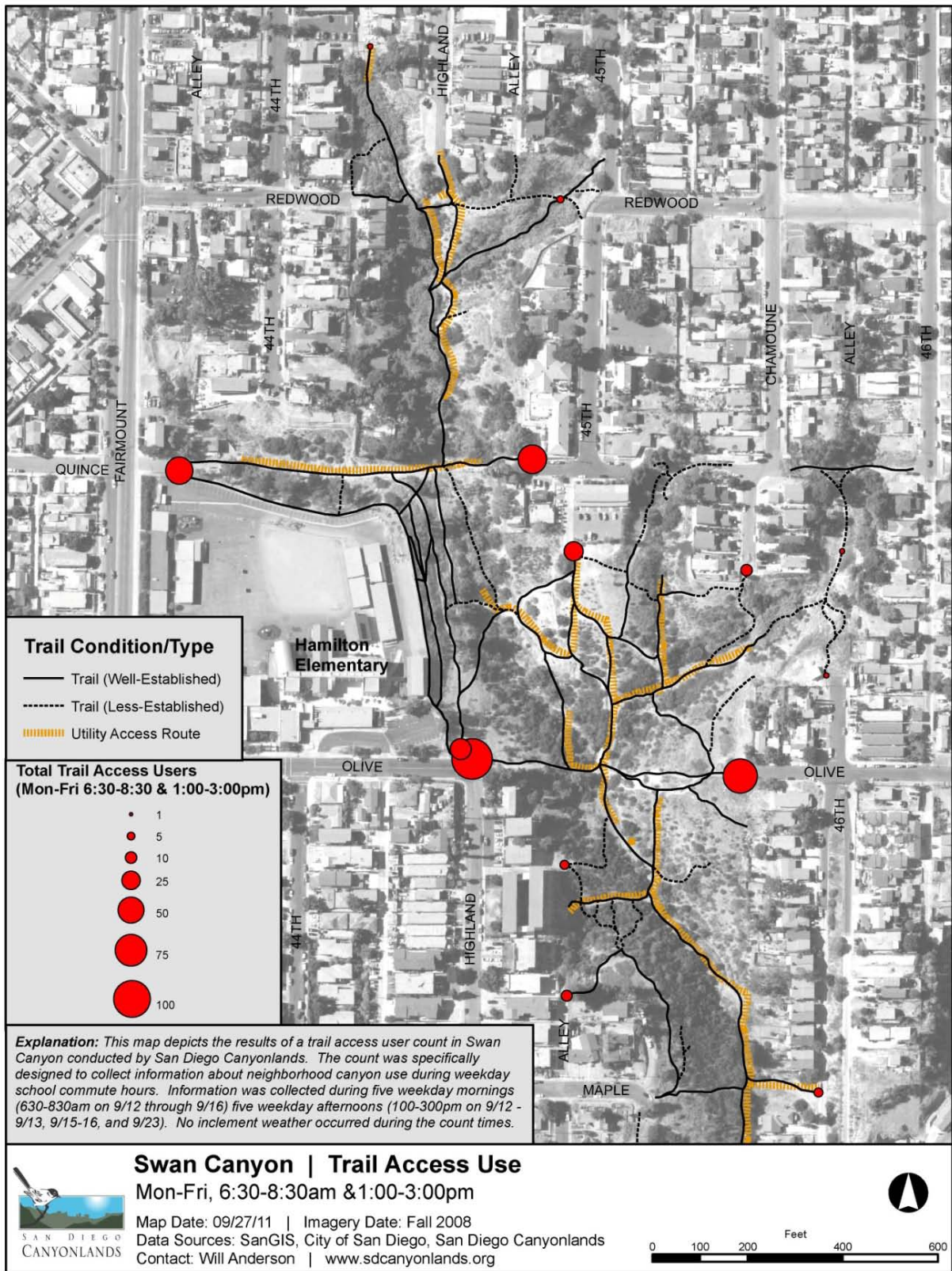


Figure 20. A map depicting the results of a trail user count in Swan Canyon (City Heights). The size of the red circles indicate the amount of use observed at a given canyon access point in a specific time period (in this case, parents and school children on their way to an adjacent elementary school). This report helped stakeholders decide to retain and plan for improving two important (but steep and eroding) west-east lateral connections. The count also collected valuable baseline use information, including data about the gender and age of users and their origins & destinations.

#2 - Geo-Topographic & View Shed Conditions

Mapping geo-topographic and view shed conditions shows conditions related to soils, slope, geology (if available), sites of stream channel erosion, visual sensitivity, upland and hillside erosion sites and eroded areas. The list below includes a checklist of information that should be included in the conditions map, while Figure 21 and Figure 22 provide examples of geo-topographic & view shed conditions maps.

Public Data

- Contour Lines (2-foot).** Depict three-dimensional topography on a two-dimensional map.
- Slope.** Geoprocessing of DEM required. Best to limit depiction to >25% (ESL - Environmentally Sensitive Land). Useful to understand vegetation conditions/opportunities, steep trails, potential erosion, etc.
- Aspect.** Geoprocessing required, optional to depict (contour lines suffice).
- Geological Hazard.** Review data, depict and/or note if applicable to the area.
- Soil Type.** Useful to understand vegetation communities and sometimes erosion. However, layer is smaller scale (large area, highly generalized), and is likely to show soils as distributed uniformly throughout the small canyon; rather than depict, it may be better to simply note the types found in the canyon and note the general coverage, e.g. "Canyon Area: Redding Cobbly Loam, Surrounding Urban Area: Terrace Escarpments").
- Aspect.** Geoprocessing of DEM likely required. Particularly important in canyons where/when afternoon sun is strong (strong determinant for plant community associations). Useful to have but not necessary to depict on map as long as compass rose (north arrow) is included.
- Reference layer(s).** To assist orientation in the field. Examples include sewer manholes, drainage structures and conveyances, or fieldwork data such as utility poles and trails.

Field Data

- Stream Channel Erosion.** Where incised or erosive conditions are observed. Point or polygon, depending on size/scale.
- Upland/Hillside Erosion.** Locations where soil erosion is observed. Point or polygon, depending on size/scale, though best to record approximate size as feature attribute.
- Vista Points & View Lines.** High quality views and their sight lines, usually along canyon rim. Annotate paper map in the field, then digitize new point and line layers.
- Visible Structures From Canyon Bottom.** Conspicuous structures seen from canyon bottom. Annotate paper field map in the field, then digitize new polygon layer at desk.
- Visible Fences From Canyon Bottom.** Conspicuous fences seen from canyon bottom. Annotate paper field map then copy previously collected fence (socio-infrastructure field data) line layer and edit to maintain visible only.

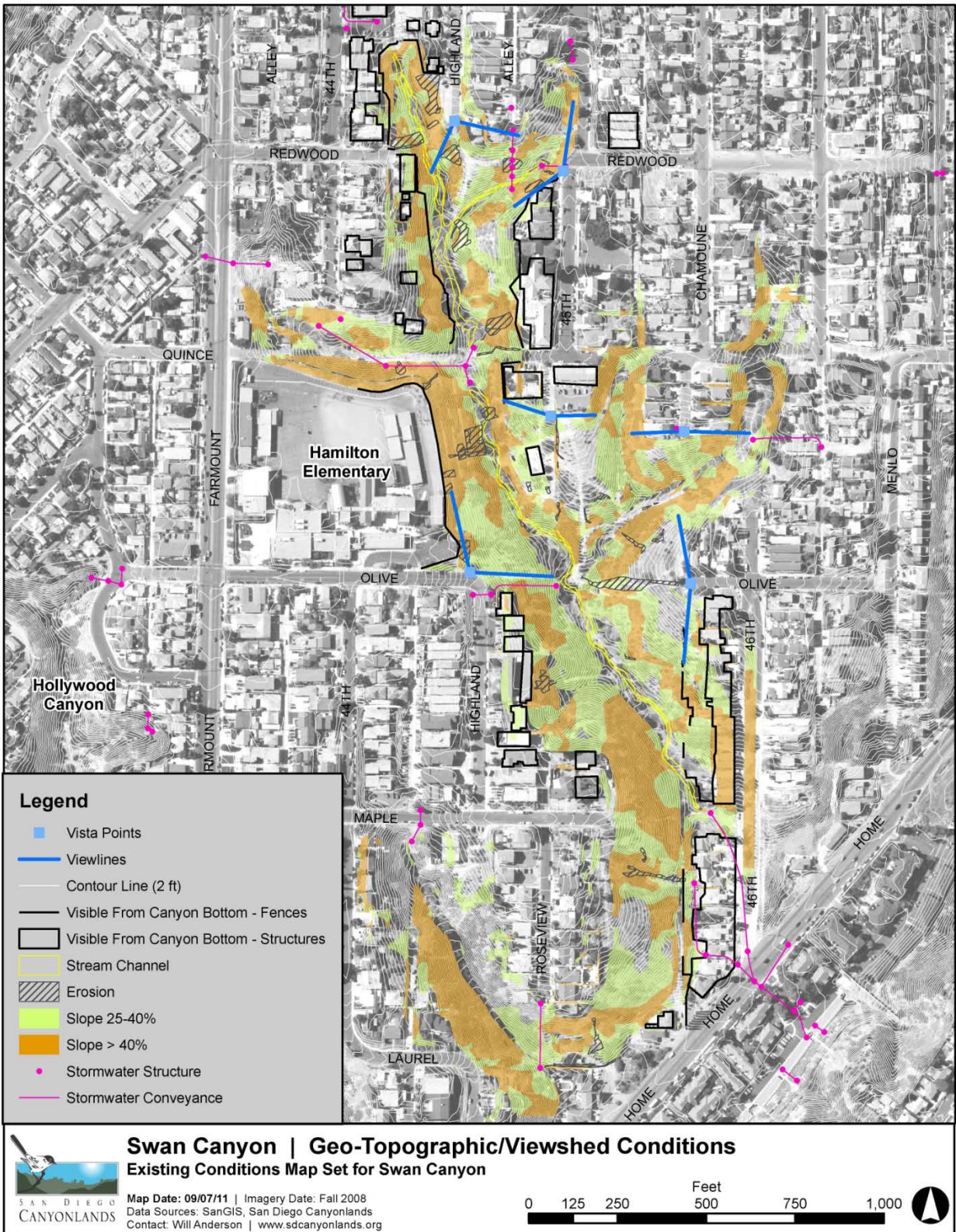


Figure 21. Example of a geo-topographic & view shed conditions map for Swan Canyon (City Heights).

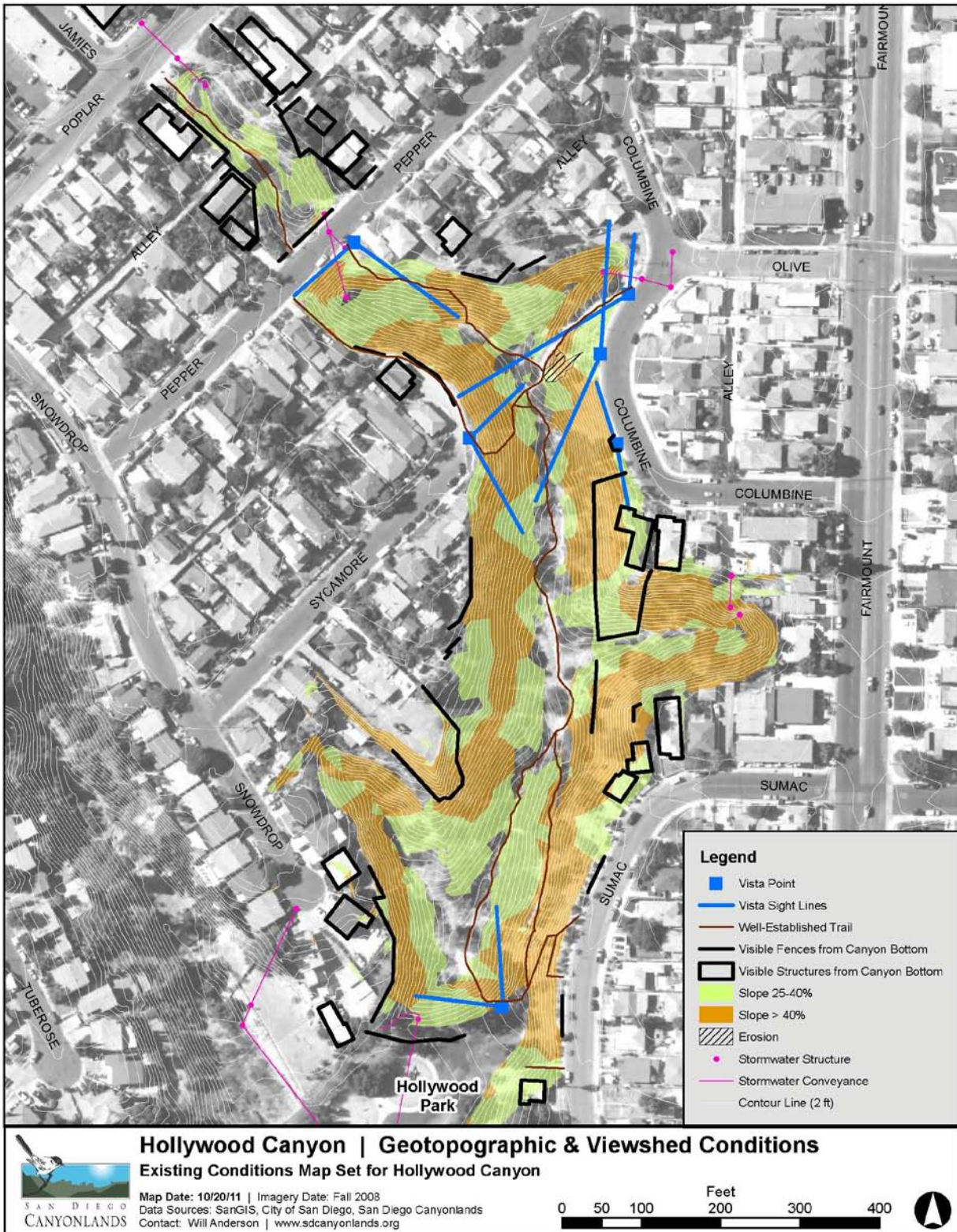


Figure 22. Example of a geo-topographic and view shed conditions map of Hollywood Canyon (City Heights).

#3 - Vegetation/Habitat Conditions

Mapping of vegetation/habitat (biological) information is necessary to evaluate the quality of habitats in the canyon, show locations of sensitive species, identify areas to avoid and protect, and help prioritize opportunities for habitat restoration. There are standard protocols and procedures for mapping biological resources to ensure consistency, accuracy and thoroughness. Mapping of biological resources should only be performed by a qualified botanist or biologist. This guide does not provide a comprehensive list of requirements for biological resource mapping. It does, however, provide an outline for the process, to give readers an idea of what's involved.

Multiple Species Conservation Program

The purpose of the Multiple Species Conservation Program (MSCP) is "preserve San Diego's unique, native habitats and wildlife for future generations". It was created after California enacted the Natural Communities Conservation Program.

This program is especially important in San Diego because of its unique habitat and rapid population growth. With the increase in development throughout San Diego County, natural habitats were confined to disconnected patches of open space. Many of these were eventually afforded some level of protection; however, it was accomplished on a species to species basis. The MSCP tries to address species at a habitat level, rather than the more traditional, individual species-level. It purportedly does this by establishing large, connected preserves. The MSCP is managed by the County Department of Parks and Recreation.

To protect natural habitats, MSCP managers created a list of species meant to be protected. The species covered were based by their rarity, as determined by the California Native Plant Society, the State and Federal government. Altogether, there are 85 plant species listed (see Appendix).

MSCP was approved in San Diego in 1997 and encompasses a 582,000 acre planning area. Within the MSCP, smaller cities can create sub-area plans for more specific habitat protection. The MSCP sets aside 172,000 acres to create a preserve within the boundaries of the Multiple Habitat Planning Area (MHPA). These lands, at present, are not all preserved, but intended for preservation.

Basically, the MSCP buys undeveloped and developed land throughout San Diego county. As businesses mitigate, they are encouraged to do so within the MSCP to create continuous natural land for biological protection.

Within the MSCP is the Multiple Habitat Planning Area (MHPA). The MSCP developed the MHPA as a type of reserve. These areas are protected under the MSCP and are regulated to protect the natural habitat. Because the land was designated after residential areas were established, a lot of MHPA designated protected areas are on privately owned land. The MSCP developed guidelines for landowners with property adjacent to or on MHPA land. The guidelines regulate "1) drainage; 2) toxics; 3) lighting; 4) noise; 5) barriers; 6) invasive species; 7) brush management; and, 8) grading/land development" (<http://www.sandiego.gov/planning/mscp/faq/index.shtml#within>).

Your targeted canyon may contain an MHPA boundary and it may contain listed species that require(s) habitat conservation. For in-depth information on biological resource mapping requirements, the MSCP/MHPA programs and sensitive species, we recommend you contact a qualified

professional/consultant (some may be happy to volunteer their expertise and service *pro bono*). You can also consult the following documents/webpages:

- Multiple Species Conservation Program (MSCP)
 - [City of San Diego MSCP Webpage](#)
 - [City of San Diego MSCP Subarea Plan \(“MHPA”, full version\)](#)
 - List of Species Covered Under the MSCP (see Table 1 this document)
 - [County MSCP Webpage](#)
- [Draft Vegetation Communities of San Diego County \(Holland Code Classification system, 2008\)](#)
- [County of San Diego Department of Planning and Land Use Biological Resource Mapping Requirements \(2002\)](#)

Summary - Mapping Conditions

Vegetation/habitat conditions maps should include information on:

- a. Sensitive Species. Develop appropriate species list (those covered under MSCP with possible occurrence in targeted canyon). Points.
- b. Vegetation Conditions. As function of percent native cover. Polygons.
- c. Vegetation Communities. Use Holland Classification. Polygons.
- d. Invasive Plant Species Infestations. Points.
- e. Wetlands.

The basic steps of mapping vegetation/biological resources include:

1. A review and assessment of existing databases (see list below).
2. Supplement existing databases as needed with field research and GPS data.
3. Add research/fieldwork results, update existing databases.
4. Develop appropriate species list, map sensitive species.
5. Compile maps.

It should be noted that the methods and examples provided in this document depict data intended for a planning/canyon-scale whose aim is to allow stakeholders to identify and plan for comprehensive components, such as a formalized trail network and general locations of restoration areas. As such, they have served CEP purposes well so far. As the planning process moves forward with project implementation, it may be necessary to collect project-specific data (for example, an area requiring 100 feet of trail improvements, like a new switchback or series of “crib” steps).

Start With Existing Data

Biological mapping should start with an inventory of any existing data for the targeted canyon area, field verification using hardcopy maps that are edited/annotated in the field, and any subsequent edits.

Sources of existing biological data include but are not limited to:

- **California Department of Fish and Game’s Natural Diversity Database (CNDDDB).**
- **City of San Diego Departments.** The managing department (most likely Open Space or Community Parks) may already have biological data for the canyon. Departments that have

infrastructure in or near the canyon (e.g. Metropolitan Wastewater Department) may have data collected for purposes of project mitigation.

- **MSCP.** The targeted canyon may have already been assessed for the MSCP, and there may be a list of sensitive species occurrences for the area.
- **Other.** There may be existing studies available for your canyon area. For example, biological information for Manzanita Canyon (City Heights) was found in a City of San Diego Canyon Sewer EIR prepared for the City of San Diego under the establishment of a permit for long-term sewer maintenance access to the canyon. It describes wildlife and vegetation resources occurring, and potentially occurring, in the canyon. GIS data used in the report was obtained from a Metropolitan Waste Water Department (MWWDD) biologist.

These sources are a good starting point. However, SDCL prefers to collect its own for the purpose, since other biological data is often either of an infeasible scale, incomplete (data for project mitigation is often only collected from the immediate project area and its vicinity, not an entire canyon), and/or of an unclear pedigree. Collecting your own ensures most current, and ensures someone (if you have a professional consultant volunteer) can be the “resident expert” of the canyon area on these matters when related questions arise during stakeholder workshops.

If there is no existing data for your targeted canyon, original field data must be collected by a qualified botanist/biologist. Any existing data will most likely need to be supplemented with fieldwork. The collector should create a set of hardcopy maps with the existing data and verify in the field by making annotations and edits to these maps, then editing/digitizing an updated layer once returning to their computer.

Required Field Data

- Sensitive Species.** Over 80 species of flora and fauna are covered under the county Multiple Species Conservation Plan (MSCP), though not all of them may occur in urban canyons. Table 1 lists the over forty vegetation species (considered “sensitive species”) covered under the County MSCP. Any occurrence of any of these species should be clearly depicted as points in the conditions maps. For areas where there are multiple occurrences of the same species, the data collector should collect a GPS point and note the number of species and approximate size of the area covered, perhaps annotate a paper map with this area, then digitize the point clusters after returning to their computer. This is done because the collection of single GPS points for every occurrence in a concentrated area would be infeasible given time constraints and the accuracy of the GPS unit used.

Table 1. Species covered under the County Multiple Species Conservation Program (MSCP). Any occurrence of one or any of these species should be clearly depicted in the vegetation/habitat conditions map. Note that not all of these species are likely to occur in urban canyons.

SAN DIEGO MULTIPLE SPECIES CONSERVATION PROGRAM COVERED SPECIES LIST	
PLANTS	
San Diego thornmint	<i>Acanthomintha ilicifolia</i>
Coastal agave	<i>Agave shawii</i>
San Diego ambrosia	<i>Ambrosia pumila</i>
Aphanisma	<i>Aphanisma blitoides</i>
Del Mar manzanita	<i>Arctostaphylos glandulosa ssp. crassifolia</i>
Otay manzanita	<i>Arctostaphylos otayensis</i>
Coastal Dunes Milkvetch	<i>Astragalus tener var. titi</i>
Encinitas Baccharis	<i>Baccharis vanessae</i>
Nevin's barberry	<i>Berberis nevinii</i>
San Diego goldenstar	<i>Bloomeria clevelandii (Muilla clevelandii)</i>
Thread-leaf brodiaea	<i>Brodiaea filifolia</i>
Orcutt's brodiaea	<i>Brodiaea orcuttii</i>
Fire redgrass	<i>Calamagrostis koelerioides (C. densa)</i>
Dunn's mariposa lily	<i>Calochortus dunnii</i>
California mustard	<i>Caulanthus heterophylles var heterophyllus</i> * formerly <i>C. stenocarpus</i> (Slender-pod jewelflower)
Lakeside-lilac	<i>Ceanothus cyaneus</i>
Wart-stem-lilac	<i>Ceanothus verrucosus</i>
Salt marsh bird's beak	<i>Cordylanthus maritimus ssp. maritimus</i>
Orcutt's bird's beak	<i>Cordylanthus orcuttianus</i>
Del Mar Mesa sandaster	<i>Corethrogyne filaginifolia var. linifolia</i>
Tecate cypress	<i>Cupressus forbesii</i>
Snake cholla	<i>Cylindropuntia californica var. californica</i> (<i>Opuntia parryi var. serpentina</i>)
Otay tarplant	<i>Deinandra conjugens (Hemizonia conjugens)</i>
Short-leaf dudleya	<i>Dudleya blochmaniae ssp. brevifolia</i>
Variiegated dudleya	<i>Dudleya variegata</i>
Sticky dudleya	<i>Dudleya viscida</i>
Palmer's goldenbush	<i>Ericameria palmeri var. palmeri</i>
San Diego button-celery	<i>Eryngium aristulatum var. parishii</i>
Coast wallflower	<i>Erysimum ammophilum</i>
Coast barrel cactus	<i>Ferocactus viridescens var. viridescens</i>
Heart-leaf pitcher sage	<i>Lepechinia cardiophylla</i>
Gander's pitcher sage	<i>Lepechinia ganderi</i>
Prostrate/Nuttall's lotus	<i>Lotus nuttallianus</i>
Felt-leaf monardella	<i>Monardella hypoleuca spp. lanata</i>
Willow monardella	<i>Monardella viminea (M. linoidea ssp. viminea)</i>
Spreading navarretia	<i>Navarretia fossalis</i>
Dehesa beargrass	<i>Nolina interrata</i>
California Orcutt grass	<i>Orcuttia californica</i>
Gander's butterweed	<i>Packera ganderi (Senecio ganderi)</i>
Torrey pine	<i>Pinus torreyana ssp. torreyana</i>
San Diego mesa mint	<i>Pogogyne abramsii</i>
Otay mesa mint	<i>Pogogyne nudiuscula</i>
Small-leaved rose	<i>Rosa minutifolia</i>
San Miguel savory	<i>Satureja chandleri</i>
Purple nightshade	<i>Solanum xanti</i> * formerly Narrow-leaved nightshade (<i>S. tenuilobatum</i>)

Vegetation Condition & Community

- **Vegetation Condition (Habitat Quality).** The vegetation conditions mapping should depict a range of habitat quality within the canyon (as polygons), from degraded to high quality. Low quality indicates areas that contain a majority of invasive non-native plant species. These are areas that will be targeted for habitat restoration during the planning phases. SDCL uses percent native cover as a function of condition (0-25% as degraded, 25-50% as low, 50-75% as medium, 75-100% as high).
 - **Vegetation Communities.** It is also helpful to map the vegetation communities using the Holland classification system, a standardized hierarchy of grouping vegetation communities in San Diego County. See [Draft Vegetation Communities of San Diego County \(Holland Code Classification system, 2008\)](#) for more information.
 - **SDCL Method:** Basically, for each canyon area, the data collector manually annotates paper field maps (containing reference data including existing trails, sewer manholes, contour lines, and an aerial image) with polygons, assigning each polygon a number and taking copious notes of species and percent cover (associating the annotated polygon with a unique number to associate written notes). The collector then uses those notes inductively to classify the polygon's/area's community (based on the Holland code classification hierarchy) and condition (based on percent of native cover). The annotations are then digitized as polygons using GIS software, where each is assigned a unique number that is then linked to a spreadsheet containing the field notes. The result is a single polygon layer that can depict vegetation/habitat condition and vegetation community, along with copious notes. See Figure 23, Figure 24 and Table 2 for a examples of the process and product of annotating a field map with numbered polygons linked to comprehensive field notes on species observed, percent native cover, Holland Code, etc, and how this creates a vegetation polygon layer that can serve to depict either “condition” or “community”.
- Wetlands.** To be collected/identified by a qualified botanist/biologist. See the [County of San Diego Department of Planning and Land Use Biological Resource Mapping Requirements \(2002\)](#) for more information.
 - Invasive Plant Species Infestations.** Points. It may also be helpful to collect points for locations of invasive plant species infestations as a means for planning targeted restoration efforts.
 - Other - Utility Poles** (see Socio-Infrastructure section). For orientation in the field. Also, planting protocols apply (species, buffer).

Other Data (Reference)

There are important data that should be included in the vegetation maps, either as reference/orientation or for restoration planning.

- Brush Management Zone.** Planting protocols apply (species, buffer, etc.). Useful for planning restoration. Available for City of San Diego Park & Recreation Dept., Open Space Division.

- Sewer Manholes and Main Lines.** Useful for orientation in the field. Also, planting protocols apply (species, buffers).
- Parcel Boundaries.** Useful for restoration planning, permissions.
- Public Ownership.** Useful for restoration planning, permissions.
- MHPA/MSCP Boundary.** Areas within the MHPA (Multiple Habitat Preserve Areas) have been prioritized for conservation because of their habitat value.
- Soils.** Indicative of species. May require only a note (not depiction), since soils data is highly generalized and usually uniform across the smaller urban canyons. See section on Geo-Topographic & View Shed Conditions Mapping.

Compile Maps

Once the necessary data has been collected and verified, it's time to compile maps of vegetation conditions, vegetation communities. Figure 25. Example of a vegetation conditions map of 47th Street Canyon (City Heights) based on percentage of native cover. Figure 25 and Figure 24 provide examples of vegetation maps.

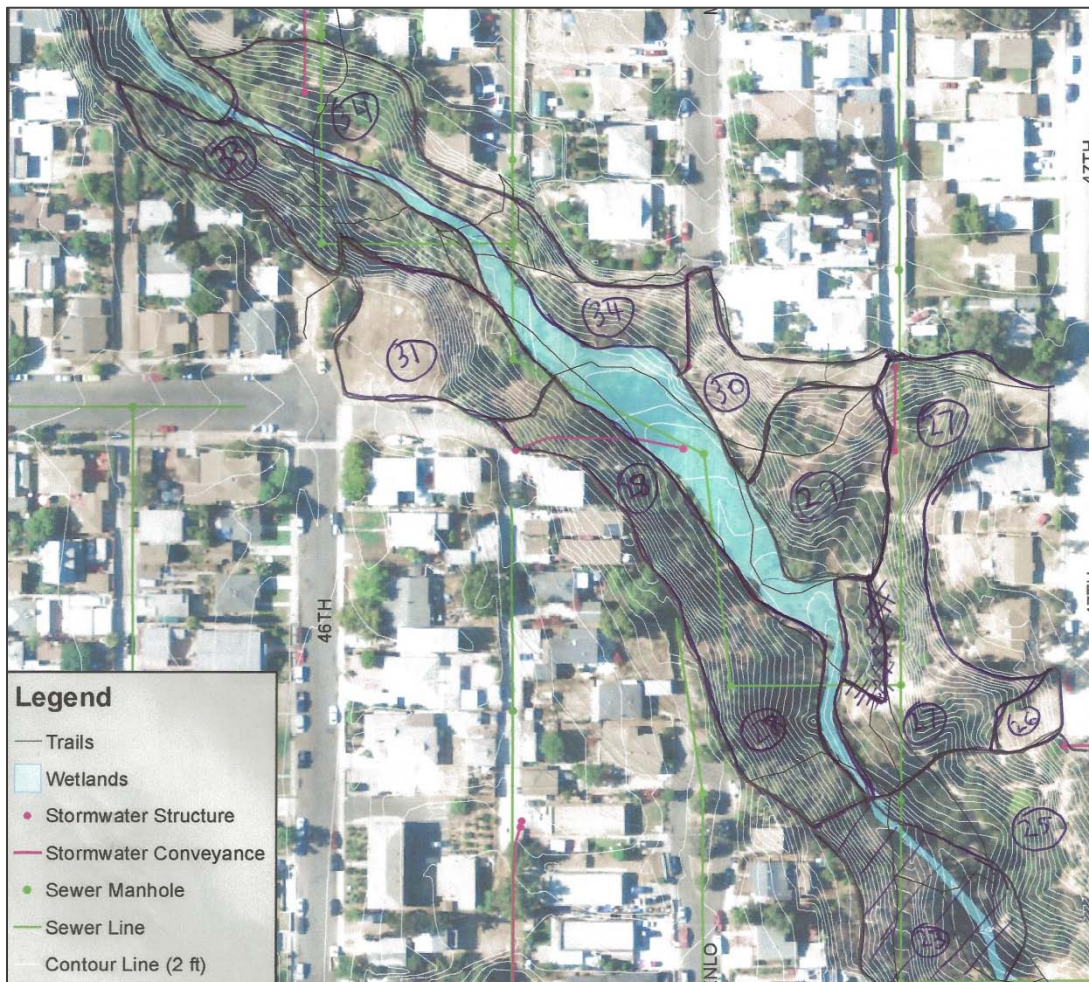


Figure 23. An example of a field map that has been created for and annotated during vegetation mapping fieldwork (map includes previously collected and public layers for reference and orientation while in the field). The collector draws the polygons and numbers them in order to associate them with comprehensive field notes on observed species, percent native cover, etc. These boundaries are later digitized to create the GIS vegetation layer used to depict vegetation condition and vegetation community.

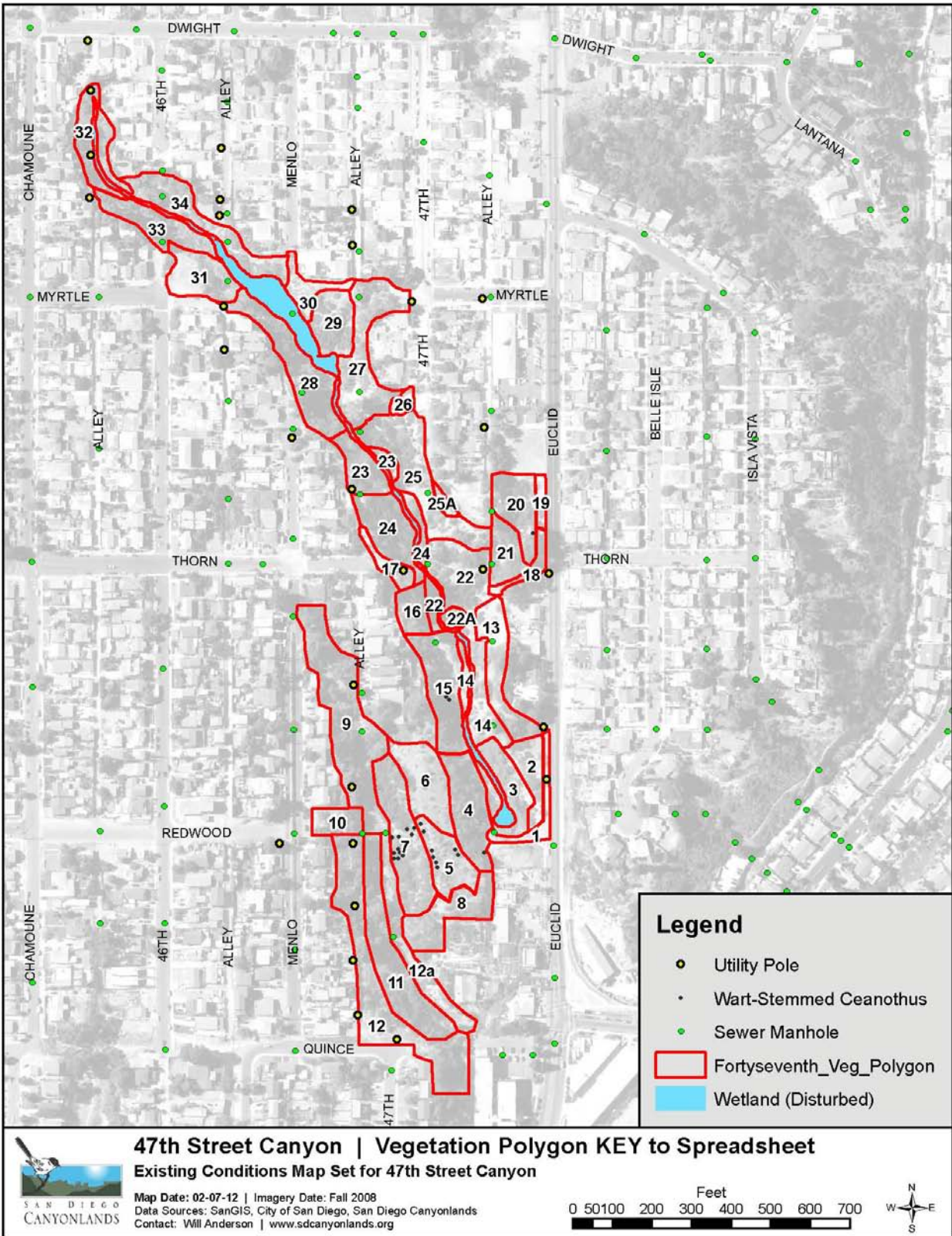


Figure 24. Example of a vegetation polygon "key" map, linked to a table containing comprehensive explanatory notes on species observed, percent of native cover, Holland classification, habitat condition, etc (see Table 2).

Table 2. An extract from comprehensive notes on vegetation condition and community type in 47th Street Canyon (City Heights). The “polygon” number is linked to a map that serves as a key to the areas (see Figure 24).

47th Street Canyon Vegetation Communities					
Polygon	Holland Code	Holland Description	Veg Condition	Field Notes	Manual of California Vegetation Alliance
1	11300	Disturbed Habitat	Degraded (0-24%)	Disturbed, open area with non-native grasses and forbs and ornamentals	None
2	37G00	Coastal-Sage Chaparral Transition	High (76-100%)	Natives: Laurel Sumac, Lemonade Berry, Mission Manzanita, Flat-top Buckwheat, Felt-leaf Yerba Santa, Black Sage, Sawtooth Goldenbush, Wart-stem Ceanothus (4), Coast Live Oak, Spiny Redberry. 90% natives, dominated by Laurel Sumac, which was 40% of total natives. Co-dominant with Lemonade Berry (30% of natives). Other natives are the remaining 30% of total natives.	None
3	42200	Non-native Grassland	Degraded (0-24%)	Only about 10% natives. Mostly non-native grasses and forbs. This area surrounds the drainage. Evidence of a previous fire. Native plants planted by SDCL winter 2011.	None
4	37G00	Coastal-Sage Chaparral Transition	Medium (51-75%)	Natives: Laurel Sumac, Wart-stem Ceanothus (1), Black Sage, Mission Manzanita, Chamise, Coastal Bushmallow, Scrub Oak, Toyon, Felt-leaf Yerba Santa, Broom Baccharis. Non-natives: Acacia. Evidence of a previous fire. Roughly 30% is open, non-native grasses and forbs, 70% natives. No dominance of any native species, but Laurel Sumac is the most prevalent.	None
5	37200	Chamise Chaparral	Low (25-50%)	Natives: Chamise, Felt-leaf Yerba Santa, Deerweed, Mission Manzanita, Lemonade Berry, Wart-stem Ceanothus (8), Coastal Sagebrush. 50% open with non-native grasses and forbs (42200). Evidence of a previous fire. Of the natives, about 80% is Chamise, mostly clustered together at the west side of the mesa.	Adenostema fasciculatum Shrubland Alliance
6	42200	Non-native Grassland	Degraded (0-24%)	North section of the mesa near private property. Area is disturbed with non-native grasses and forbs including iceplant.	None
7	37120	Scrub Oak Chaparral	High (76-100%)	Natives: Flat-top Buckwheat, Laurel Sumac, Lemonade Berry, Coastal Sage, Mission Manzanita, Scrub Oak, Black Sage, Coast Live Oak, Wart-stem Ceanothus (12). Non-natives: Acacia. 90% natives. Approximately 70% of natives are Scrub Oaks; the remainder are other natives. Non-natives are primarily Acacia and non-native grasses/forbs.	None
8	11300	Disturbed Habitat	Degraded (0-24%)	Disturbed, open area with non-native grasses and forbs and escaped ornamentals with a significant amount of Acacias. Some Acacias were cut-and-sprayed Winter 2012.	None

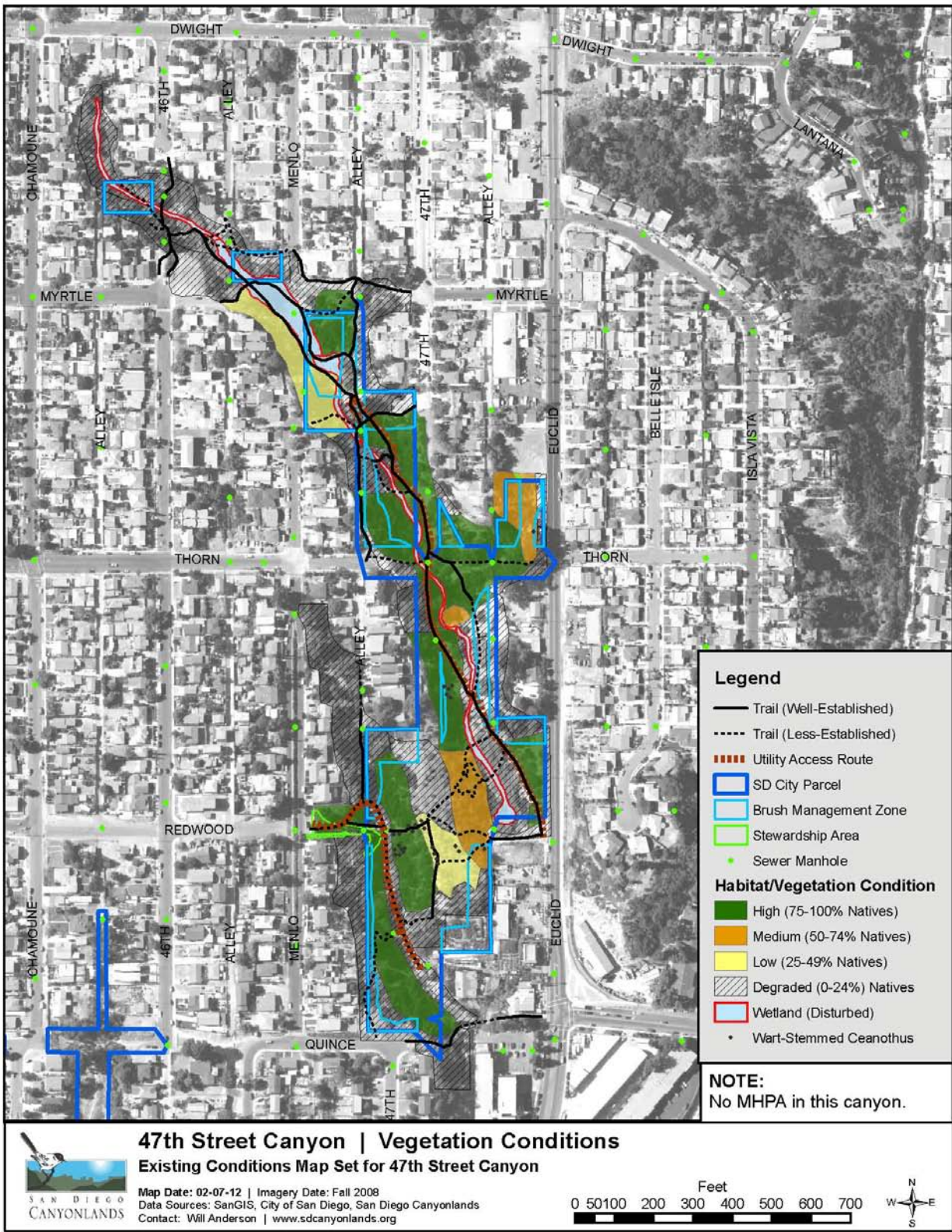


Figure 25. Example of a vegetation conditions map of 47th Street Canyon (City Heights) based on percentage of native cover.

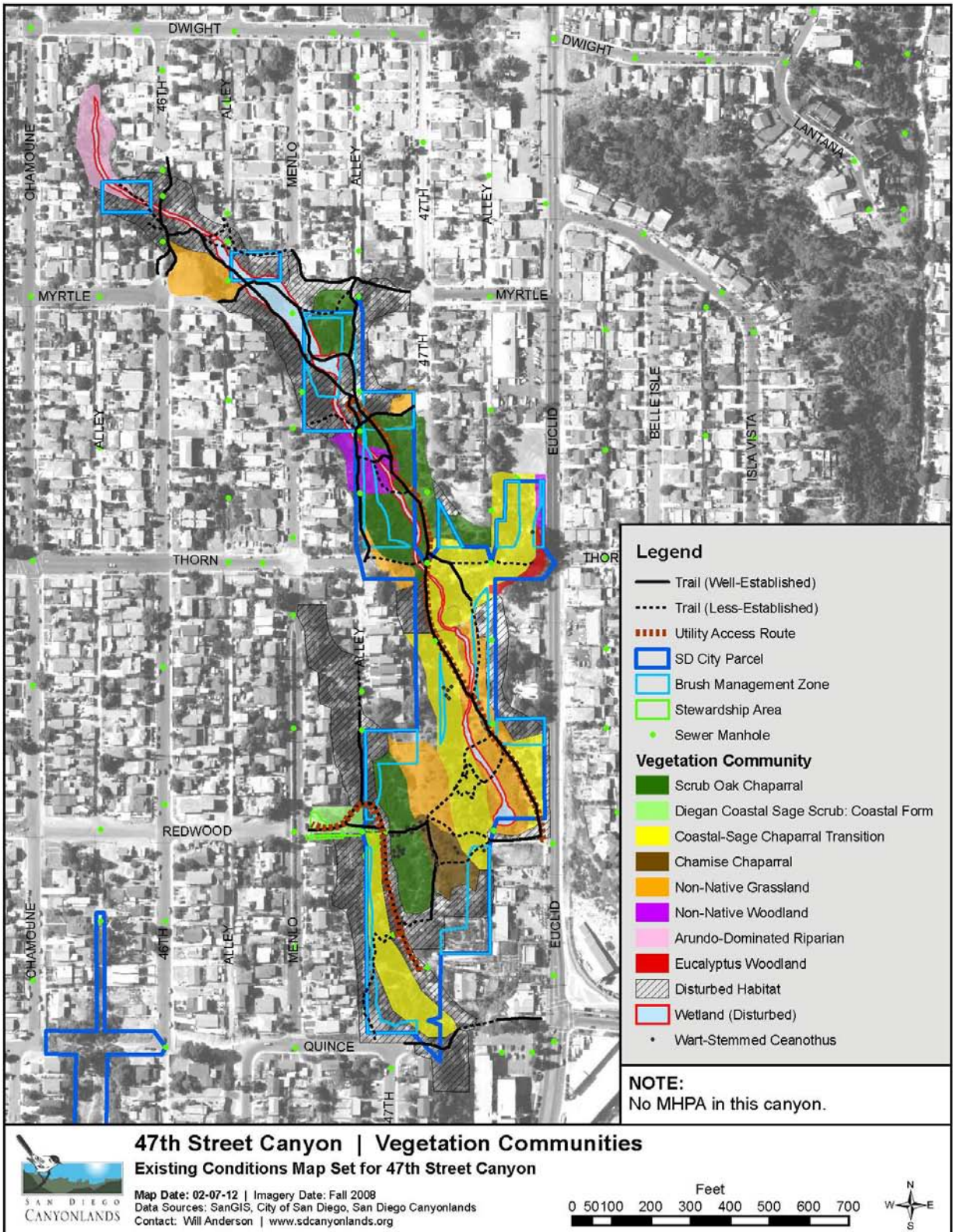


Figure 26. Example of a vegetation communities map of 47th Street Canyon (City Heights) based on the Holland classification code hierarchy.

Written Description of Canyon Vegetation

It may be helpful for the data collector to also compile a written description of the vegetation conditions of the canyon. As sample summary for Manzanita Canyon (City Heights), written by David Varner of Confluence Resource Conservation, is provided below.

“Chaparral is the most dominant community in California. Chaparral areas are dominated by evergreen, needle or sclerophyllous shrubs. They occur in dense shrubby communities, usually ranging from 3 to 10 ft high. Vegetation grows on slopes in shallow, rocky, nutrient-poor soils. Chaparral often intermingles with Coastal Sage Scrub, but will dominate north-facing slopes, while coastal sage scrub are more abundant on south-facing slopes. This is especially true in Manzanita Canyon.

Because of its large range that spans various habitats, chaparral is sometimes broken into different types depending on aspect, coastal or desert influence, elevation, and dominant species. These types include, chamise, ceanothus, scrub oak, manzanita, montane, red shanks, serpentine, desert, and woodland chaparral. The two types found in Manzanita Canyon are ceanothus and scrub oak chaparral. Both of these types can be found throughout southern California and vary depending on aspect and relation to fire. Scrub oak chaparral gets its name from its dominant species, Nuttall’s scrub oak (*Quercus dumosa*). It usually occurs in areas of coastal influence on north facing slopes; this provides consistent moisture and indirect sun. Scrub oak chaparral has a dense canopy of many woody shrubs. The resulting leaf-litter prohibits most undergrowth and herbacious plants. Typical species associated with this habitat are *Lonicera*, *Rhamnus ilicifolia*, *Heteromeles arbutifolia*, *Prunus ilicifolia*, *Ceanothus leucodermes*, *Cercocarpus betuloides*, *Fraxinus dipetela*, *Garry*, *Rhamnus californica*, *Sambucus spp.*, and *Ribes spp.*

Like scrub oak, ceanothus chaparral is named for its dominant species, *Ceanothus spp.* It is considered a successional form of chaparral, occurring closely after fires or other disturbance. It tends to be less dense than scrub oak chaparral. It usually reaches 1-3m in height allowing for an understory. Like scrub oak, it usually occurs in areas of coastal influence, however is not dictated by aspect. Species found in this habitat include, *Adenostoma fasciculatum*, *Quercus dumosa*, *Heteromeles arbutifolia*, and *Rhus ovata*.

Coastal sage scrub is sometimes referred to as a subtype of chaparral or "soft" chaparral; however, it has different needs and so is classified differently. Coastal sage scrub often intermixes with chaparral so it is difficult to determine where one ends and the other begins; vegetation communities exist on a gradient with each community transitioning into the next, rather than clear delineations between them. Distinguishing ecological characteristics are used to identify where coastal sage scrub can be found, such as elevation, proximity to the coast, temperature, and aspect. Coastal sage scrub requires moderate temperatures and little moisture variability; therefore is found in the in low-elevated coastal regions. In San Diego it can be found up to approximately 4000 ft. elevation. It is found in dry, rocky soils on relatively steep slopes. When in proximity to chaparral at lower elevations, it usually occurs on south-facing slopes, while chaparral is more abundant on north-facing slopes. Although coastal sage scrub and chaparral share species, they are easy to distinguish. Coastal sage scrub consists of low-lying shrubs with soft, aromatic leaves; typical species include: *Artemisia californica*, *Eriogonum fasciculatum*, *Malosma laurina*, *Encelia californica*, *Salvia mellifera*, and *S. apiana*.

Chaparral and coastal sage scrub communities dominate Manzanita Canyon, but also included are degraded riparian areas, nonnative grasses, and eucalyptus woodlands. All of these communities consist of a mixture of plants, mostly nonnative species. Non-native species are sometimes problematic because they have no natural predators or competition; therefore they have the ability to spread rapidly without hinderence. The most problematic of these non-natives are considered invasive species. Invasive species of concern include *Arundo donax*, *Eucalyptus sp.*, *Ricinus communis*, *Schinus sp.*, and *Carpobrotus sp.*”