



# Stream Protection Ordinance Update

## Existing Conditions Report

July 2024



Prepared by:



With Environmental Collaborative

# City of Palo Alto

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# Introduction

This Existing Conditions Report was prepared by Environmental Collaborative and Good City Company as an initial task in the process of reviewing and updating the City of Palo Alto's Stream Corridor Protection Ordinance (Palo Alto Municipal Code Section 18.40.140).

The document provides a summary of the current regulatory framework protecting streams, describes the existing network of creeks in Palo Alto and the City's Stream Corridor Protection Ordinance (SCPO), reviews development requirements and guidelines for streams protected under the SCPO, identifies limitations in current mapping of protected streams, summarizes riparian protections used by local agencies in the Bay Area as reported by the Regional Water Quality Control Board (RWQCB), provides information on existing conditions along protected streams mapped by the City, and makes recommendations for further review and refinement of the SCPO.

This report was prepared based on a review of available data and mapping, coordination with Good City Company, input from City of Palo Alto staff, and a field reconnaissance survey conducted on April 10, 2024. Geographic Information System (GIS) data available from the City and the Santa Clara Valley Water District (SCVWD) was reviewed and used to analyze conditions associated with the mapped streams, and better understand opportunities in revising setback requirements in the current SCPO. The single-day field reconnaissance served to confirm the varied conditions of streams in Palo Alto where accessible from roadways and public areas, although no detailed sampling or mapping was performed as part of this effort.

## Background

Goals, policies, and programs from the Natural Environment Element of the *City of Palo Alto Comprehensive Plan 2030*<sup>1</sup> (CP 2030) recognize the importance of conserving and enhancing creeks in recognition of their important values as natural habitat, role in connectivity and defining community character, and their flood control function. Policy N-3.3 calls for protecting the City's creeks from the impacts of future development and preserving their role for habitat connectivity by establishing appropriate setbacks. Programs N3.3.1, N3.3.2 and N3.3.3 all call for updating the City's Stream Corridor Protection Ordinance (SCPO) to refine setback standards and development regulations, as well as to explore ways to further minimize impacts on wildlife habitat and movement opportunities. These CP 2030 policies and programs include:

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<sup>1</sup> City of Palo Alto, 2017. *City of Palo Alto Comprehensive Plan*. Adopted November 13. Amended on December 19, 2022.

**Policy N-3.3:** Protect the city's creeks from the impacts of future buildings, structures, impervious surfaces and ornamental landscaping and preserve their function as habitat connectivity corridors by establishing a range of setback requirements that account for existing creek conditions, land use characteristics, property ownership and flood control potential.

**Program N3.3.1:** Update the Stream Corridor Protection Ordinance to explore 150 feet as the desired stream setback along natural creeks in open space and rural areas west of Foothill Expressway. This 150-foot setback would prohibit the siting of buildings and other structures, impervious surfaces, outdoor activity areas and ornamental landscaped areas within 150 feet of the top of a creek bank. Allow passive or intermittent outdoor activities and pedestrian, equestrian and bicycle pathways along natural creeks where there are adequate setbacks to protect the natural riparian environment. Within the setback area, provide a border of native riparian vegetation at least 30 feet along the creek bank.

The update to the Stream Protection Ordinance should establish:

- Design recommendations for development or redevelopment of sites within the setback, consistent with basic creek habitat objectives and significant net improvements in the condition of the creek.
- Conditions under which single-family property and existing development are exempt from the 150-foot setback.
- Appropriate setbacks and creek conservation measures for undeveloped parcels.

**Program N3.3.2:** Examine the development regulations of the Stream Corridor Protection Ordinance, with stakeholder involvement to establish appropriate setback requirements that reflect the varying natural and channelized conditions along creeks east of Foothill Expressway. Ensure that opportunities to provide an enhanced riparian setback along urban creeks as properties are redeveloped or improved are included in this evaluation.

**Program N3.3.3:** For all creeks, update the Stream Corridor Protection Ordinance to minimize impacts on wildlife by:

- Limiting the development of recreational trails to one side of natural riparian corridors.

- Requiring careful design of lighting surrounding natural riparian corridors to maximize the distance between nighttime lighting and riparian corridors and direct lighting away from the riparian corridor.

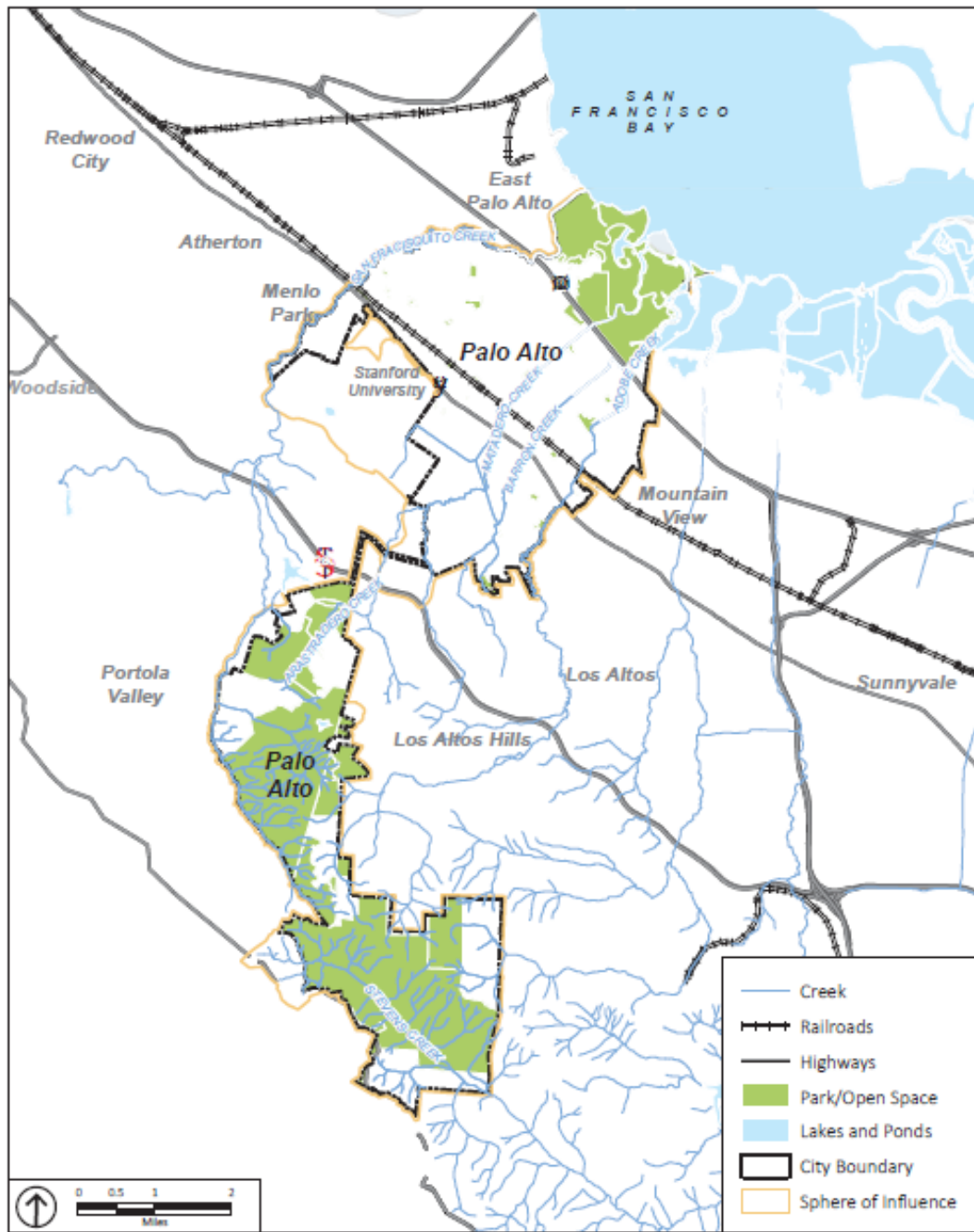
## **Regulatory Framework for Stream Protection**

In addition to the local requirements under the SCPO and controls associated with obligation for proposed land use changes to conform with the CP 2030, state and federal regulations also serve to protect streams and other aquatic habitats. These include the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW). Following is a summary of key regulations that serve to protect streams and other water bodies.

**Clean Water Act:** The Corps is responsible under Section 404 of the Clean Water Act to regulate the discharge of fill material into waters of the United States (U.S.). These waters, and their lateral limit, include streams that are tributaries to navigable waters and their adjacent wetlands. The lateral limits of jurisdiction for a non-tidal stream are measured at the line of the ordinary high-water mark (OHWM) or the limit of adjacent wetlands. The OHWM means the line on the banks or shore established by the fluctuation of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. Any permanent extension of the limits of an existing water of the U.S., whether natural or human-made, results in a similar extension of Corps jurisdiction.

Waters of the U.S. fall into two broad categories: wetlands and other waters. Other waters include waterbodies and watercourses generally lacking plant cover, such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands are aquatic habitats that support hydrophytic wetland plants and include marshes, wet meadows, seeps, floodplains, basins, and other areas experiencing extended seasonal soil saturation. Seasonally or intermittently inundated features, such as seasonal ponds, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and support wetland plant communities. Seasonally inundated waterbodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the U.S.

Waters and wetlands that cannot trace a continuous hydrologic connection to a navigable water of the U.S. and are not tributary to waters of the U.S. are termed "isolated." Isolated wetlands may be jurisdictional when their destruction or degradation can affect interstate or foreign commerce. The Corps may or may not take jurisdiction over isolated wetlands depending on specific circumstances.



Source: USDA, 2006; ESRI, Tiger Lines, USGS, 2010; City of Palo Alto, NHD, 2013; PlaceWorks, 2015.

Figure 4.3-3  
Open Space and Water Bodies

Figure 1. Open Space and Water Bodies (Comprehensive Plan Update Figure 4.3-3)

In general, a project proponent must obtain a Section 404 permit from the Corps before placing fill or grading in wetlands or other waters of the U.S. Prior to issuing the permit, the Corps is required to consult with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act if the project may affect federally listed species.

All Corps Section 404 permits require water quality certification under Section 401 of the Clean Water Act. In the San Francisco Bay Area, this regulatory program is administered by the San Francisco Bay RWQCB. Project proponents who propose to fill wetlands or other waters of the U.S. must apply for water quality certification from the San Francisco Bay RWQCB. The San Francisco Bay RWQCB has adopted a policy requiring mitigation for any loss of wetland, streambed, or other jurisdictional area.

**Porter-Cologne Water Quality Control Act:** Under the Porter-Cologne Water Quality Control Act, the RWQCB is authorized to regulate the discharge of waste that could affect the quality of the State's waters. The RWQCB asserts jurisdiction over isolated waters and wetlands, as well as waters and wetlands that are regulated by the Corps. Therefore, even if a project does not require a federal permit, it still requires review and approval by the RWQCB. When reviewing applications, the RWQCB focuses on ensuring that projects do not adversely affect the "beneficial uses" associated with waters of the State. In most cases, the RWQCB seeks to protect these beneficial uses by requiring the integration of waste discharge requirements into projects that will require discharge into waters of the State. For most construction projects, the RWQCB requires the use of construction and post-construction best management practices. Jurisdiction of the RWQCB typically extends to the top of bank (TOB) for creeks or to the outer edge riparian vegetation canopy cover beyond the TOB, similar to the limits of the CDFW.

**Streambed Alteration Agreement Under California Fish and Game Code:** The CDFW is responsible for enforcing the California Fish and Game Code (CFGC), which includes regulations to protect streams, water bodies, and riparian corridors through the Streambed Alteration Agreement process under Section 1600 to 1606 of the CFGC. The CFGC stipulates that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without notifying the CDFW, incorporating necessary mitigation, and obtaining a Streambed Alteration Agreement. CDFW's jurisdiction extends to the TOB and typically extends to the outer edge of riparian vegetation canopy cover beyond the TOB.

## Creeks in Palo Alto

As described in the Biological Resources section of the Environmental Impact Report (EIR)<sup>2</sup> on the CP 2030, three main watersheds encompass most of Palo Alto: the San Francisquito Creek watershed, the Matadero Creek watershed, and the Adobe Creek watershed. All the creeks in these watersheds flow to San Francisco Bay and enter the bay at the Palo Alto Baylands. The largely undeveloped southernmost portion of Palo Alto flows into the upper reaches of the Stevens Creek watershed, which eventually discharges into the Bay near Long Point, north of Moffett Field Naval Air Station. **Figure 1 (Comprehensive Plan Figure 4.3-3)** from the EIR shows the location of the major creeks in Palo Alto. Their locations and general conditions are summarized as follows:

- San Francisquito Creek forms the northern border of the City adjacent to Menlo Park and East Palo Alto. The main tributaries to San Francisquito Creek are Corte Madera Creek (which extends into other jurisdictions such as Portola Valley and Stanford University property), Bear Creek (in Woodside and Menlo Park), and Los Trancos Creek (in Portola Valley and unincorporated Santa Clara County including Stanford). Upstream of Highway 101 the creek and its tributaries are generally natural channels; downstream of Highway 101 to San Francisco Bay the San Francisquito Creek channel has been engineered for flood control purposes and is bordered by vertical flood walls for a distance of about a half mile with a heavily rocked earthen levee system continuing out to the Bay.
- The Matadero Creek watershed includes the mainstem of Matadero Creek together with Deer Creek, Arastradero Creek, Santa Rita Creek, the Stanford Channel, and Mayfield Slough. Except for the Stanford Channel located near Hanover Street and Page Mill Road, the watershed consists of natural channels upstream of El Camino Real. Downstream of El Camino Real to Highway 101 the creeks are concrete-lined engineered channels. Downstream of Highway 101, Matadero Creek is a natural channel that supports dense riparian vegetation and coastal salt marsh where tidal influence creates saline conditions.
- The Adobe Creek watershed drains south Palo Alto, Los Altos Hills, and Los Altos. Barron Creek is part of this watershed; it flows through south Palo Alto to meet Adobe Creek just before it enters the bay. Both Adobe Creek and Barron Creek are mostly natural channels upstream of El Camino Real and are in engineered, paved channels downstream of El Camino Real to Highway 101. Downstream of Highway 101, both creeks are natural channels that support dense riparian vegetation and coastal salt marsh where tidal influence creates saline conditions.

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<sup>2</sup> PlaceWorks, 2016. Comprehensive Plan Update Environmental Impact Report for the City of Palo Alto, Volume 1: Draft EIR. February 5.



# Stream Corridor Protection Ordinance

## Summary

The City's current SCPO (Palo Alto Municipal Code Section 18.40.140) was significantly amended in 2007 and was last updated in 2020. The SCPO is intended to preserve riparian habitat, protect improvements from damage from flooding and bank erosion or migration, and minimize storm water pollution. The full text of the current SCPO is contained in **Appendix A**.

The SCPO establishes a "streamside review area" for creeks protected under the ordinance. All properties abutting or located within 50 feet from the TOB of a protected creek are subject to the requirements and guidelines defined in the SCPO. These requirements and guidelines are largely based on specifics identified in the *Guidelines and Standards for Land Use Near Streams*<sup>3</sup> prepared by the Santa Clara Valley Water Resources Protection Collaborative (Collaborative), a cooperative decision-making process for which the City of Palo Alto is a member. The requirements and guidelines of the SCPO pertain to proposed development in all zoning districts within the City, including discretionary review for proposed development in R-1, R-2 and RMD zoning districts, consisting of but not limited to:

- Individual review for a new two-story home;
- Individual review in some cases<sup>4</sup> for a new second story on an existing house, where an expansion or change in the building footprint is proposed;
- Variance, including for fences;
- Home Improvement Exceptions; and
- Development requiring a Conditional Use Permit in these zoning districts.

Exceptions from streamside review area requirements and guidelines consist of projects that are:

- Less than 3 cubic yards of earthwork associated with landscaping with native riparian vegetation or with remedial creek bank stability work deemed necessary the Director of Public Works;
- Interior construction; or

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<sup>3</sup> Santa Clara Valley Water Resources Protection Collaborative, 2005. *Guidelines and Standards for Land Use Near Streams, A Manual of Tools, Standards and Procedures to Protect Streams and Streamside Resources in Santa Clara County*. August, revised July 2006.

<sup>4</sup> See Municipal Code Section 18.12 for greater detail.

- Replacement of utility service laterals where location outside of protected areas is not readily available.

The SCPO call for restrictions on development inside a “slope stability protection area”, which extends to a point 20 feet landward from the TOB or to a point measured at a ratio of 2:1 (horizontal: vertical) landward from the toe of bank, whichever is greater. The following uses are not allowed within the slope stability protection area:

- All structures (including accessory structures);
- Decks of any height;
- Swimming pools, spas, and hot tubs; and
- Parking lots.

Exceptions to these restrictions within the SCPO may be granted by the Director of Public Works where an applicant provides a geotechnical slope stability analysis that demonstrates the proposed development would not threaten the stability of the creek bank, require introduction of hardscape to maintain the bank, or be at risk of damage from future bank stability or erosion, and demonstrates how maintenance and repair of the creek could be provided with the proposed development in place, subject to compliance with the following requirements and all applicable zoning setbacks:

- New fences shall be constructed a minimum of five feet landward from the TOB;
- All native riparian vegetation within 100 feet from the TOB shall be retained unless its removal is approved by the Director of Planning and Development Services.
- Replacement planting shall be required when native riparian vegetation is approved for removal.
- Planting of non-native invasive plant species is not permitted. Prohibited plant material is listed in the Santa Clara Valley Water Resources Protection Collaborative’s User Manual *Guidelines and Standards for Land Uses near Streams*.
- Only native riparian vegetation shall be planted between the TOBs of a stream.
- Loading docks, trash enclosures, chemical storage areas, and stationary noise-producing mechanical equipment shall be located a minimum of 50 feet from the TOB of a stream, provided that the Director may allow noise producing equipment closer than 50 feet where site conditions and/or other setback requirements make compliance impractical.
- Nighttime lighting shall be directed away from the riparian corridor of a stream.
- Irrigation systems shall be designed such that they do not cause soil erosions.

- All permitted improvements shall be constructed in a manner consistent with the current version of the Santa Clara Valley Water Resources Protection Collaborative User Manual *Guidelines and Standards for Land Uses Near Stream*.

As part of the streamside review, regulated proposed developments must also conform with the following guidelines:

- Distance between nighttime lighting and the riparian corridor of a stream should be maximized.
- Bright colors or glossy or glare-producing building finishes on buildings facing streams or riparian areas should be avoided.
- Lot measurement along watercourses.

Finally, the SCPO states that “no portion of a lot which is located within the easement lines, or top of the banks in the event such easement lines cannot be ascertained, of any natural watercourse, river, stream, creek, waterway, channel, or flood-control easement or drainage easement shall be included in the determination of lot area and lot dimensions. In the case of any such lot which is bounded, in whole or in part, by any such natural watercourse, river, stream, creek, waterway, channel, or flood-control easement or drainage easement, for those portions of the lot so bounded, all measurements and dimensions specified by this title and related to or determined from lot lines shall be measured from said easement line, or TOB, of such watercourse. Provided the expansion of an existing easement over a lot adjacent to San Francisquito Creek and fronting on Edgewood Drive in favor of the Santa Clara Valley Water District (or its successor in interest) on or after January 1, 2002, shall not alter the calculation of lot area. Lot area, lot dimensions, and setbacks shall be calculated for such lots as if the post-January 1, 2002, easement had not been created.”

### **Current SCPO Mapping of Major Streams**

Under current practices, the SCPO is applied to parcels that contain a streamside review area along perennial and intermittent streams mapped on the City’s GIS dataset as “Water Features Palo Alto.” These include the main stems of San Francisquito Creek, Matadero Creek, Barron Creek, and Adobe Creek, together with the tributary Los Trancos Creek, Buckeye Creek, Stanford Channel, and Deer Creek. While these represent the major drainages in Palo Alto, review of the City’s GIS data and comparison to other mapping sources indicate that there may be errors in the location of some of these features or that additional tributary drainages may be present that are not currently mapped or regulated under the SCPO. This includes GIS mapping available from the Santa Clara Valley Water District (SCVWD).

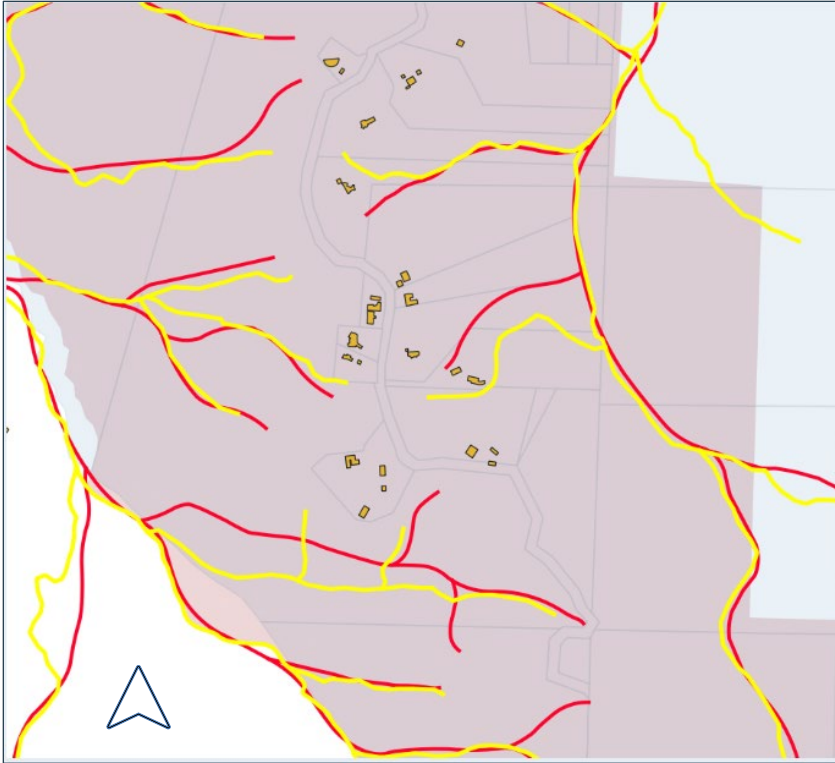


Figure 2. Comparison of Creek Layers along Los Trancos and Adobe Creeks (red lines show mapped creeks from the City's GIS layer, yellow lines show alignments available from data from SCVWD)

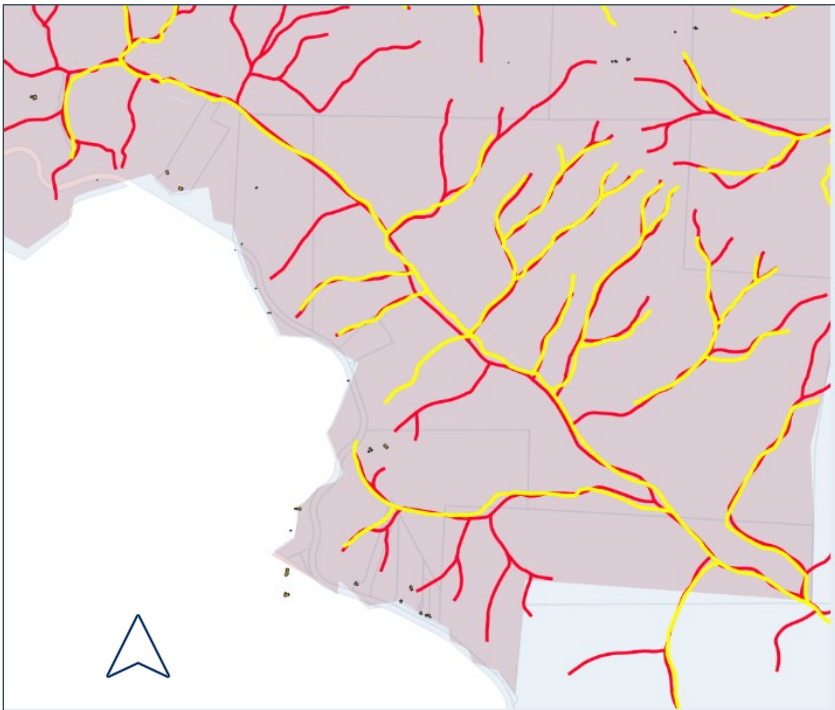


Figure 3. Comparison of Creek Layers along Stevens Creek (red lines show mapped creeks from the City's GIS layer, yellow lines show alignments available from data from SCVWD)

For comparison purposes to demonstrate differences in the available GIS data on creeks, the following images in **Figures 2** and **3** show clips of mapped streams from a portion of Palo Alto west of the Foothill Expressway from the City's GIS and the SCVWD's datasets. In **Figure 2**, Los Trancos Creek is the drainage on the left side of the clip and the upper reaches of Alamo Creek are on the right side. **Figure 3** shows the upper drainages in the Stevens Creek watershed. In both clips, the red lines show mapped creeks from the City's GIS layer typically used in applying the SCPO, while the yellow lines show alignments available from data from the SCVWD. There are considerable differences in the location and alignment of some of the mapped drainages, as well as their lengths and in some areas, discrepancies in the number of tributaries. On two different parcels shown in this example in **Figure 2**, the mapped creek alignments fall on different sides of existing structures. Numerous additional tributary drainages are evident in **Figure 3** according to the SCVWD creek data. These differences in mapping could have major implications on development applications and applicability of the various requirements under the SCPO, demonstrating the importance of verifying the current location of existing drainages, including TOB, as part of the review process.

### **Current SCPO Setback Standards**

The current SCPO identifies several minimum setback standards for proposed improvements where a protected creek and streamside review area are present on a regulated parcel. These include the following setback standards:

- Establishment of a slope stability protection area 20 feet landward from TOB or to a point measured at a 2:1 ratio landward from the toe of bank, whichever is greater, within which all structures, decks, swimming pools, spas, hot tubs, and parking lots shall be restricted unless allowed by approved exceptions.
- Restrictions on loading docks, trash enclosures, chemical storage areas, and stationary noise-producing mechanical equipment closer than 50 feet from TOB, unless allowed by approved exceptions.
- New fences shall be constructed a minimum of five feet landward of TOB.
- Protection of all native riparian vegetation within 100 feet from TOB unless removal is approved, and replacement plantings are provided.
- Requirement that only native riparian vegetation shall be planted between TOBs of a stream.
- Planting on non-native invasive plant species is not permitted.

## Summary of RWQCB Riparian Buffers Study

The most comprehensive review of riparian buffers in the Bay Area was conducted by the San Francisco RWQCB in 2003 as reported in the *Local Government Riparian Buffers in the San Francisco Bay Area* (LGRB).<sup>5</sup> While considerable time has passed since this survey was completed, and local agencies have undoubtedly refined and expanded riparian buffer protections, the LGRB continues to provide useful information relevant to updating the City's SCPO. The LGRB concluded that buffer distances in the Bay Area vary greatly and that it was likely that many of these buffer distances were not based upon specific thresholds designed to satisfy water quality and habitat considerations. But at the time of the survey in 2003, respondents indicated that approximately 38% of stream buffer policies required a 33-foot or greater minimum buffer distance.

Estimates of effective buffer distances for sediment and nutrient filtration vary, but most of the scientific studies suggest distances between 50 and 100 feet from TOB for this purpose<sup>6</sup>, with larger distances to protect important wildlife habitat values and connectivity functions. The LGRB points out the importance of preserving headwater drainages, commonly referred to as ephemeral streams, as a critical step in environmental protection, which has been largely overlooked, as appears to be the case with the SCPO in Palo Alto. Finally, the LGRB points out the importance of engaging the public in the process of adopting or refining stream buffer protections, so that community concerns can be addressed and scientific justification for land use restrictions provided as part of the process. Staff from the RWQCB have indicated that they are currently<sup>7</sup> in the process of providing an update in providing guidance around riparian protections,<sup>7</sup> which will focus on stream buffer recommendations rather than updating the status of current practices for local agencies in the Bay Area. A copy of the LGRB is contained in **Appendix B**.

## Review of SCPO Setback Data

To better understand the implications of revising setback standards under the SCPO, GIS data for streams protected under the City's "Water Features Palo Alto" layer were analyzed against variables of 1) setback distance from protected streams, 2) a range of parcel sizes, and 3) location west and east of Foothill Expressway. To provide a better understanding of flexibility in

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<sup>5</sup> San Francisco Bay Regional Water Quality Control Board, 2004. *Local Government Riparian Buffers in the San Francisco Bay Area*. July.

<sup>6</sup> Jones & Stokes, 2002. *Stream Setback Technical Memorandum*. October 18.

<sup>7</sup> Hunt, Lisa, Water Resource Control Engineer, San Francisco Bay Regional Water Quality Control Board, 2024. Personal communication with James Martin, Principal of Environmental Collaborative on March 28.

siting proposed improvements on individual parcels, data was further subdivided into a range of parcel sizes – those under ½ acre, from ½ to 2 acres and over 2 acres. Vegetation and lifeform data available from the SCVWD lidar data from 2020 was then used as a basis for better understanding conditions along the City’s protected streams and the effects of providing setbacks for 50, 100 and 150 feet from the centerline of mapped streams. While setbacks under the SCPO are established from the TOB, available GIS data is plotted to the centerline of the stream, not the TOB as data for TOB would need to be field verified by a qualified biologist and may change over time.

Conditions varied considerably along protected streams in Palo Alto. In general, the Matadero, Barron, and Adobe Creek channels have been heavily modified for flood control purposes across the urbanized valley floor of Palo Alto downstream of El Camino Real and to Foothill Expressway along some drainages. These reaches of the protected streams tend to be bordered by urban development, until they pass under Highway 101 and reach the remnant riparian and marshlands along the shore of San Francisco Bay. Upstream of Foothill Expressway, most of the protected streams remain in a natural condition except where I-280 and other roadway crossings have culverted these reaches. Some residential, institutional, and recreational uses border these creeks and their tributaries, but most of the adjacent lands retains natural cover and these areas remain largely open for wildlife movement along the creek corridors and surrounding uplands.

Data from the GIS analysis of the City’s protected stream layer provides some quantification of existing conditions and opportunities for expanding existing protections under the SCPO. The number of parcels with mapped protected streams in the City ranged from 3,976 when a 50-foot setback distance from stream centerline was used, to a total of 6,637 when a 150-foot setback was used. It should be noted that the GIS layer of mapped protected streams captures all parcels within the prescribed setback distances, even where a parcel may be separated from the stream by a roadway or an intervening parcel. As a result, the total number of parcels that would be subject to the SCPO is likely lower than those reported here, but the available data nevertheless is useful in understanding differences between the more urbanized areas and those with more natural habitat, the implications of increasing setback distances, and existing cover types within these setbacks along mapped protected streams. Under the 150-foot setback distance, there were a total of 1,888 parcels that intersect with one of the City’s mapped protected streams west of Foothill Expressway. Of these, 31 were parcels under ½ acre in size, 188 were from ½ to 2 acres, and 1,699 were greater than 2 acres. This 150-foot setback along the mapped protected streams west of Foothill Expressway encompasses an area of about 1,493.2 acres. Of this total, only 18.38 acres were mapped as “Developed” based on the SCVWD cover data, with about 3.5 acres of open water, about 1.1 acre of vineyard or other agricultural cover, and the remainder supporting native and non-native vegetation.

Applying this same 150-foot setback to the City's mapped protected streams east of Foothill Expressway demonstrates the largely developed condition through the urbanized areas of Palo Alto. Under the 150-foot setback distance, there were a total of 4,749 parcels that intersect with one of the City's mapped protected streams. Of these, 2,151 were under ½ acre in size, 430 were from ½ to 2 acres, and 1,468 were greater than 2 acres. The 150-foot setback along mapped protected streams east of Foothill Expressway encompasses an area of about 1,233.2 acres. Of this total, 338.4 acres are mapped as "Developed" or "Barren" based on the SCVWD cover data, with about 168.1 acres of open water or tidal mudflats, and the remainder supporting native and non-native vegetation. An estimated 355.8 acres of this vegetative cover is comprised of coastal salt marsh in the Baylands downstream of Highway 101. The majority of the remaining vegetative cover is composed of non-native forest indicative of mature landscaping in yards and along tree-lined streets, which occupies an estimated 111.3 acres within this 150-foot setback distance from mapped protected streams.

Applying a 50-foot setback to the City's mapped protected streams east of Foothill Expressway reduces the total affected parcels and associated cover types. Under the 50-foot setback distance, there were a total of 2,690 parcels that intersect with one of the City's mapped protected streams. Of these, 1,421 were under ½ acre in size, 300 were from ½ to 2 acres, and 969 were greater than 2 acres. The 50-foot setback along mapped protected streams east of Foothill Expressway encompasses an area of about 451.3 acres. Of this total, 67.3 acres are mapped as "Developed" or "Barren" based on the SCVWD cover data, with about 98.2 acres of open water or tidal mudflats, 117.2 acres of coastal salt marsh downstream of Highway 101, and 54.9 acres of non-native forest, with the remaining 113.7 acres supporting other non-native or native vegetative cover types.

The GIS data of mapped protected streams reflects assumptions made in the CP 2030 regarding opportunities for larger setbacks and resource protections west of Foothill Expressway and more challenges with smaller parcel sizes and greater development intensities east of Foothill Expressway. Less of the setback areas are developed and still support primarily native habitat west of Foothill Expressway and much of the creek corridors east of Foothill Expressway have been modified by past flood-control improvements, are crossed by major roadways including Highway 101 and El Camino Real and are bordered by urbanization rather than natural habitat.

## Conclusions and Recommendations

The City's current SCPO serves to recognize the value of major streams in Palo Alto and provides an important framework for their protection. However, Policy N-3.3 and Programs



N3.3.1, N3.3.2 and N3.3.3 from the Natural Environment Element of the CP 2030 all call for updating the SCPO with the objective of refining setback standards, reviewing the adequacy of development restrictions, and exploring ways to further minimize impacts on wildlife habitat and movement opportunities. These considerations include:

- 1) Establishing a range of setback requirements from protected streams to reflect the range in habitat values, land use characteristics, and other factors (see **Policy N-3.3**).
- 2) Exploring the appropriateness of providing a 150-foot setback along natural creeks in open space and areas west of the Foothill Expressway, as well as a border of native riparian vegetation at least 30 feet along the creek bank (see **Program N3.3.1**).
- 3) Examining appropriate setback for creeks east of the Foothill Expressway that reflect the varied natural and channelized conditions of these drainages while providing opportunities for an enhanced riparian setback as properties are redeveloped or improved (see **Program N3.3.2**).
- 4) Updating the SCPO to further minimize impacts on wildlife, including limiting the development of recreational trails to one side of natural riparian corridors and requiring careful design of lighting adjacent to natural riparian corridors to maximize the distance between nighttime lighting and direct lighting away from the riparian corridor (see **Program N3.3.3**).

All of these considerations would serve to improve the habitat protections provided by the SCPO. Any increases in development setbacks beyond those currently specified in the SCPO would serve to protect existing vegetation and wildlife habitat values where natural habitat remains, while reducing the risk of disturbance to the sensitive riparian corridors as a result of short-term construction and long-term occupation and management. Understandably, these refinements to the SCPO development restrictions and guidelines must be balanced with the rights of private property owners where protected streams are present.

During preparation of this Existing Conditions Report, limitations with the current SCPO and available mapping data became apparent, which should be considered as part of the ordinance update. These consist of the following:

**Definition of Stream:** No definition of “stream” or “protected stream” is provided in the current SCPO or could be found in the City’s Municipal Code. Ordinance No. 4932 calls for the City to conform with the Collaborative’s *Guidelines and Standards for Land Use Near Streams*, which contains a definition of stream within the User Manual, however, the Municipal Code was not updated to explicitly adopt the definition of stream used in the User Manual. Providing a definition of stream in the Municipal Code language would

reinforce what is regulated under the future stream protection ordinance and help clarify the issue for private property owners and the interested public.

**Identification of Protected Streams:** Differences in mapping of protected streams used by the City and data available through other sources demonstrate uncertainties in the location, alignment and tributaries that warrant consideration as part of the SCPO. These differences in mapping could have major implications on development applications and applicability of the various requirements under the SCPO, demonstrating the importance of verifying the current location of existing drainages as part of the ordinance compliance review process. However, it should be acknowledged that these streams and their defined banks are subject to natural forces and may shift over time, underscoring the importance of field verification in certain instances.

**Protection of Unmapped Drainages:** The current SCPO focuses on major creeks and tributaries, generally the known perennial and intermittent drainages in Palo Alto. However, headwater or ephemeral streams provide important water quality filtration functions and can provide important linkages between aquatic and upland habitat. Including protection of currently unmapped features would be an important consideration as part of updating the SCPO. Development setback standards from ephemeral streams could be considerably less than those for intermittent and perennial drainages, where the primary goal is to provide sediment filtration. Some segments of ephemeral drainages may be part of a larger native woodland or contain bands of woody riparian vegetation that warrant protection beyond their primary role in recharge and sediment filtration functions.

**GIS Data from Assigned Setbacks:** The GIS data related to setbacks of from 50 to 150 feet from mapped protected streams is useful in understanding existing conditions and need for greater protections, where feasible and reasonable. Some of this data has its limitations, such as the inclusion of parcels separated from nearby streams or with an intervening parcel under different ownership, conditions where the SCPO would not apply. But the available GIS data is overall very useful and can be used to better understand the extent of existing development, presence of absence of native vegetative cover, and other variables to be considered as part of updating the SCPO. Within limitations, this data can be further applied to respond to questions and concerns as the review process for updating the SCPO proceeds.

## Appendix A: Stream Corridor Protection Ordinance

## **18.40.140 Stream Corridor Protection**

### **(a) Purpose**

The purpose of the water resources protection measures specified below is to provide site planning and development standards designed to preserve riparian resources, protect improvements from damage caused by potential stream flooding and bank erosion, and minimize storm water pollution. The further intent of the regulations and guidelines is to consider these factors in site planning early in the review process.

### **(b) Water Resources Protection for Streamside Properties**

#### **(1) Streamside Review Area Defined**

"Streamside review area" means all properties abutting a stream or located within 50 feet from the top of a stream bank, except those properties separated from the stream by a public street.

#### **(2) Applicability of Streamside Review Area Requirements and Guidelines**

For parcels within the streamside review area, the following types of developments are subject to these requirements and guidelines listed in subsections (3) and (4) below.

- (a) Development in all zones except the R-1, R-2 and RMD districts;
- (b) Development in the R-1, R-2, or RMD zones requiring discretionary review, including but not limited to:
  - (i) Individual review for a new two-story home
  - (ii) Individual review for a new second story on an existing house, where an expansion or change in the building footprint results
  - (iii) Variances, including for fences
  - (iv) Home Improvement Exceptions; and
- (c) Development requiring a Conditional Use Permit in the R-1, R-2, or RMD zones.

The following projects are exempt from streamside review area requirements and guidelines:

- (a) Less than 3 cubic yards of earthwork associated with landscaping with native riparian vegetation or with remedial creek bank stability work deemed necessary by the director of public works;
- (b) Interior construction; or
- (c) Replacement of utility service laterals where location outside the protected areas is not readily available.

#### **(3) Requirements Within streamside review area**

(a) Slope stability protection area. All development shall be located outside the slope stability protection area. The slope stability protection area shall extend to a point 20 feet landward from the top of bank or to a point measured at a ratio of 2:1 (horizontal: vertical) landward from the toe of bank, whichever is greater.

The following structures/uses shall not be allowed within the slope stability protection area:

- (i) All structures (including accessory structures);
- (ii) Decks of any height;

- (iii) Swimming pools, spas, and hot tubs; and
- (iv) Parking lots.

Exceptions to this requirement may be granted by the director of public works where the applicant provides a geotechnical slope stability analysis, demonstrating that the proposed development would not threaten the stability of the stream bank slope, require introduction of hardscape in order to maintain the stream bank slope, or be at risk of damage from future bank stability or erosion, and demonstrating how maintenance and repair of the stream could be provided with the proposed development in place, subject to compliance with requirements (b) through (i) below and with all applicable zoning setbacks.

(b) New fences shall be constructed a minimum of five feet landward from the top of bank.

(c) All native riparian vegetation within 100 feet from the top of bank shall be retained unless its removal is approved by the director of planning and development services. Replacement planting shall be required when native riparian vegetation is approved for removal.

(d) Planting of non-native invasive plant species is not permitted. Prohibited plant material is listed in the Santa Clara Valley Water Resources Protection Collaborative's User Manual *Guidelines and Standards for Land Uses Near Streams*.

(e) Only native riparian vegetation shall be planted between the top of the banks of a stream.

(f) Loading docks, trash enclosures, chemical storage areas, and stationary noise-producing mechanical equipment shall be located a minimum of 50 feet from the top of bank of a stream, provided that the director may allow noise-producing equipment closer than 50 feet where site conditions and/or other setback requirements make compliance impractical.

(g) Nighttime lighting shall be directed away from the riparian corridor of a stream.

(h) Irrigation systems shall be designed such that they do not cause soil erosion.

(i) All permitted improvements shall be constructed in a manner consistent with the current version of the Santa Clara Valley Water Resources Protection Collaborative User Manual *Guidelines and Standards for Land Uses Near Streams*.

#### (4) Guidelines Within Streamside Review Area

(a) The distance between nighttime lighting and the riparian corridor of a stream should be maximized.

(b) Bright colors and glossy or glare-producing building finishes on buildings facing streams or riparian areas should be avoided.

#### (c) Lot Measurement Along Watercourses

No portion of a lot which is located within the easement lines, or top of the banks in the event such easement lines cannot be ascertained, of any natural watercourse, river, stream, creek, waterway, channel, or flood-control easement or drainage easement shall be included in the determination of lot area and lot dimensions. In the case of any such lot which is bounded, in whole or in part, by any such natural watercourse, river, stream, creek, waterway, channel, or flood-control easement or drainage easement, for those portions of the lot so bounded, all measurements and dimensions specified by this title and related to or determined from lot lines shall be measured from said easement line, or top of the bank, of such watercourse. Provided the expansion of an existing easement over a lot adjacent to San Francisquito Creek and fronting on Edgewood Drive in favor of the Santa Clara Valley Water District (or its successor in interest) on or after January 1, 2002 shall not alter the calculation of lot area. Lot area, lot dimensions, and setbacks shall be calculated for such lots as if the post-January 1, 2002 easement had not been created.

(Ord. 5494 § 3, 2020: Ord. 4934 § 3 (part), 2007)

## Appendix B: Riparian Buffers in the San Francisco Bay Area

# **Local Government Riparian Buffers in the San Francisco Bay Area**



**San Francisco Bay  
Regional Water Quality Control Board**

**July 2004**



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## INTRODUCTION

### Background

As indicated in the *Plan for California's Nonpoint Source Pollution Control Program* (Plan), the San Francisco Bay Regional Water Quality Control Board (Water Board) supports local agency efforts to reduce erosion and sedimentation and protect riparian areas. The Plan calls on local agencies to:

- Develop a technical assistance program for project design that will include guidelines for designing projects that avoid wetlands and riparian areas
- Develop a framework linking stream, hydrological, and ecological function to beneficial uses
- Develop criteria for protecting ecological functions and other beneficial use of streams
- Draft Stream Protection Policy

The Water Board is currently working to support local agency efforts to enact stream protection regulations that protect and restore natural stream function. As part of that effort, the Water Board published *A Primer on Stream and River Protection for the Regulator and Program Manager* (April 2003), which discusses the link between channel stability and water quality and outlines ways to avoid excessive erosion and sediment deposition.

The Water Board has also prepared a draft Stream Protection Policy that contains the following objectives for riparian buffer zones:

Buffer zones shall be maintained or enhanced to protect stream functions. Examples of ways in which buffer zones protect stream functions include: removing agricultural and urban stormwater pollutants, reducing sediment from upland sources, stabilizing stream banks, minimizing changes to the hydrograph by infiltrating stormwater runoff, metering stream baseflow, and supporting vegetation which provides nutrients and shade.

### Purpose

This survey of local government efforts to regulate land use for the protection of water quality and habitat for aquatic species was conducted in order to:

- 1) Determine what land use regulations and management measures local jurisdictions are already undertaking to protect riparian corridors;
- 2) Inventory riparian buffer widths and the methods used to calculate the width of the buffers
- 3) Identify obstacles to establishing riparian protection regulations
- 4) Make recommendations for local governments regarding riparian buffer regulations with the goal of drafting a model ordinance. This can serve as a point of departure for local jurisdictions crafting new or revised ordinances.

Many Bay Area cities and counties have riparian protection policies, rules, or ordinances and others are considering adopting such rules. As the embarks on Total Maximum Daily Load (TMDL) development and implementation and the issuance of Phase 2 Urban Stormwater Permits, we are interested in knowing how local jurisdictions regulate land use to protect water quality and preserve aquatic habitat.

Other topics that will be addressed in this study are:

- The number of cities and counties that are currently working on or considering proposing riparian setback ordinances.
- The key areas of controversial issues that have arisen over riparian buffers in each community

### **Why Establish Creek Buffers?**

Stream buffers can be effectively established through a variety of planning tools, including overlay zoning, creek setback ordinances, and conservation easements. The preparation of local regulations typically involves several components. The first step is to develop the purpose and need for the regulation. Purposes and needs statements contained in ordinances typically cite public safety, hazards reduction, health, and other compelling traditional “police powers” of local government. Protection of environmental habitats has been added to these purposes recently because responsibilities for complying federal and state laws, including the federal Clean Water Act, Endangered Species Act, and the state Porter Cologne and Endangered Species Acts, are increasingly being shifted from federal and state levels to local levels. The next section describes the regulations, which must have a clear and logical connection to the purposes just described. Other sections typically describe enforcement provisions, variances allowed, and often an appeals process.

Riparian zones perform many ecological functions important to enhancing water quality, water quantity, biodiversity, habitat connectivity, and flood capacity. The stream channel itself conveys runoff, supports aquatic plants and animals, provides groundwater recharge, and supplies water to trees and plants that typically thrive in the riparian zone.

Stream buffers are an effective way to physically protect and separate a stream or wetland from future disturbance or encroachment. A network of stream buffers acts as a right-of-way during floods and sustains the integrity of stream ecosystems and habitat (Center for Watershed Protection, [www.cwp.org/aquatic\\_buffers.htm](http://www.cwp.org/aquatic_buffers.htm)). Riparian forest and wetland buffers, if properly maintained, appear to have a significant capacity to mitigate some of the effects of development. Riparian buffers protect stream function, protect habitat, and provide additional capacity for flood flow conveyance.

The Water Board's Watershed Management Initiative identifies the following major non-point source problems in the San Francisco Bay Region, many of which can be partially or fully addressed through establishment of riparian buffers:

- Elimination of natural channels, including loss of wetlands, wildlife, fisheries and riparian areas;
- Increased sedimentation due to construction activities and land clearing;
- Unmitigated changes in hydrology that upset the geomorphic equilibrium of streams, causing destabilization and erosion of channels, and more frequent flooding;
- Increased pollutant loads associated with urban activities;
- Impairment of fish habitat from water diversions and fish passage barriers due to the construction of in-channel reservoirs and diversion structures, the sedimentation of channels, and the removal of vegetation; and,
- Increased pollutant loads associated with agricultural activities.

### *Stream Function*

The riparian zone functions to decrease sedimentation by intercepting sediment and debris in root zones before sediment-laden runoff enters the stream system. The capture of sediments has the added benefit of trapping particle-bound chemicals and pollutants, preventing them from degrading aquatic environments. Also, the vegetation within a creek buffer will decrease erosion and allow for increased soil infiltration by stabilizing stream banks and slowing flow velocities. In some settings, intact riparian areas will remove pollutants traveling in stormwater or groundwater.

### *Riparian Habitat*

The riparian zone is an ecotone, or transition zone, between aquatic and terrestrial habitats. Because riparian zones contain both aquatic and terrestrial plant and animal species they have unusually high species diversity. Riparian zones are also important migratory corridors. A continuous buffer provides migratory and wildlife corridors, which are of particular value in protecting amphibians and waterfowl populations, as well as fish spawning and nursery areas. According to the U.S. Fish and Wildlife Service, California has lost 90 percent or more of its wetlands, which includes riparian communities. This is despite the fact that according to government biologists, riparian communities in the Western states, such as California, provide habitat for up to 80 percent of western wildlife species. It is estimated that about 50 percent of endangered species require wetlands at some point in their life cycle.

### *Flood Conveyance*

Riparian zones form the part of the floodplain that is closest to the edge of the water body and are the most frequent areas to be inundated. To minimize property damage, it is advantageous for local regulations to include the entire 100-year floodplain within the riparian buffer to reduce flood risks.

## **Regulatory Context**

### *Federal Clean Water Act Sections 404 and 401*

The California Regional Water Quality Control Boards review applications for water quality certifications under Section 401 of the federal Clean Water Act (CWA). CWA Section 401 is tied to CWA Section 404, which requires federally issued permits for all proposed fill and dredge activities in waters of the United States. Section 401 gives states the authority to approve, conditionally approve, or deny a Section 404 permit to ensure that federally permitted actions are consistent with state law. Section 404(b)(1) provides guidance for evaluating project alternatives. It calls for first avoiding impacts, and then minimizing impacts to assure that there is no net loss of fully functional streams, wetlands, and/or water bodies. Implementation of stream protection regulations can go a long way to avoiding impacts and can ease the Section 404/401 permit process for projects. Additionally, projects that avoid all impacts, or potential impacts to waters of the State will not require 401 water quality certification.

### *California's Porter-Cologne Water Quality Control Act*

California's Porter-Cologne Act provides both immediate and long-term authority for the protection of the physical integrity of river and stream environments. The Act directs regional boards to regulate impacts to waters of the State by the issuance of Waste Discharge Requirements (WDRs) for any activity that results in a waste discharge that directly or indirectly impacts waters of the State. WDRs can and are being used to maintain and promote stable waterways. When used to condition discharges such as fill into a water body, WDRs may encourage a balance between erosion, sediment transport, and deposition as a means of avoiding the degradation of water quality. In the past, WDRs were primarily used to regulate point source discharges of liquid or solid waste to land (e.g., septic tank discharges, landfill operations, etc.) However, WDRs are an appropriate means to regulate discharge of waste including fill material, sediment and changes in flow to waterways.

Each of the nine Regional Boards has a master policy document that describes the legal, technical, and programmatic foundation used for protecting water quality. In the Bay Area, this Water Quality Control Plan, or "Basin Plan," details beneficial uses that are directly related to the concern of the physical integrity of stream and river channels. While there are many beneficial uses provided by aquatic ecosystems, the uses best preserved by riparian buffers are: cold freshwater habitat for trout and anadromous salmon and steelhead; fisheries migration including unimpeded river flows; preservation of rare and endangered species; and protection of wildlife habitat. These beneficial uses can be effectively protected and maintained through riparian and wetland land use regulation at the local level.

### *Federal Clean Water Act Sections 303(d)*

Section 303(d) of the CWA requires identification of impaired water bodies (those that do not meet water quality objectives or support designated beneficial uses). Many water bodies in the Bay Area have been listed under Section 303(d) as impaired and the Water Board is developing Total Maximum Daily Loads (TMDLs) to address these impairments. TMDLs create a plan to attain the designated water quality objectives and protect beneficial uses for impaired water bodies. Impairment due to excess sediment, nutrients, and pathogens are common in the Bay Area.

The Water Board is developing TMDLs to address impaired water bodies in the Bay Area. We are encouraging a broad watershed management approach that allows for flexibility in attaining water quality goals and objectives. The TMDL may combine the concept of load allocations with aggressive Best Management Practice programs and local “commitments to action” tied to measurable factors such as extents of riparian setbacks, riparian canopy coverage, and stable vegetated stream banks. TMDLs provide an opportunity to identify and apply locally based remedies to improve watershed conditions.

### *Endangered Species Act*

The Regional Board works cooperatively with the California Department of Fish and Game and the federal U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to assist in the protection of threatened and endangered species. In June 2000, NMFS adopted regulations affecting fourteen groups of salmon and steelhead listed as threatened under the Endangered Species Act (ESA). Other listed aquatic species found in the Bay Area include freshwater shrimp, red-legged frog, western pond turtle, and other non-salmonid fish. In addition to aquatic species there are a number of threatened and endangered birds and mammals that use sensitive riparian and wetland habitat for vital life functions. The ESA provides a variety of tools for saving species threatened with extinction. Review of activities that could affect endangered aquatic species is facilitated by proactive riparian and wetland land use policies.

### *California Environmental Quality Act*

The California Environmental Quality Act (CEQA) requires that the potential environmental impacts of projects be evaluated and that mitigation measures be developed to reduce any identified significant impacts. CEQA requires evaluation of hydrologic, water quality, and biotic resource impacts. Mitigation measures, developed on a project-by-project basis, often include riparian buffers. Local stream protection policies and ordinances limit development in riparian areas and can alleviate the need to conduct a project-specific impact analysis.

## **Political Reality**

Many cities and counties in the Bay Area are struggling to adopt stream protection policies and ordinances to provide a mechanism for complying with the wide range of water quality and endangered species regulations discussed above. However, in many jurisdictions there is concern that riparian buffers could result in undesirable restrictions on private property. These concerns can be addressed through ordinance exceptions or variance provisions. It is important for local government to initiate a stakeholder outreach and education program prior to releasing a draft ordinance for the decision-making body to consider.

On the other hand, in some communities concerned citizens and environmental groups may believe that the riparian protections are not stringent enough or that enforcement mechanisms are weak. The success of riparian buffer regulation lies with the community. The community must be educated about the benefits of riparian protection, what the proposed regulations will and will not allow, how exceptions to the regulations are permitted, and finally, who will implement and enforce the ordinance.

## **METHODOLOGY**

In February 2003, a “Stream Protection and Erosion Control Survey” (Appendix A) was drafted by the Water Board with the intent of being administered to staff in city and county planning departments. In an effort to identify policies that contribute to sediment reduction and aquatic habitat protection throughout the San Francisco Bay region, questions were asked regarding stream and tree protection, and hillside development policies. San Francisco Estuary Project Interns Orrin Cook and Brendan Thompson conducted phone and email surveys between March and November 2003. At times, planning staff deferred questions to their jurisdictions’ public works or community development departments, who then replied to the survey questions. Between March and May 2004, the data were fact-checked to ensure that the results were current.

The survey questionnaire consisted of nine questions, and question results were entered into an Excel spreadsheet and then summarized. For survey question #1, which asks if a given General Plan contains policies about the protection of riparian resources, a threshold was established whereby if the General Plan had a clear statement about restricting development in the riparian zone, then an affirmative answer would be assigned. All affirmative responses from city and county staff were checked with that jurisdictions General Plan to ensure the threshold was satisfied. For some of the cities that did not respond to the survey, we were able to access their General Plans online. These cities were included in the survey results for question #1. If the General Plan could not be accessed, then the question was not assigned a response.

Survey question #3 asks if a municipality has a zoning ordinance regarding riparian buffers. If a stream buffer policy existed in the jurisdictions zoning ordinance, municipal code, or supplemental policy document, an affirmative response was assigned. General Plan policies were not included. “Easement” and “setback” policies were included in our definition of a stream buffer. For all of the questions, responses were confirmed by checking the corresponding policy document.

During our study, we discovered that the initial scope of the survey was too broad, given the available resources. Information was gathered on tree protection policy, hillside development policy, and flood hazard issues (see Appendix D). Once much of these data were gathered, it was evident that there was not enough information for analytical applications. Later survey participants were given an abbreviated survey that only asked the questions of the survey that applied to issues of stream resource protection.

### **Limitations of Study**

The survey began with the intention of finding several meaningful, quantitative descriptions to describe stream, tree, and hillside protection policies in the 85 incorporated cities and nine Bay Area counties within the San Francisco Bay Regional Water Quality Control Board (Region 2). Not surprisingly, the absence and presence and characteristics of these policies were not clear-cut, and did not lend themselves to be easily summarized within discrete categories. Consequently, the only absolute quantitative data we can report from this survey is the number



of jurisdictions with some form of riparian buffer policy in their city and county codes. We also provide a range of buffer widths prescribed by local regulation, as well as a percentage of jurisdictions with tree protection ordinances and hillside development ordinances (Appendix D).

We intended to develop a rating system that would evaluate the effectiveness of the stream buffer policies. This proved to be unmanageable, as the effectiveness of a given stream buffer policy is a function of many variables. For a list of stream buffer policy characteristics that would be used to develop evaluative criteria of a given policy, see Appendix C. Additionally, we were unable to determine how closely or effectively a given jurisdiction was following their stream protection policies. It is possible that some communities protect their riparian areas more effectively through their design review process than other communities who have an established buffer policy. Although it is difficult to assess the success of these buffer policies, it can be said that vague definitions of allowable land use in buffer zones, or liberal granting of variances do not lend themselves to an effective buffer policy.

We cannot guarantee the accuracy of the information provided by participants. We interviewed senior planners, principal planners, planning directors, city planners, planning managers, assistant planners, and various staff in public works departments. It is also possible that certain participants' unfamiliarity or inexperience could have resulted in inaccurate survey replies.

The reported results reflect conditions that were accurate at the time the surveys were conducted. The information was gathered between March 2003 and May 2004. Since the time interviews were done, General Plans may have been updated or new ordinances may have been implemented.

## **RESULTS**

With 89% of cities reporting, 41% have some form of a stream buffer policy in their municipal code, zoning ordinance, or supplemental policy document. Of the nine counties in the Region 2 jurisdiction, with San Francisco County not responding, 75%, or 6 of 8 have a stream buffer policy established. After examining the General Plans of 81% of the 85 Region 2 cities, we determined that 32% of those cities have General Plans describing an implementation policy that restricts development within riparian zones. A summary of some local stream buffer policies and stream protection approaches is provided in Appendix B.

Of the 59% of cities that do not have a stream buffer policy, 4% are working to adopt such policies, 7% are considering the possibility, 80% are not considering adopting one, and for 9%, it is unknown whether or not they are working on or considering a buffer policy.

See Appendix D for a graphical summary.

## FINDINGS

### Typical Issues of Controversy

#### *Property Encroachment*

Fear of private property encroachment is the most common contention raised at the mention of stream buffer policy. Enactment of a policy has the perceived potential to restrict property owners of some uses or activities on portions of their parcels. This becomes less of an issue in communities with large lots; in cities with small lots, the buffer would have a greater effect on a landowners' "reasonable use," thereby making the implementation of a stream buffer policy much more difficult. Planners expressed a need to accommodate property owners who may have small parcels, or parcels with a high ratio of total property line adjoining a creek. Cupertino is the only city found with a buffer policy that establishes buffer widths based on lot size. In Cupertino, lots less than one acre in size must provide a 50-foot stream buffer zone; sites over one acre must leave 100-foot buffers. Some policies reflect other methods of protecting landowners. In 1990, when the City of San Ramon established a 100-foot stream buffer ordinance within "resource conservation areas," properties that were already parceled prior to conservation district approval were precluded from the ordinance.

In a very small percentage of jurisdictions, a proposed, amended, or approved stream buffer ordinance has met opposition from members of the community. Amidst concerns and debate from citizens opposed to regulation of private property, Napa County Supervisors adopted a stream setback Revision Ordinance that ambitiously expanded upon an existing stream buffer policy (see Appendix B). The Board of Supervisors then withdrew the ordinance after critics of the new policy submitted a referendum petition. According to a senior planner from the County, resistance came from private property owners who thought that the county was taking land unjustifiably. Private landowners argued that the science behind the stream buffer guidelines might not be valid. The fate of the ordinance was determined by a countywide vote in March 2004, whereupon it was defeated. The City of Portola Valley in San Mateo County has also been having difficulty increasing an existing 20-foot from creek center setback policy, due to property owner opposition.

Many landowners have misconceptions about existing and proposed riparian buffer ordinances. Often landowners assume that their land will be transferred to public ownership. In addition, landowners are often unfamiliar with existing land use restrictions and state and federal law pertaining to wetland fill and stream alteration. (Some existing regulations are described in the Introduction). The goal of riparian buffer regulation is to reinforce at the local level Section 404 and Section 401 CWA regulations on all streams (see introduction, pg. 6) and to further provide for a setback from the top of bank to allow for improved water quality, to promote riparian habitat values, and to protect stream banks from erosion.

A Napa county planner noted that if the county could start the entire process again, it would have "done more public scoping and more public education." He emphasized the need for open workshops and town meetings with *scientists* present, since planners and commissioners are

often now well versed in stream science. Doing this, he said, would have allowed the public to better understand the environmental benefits of a stream buffer ordinance.

### *Jurisdictional resistance*

Some communities, and more often community groups, have pressured their city or county to adopt a stream buffer ordinance or make an existing ordinance more stringent. However, these groups have occasionally met opposition from the city or county. The governing body often cites a lack of funding, departmental resources, or political will to pursue stream protection legislation. Instead, jurisdictions frequently respond to political pressure by focusing on the design review or permit process as a way to limit development within riparian zones. Though these results may be beneficial, the sincerity of their efforts can sometime be viewed as questionable. As one county senior planner stated, “If you throw enough money at [a proposed development], anything is possible.” This approach also leads to a case-by-case approach to stream setbacks that can be inconsistent and inefficient.

In similar respect to the aggrieved property owner who must compromise development potential because of a riparian buffer, jurisdictions may tend to perceive the buffer as an expensive policy that further depletes an already finite reservoir of developable land. One city planner suggested that setting aside and preserving riparian areas would reduce the amount of land available for development, thereby adversely affecting housing availability and affordability.

Development and a riparian buffer need not always be at odds with one another. We learned from the survey of one instance where the passage of a proposed large residential development would have been facilitated by the presence of a riparian buffer ordinance. The city’s conditions of approval for the development were being heavily contested partly due to public demand for a significant level of riparian protection. If the city had already had a riparian buffer ordinance in place prior to the project introduction, the developer would have presented a different plan at the outset, and the conflict could have been greatly diminished, or avoided entirely. Aside from providing the developer with a level of certainty, the city would be alleviated of the need for extra analysis within the CEQA process. Cities can provide incentives, such as housing density bonuses, for development that avoids riparian areas.

### **Approaches to Regulation**

Throughout the region, cities are employing various tools to regulate riparian zones. No two are quite the same. Appendix B describes some representative policies that demonstrate the wide range of riparian resource management.

The 59% of cities without a stream buffer policy do exercise some regulation of development in their riparian areas. When asked whether or not they regulate land use in riparian zones beyond state and federal law, planners often responded affirmatively, noting that through development permits and CEQA processes, riparian areas are protected. This “case-by-case,” or “project-by-project” approach to riparian regulation may result in inconsistent and

inadequate riparian protection. Some planners earnestly described community and planning commission support for protection of riparian resources. It was likely in many of these cities that unwritten buffer policies and other riparian protection guidelines were adhered to by the planning departments, and that even in the absence of an ordinance or formal policy, the watercourses were in good health. In other cases, a case-by-case approach is tantamount to not having a riparian protection policy. In municipalities or counties where the planning commission is more supportive of development, or community interest in preserving riparian zones is lacking, the absence of a formal policy will contribute to degradation of the riparian areas. Without a formal policy, adequate long-term creek stewardship is not assured.

Virtually all the cities in the Bay Area without a stream buffer ordinance have within their General Plan a paragraph that acknowledges and praises the value of their creeks. Far fewer have implementation policies that attempt to actively preserve those waterways. The General Plan of Colma contains a recommended stream setback that does not have specific implementation policies. When a development project comes under review by the planning department, the General Plan recommended stream setback is referenced as an attempt to establish some degree of riparian protection. While such a policy is not as reliable as a code/ordinance, it provides a tool for riparian preservation where a code or ordinance does not exist. It is also an alternative approach to riparian protection for communities where a riparian buffer ordinance is not yet a political possibility. Contra Costa County also has a stream buffer policy within their General Plan. This policy is stronger than the aforementioned, because the policy is not “recommended,” but rather states that setback areas “*shall* be provided.”

The City of San Jose has a stream buffer policy that is neither in the code nor the General Plan. The city administers a riparian buffer policy through use of a “riparian corridor study” document that describes suggested buffer widths. The document recommends a 100-foot setback, but exemptions are given that may reduce the setback to 50-foot distances.

Some cities protect watercourses by requiring that development projects near riparian areas obtain a special permit. Although a stream buffer requirement is not part of the regulatory process, this approach ensures that every project adjacent to a creek will be evaluated in terms of avoiding watercourse impacts. The permit will typically have conditions of development that are designed to protect riparian functions. Jurisdictions that claim to effectively protect creeks through the design review process could adopt a permit requirement, thereby providing assurance that potential creeks impacts are receiving due consideration. The city of Oakland uses this permit approach (see Appendix B).

There is much variability among the established stream buffer ordinances. Stream buffers are measured from either the top of the stream bank, the centerline of the creek, or sometimes from the outward edge of riparian vegetation. Measuring the buffer from the outward edge of vegetation has the potential to discourage property owners from preserving their riparian zones. Some ordinances use the dimensions of the stream channel to formulate a buffer width, and the calculations can get rather complicated (see Lafayette, Appendix B). Operative assumptions within these policies are that steeper and deeper channels require wider buffer widths. The cities of Orinda and Lafayette in Contra Costa County, and the County of Napa have such policies.

Many policies apply only to waterways that are specifically identified in the text of the codes. These policies are excellent for high-profile waterways, but can leave headwater and other unnamed tributaries unprotected.

While not stream buffer policies *per se*, some cities and counties have floodplain ordinances that will leave a stream buffer as a consequence of limiting development within FEMA or high-risk flood zones. Contra Costa County has a Floodplain Management Ordinance that incidentally protects riparian areas by prohibiting development within a one- to two-foot elevation range above a FEMA or Floodplain Administrator-determined base flood elevation. This approach doesn't specifically target preservation of riparian functions, and will leave higher-elevation watercourses unprotected by the ordinance.

## **DISCUSSION**

### **Summary of Analysis**

Responses to our survey indicate that some city and county planning departments lack awareness of stream issues and functions. Many of the established stream buffer policies have ineffective or sub-optimal buffer distances for effective sediment and pathogen filtration functions. An effective buffer would require increasing buffer distances with gradients; few of the policies we researched account for this need. Also, many of the policies do not mandate that buffers apply to the entire jurisdiction, but rather to special zoning districts and/or areas within the cities and counties.

Most survey participants informed us that their jurisdiction's General Plan addressed the protection of riparian areas. Upon inspection, the Plans did often have excellent objectives to protect creeks, but the implementation measures lacked a detailed performance standard. In the cities without riparian protection policies, planners often justified their absence by citing the lack of riparian areas within their community.

### **Analysis/Priority for Water Board Outreach and Implementation**

There are many areas in which the Water Board can provide regional leadership. Many city and county planners have a vague familiarity with stream issues. While some planning departments are extremely knowledgeable and competent in riparian science, many planners we spoke with were unaware of stream issues relevant to Water Board goals.

Before the Water Board encourages the adoption of stream buffer policy by local jurisdictions, there must be an effort to educate the community on the water quality, habitat, and property protection benefits of stream buffers. It will be easier to argue the relevance of adopting such policies within cities or counties that still have significant amounts of undeveloped area. However, cities that have either reached, or have nearly exhausted, their reserve of developable land will need to be convinced why their communities would benefit from the enactment of a stream buffer policy.

During the survey, planners from these heavily urbanized or "built-out" cities acknowledged not having or planning stream buffer policies, and justified this by mentioning that the scant developable land is generally devoid of drainages, and all existing watercourses are already in culverts, channelized, or underground. In their opinion, there is no need to adopt an ordinance to protect streams where there are none to protect. Only the most obvious of open-channel, flowing waterways are considered creeks. One city was devoid of riparian protection because, in the planner's words, "we don't have too many riparian zones." This situation appears to be quite common, and is most likely a major reason why riparian issues are perceived as non-existent or irrelevant. An "out-of-sight, out-of-mind" mentality is present, where the role of watercourses in non-point source/sediment transportation is overlooked. The lack of awareness of creek functions may inhibit any beneficial regulations from being considered or enforced. In

a built-out community, a riparian buffer policy is critically needed to protect the remaining riparian areas from future re-zoning and/or development intensification.

Survey participants had varying levels of familiarity with the stream protection policies in their jurisdictions' General Plans, municipal codes, and zoning ordinances. A thorough knowledge of municipal code and zoning ordinance regulations was typical. However, often when planners were asked to summarize and evaluate the level of protection of riparian resources in their General Plans, they appeared to be unfamiliar with the associated policies. The apparent lack of familiarity on the part of some planners with these portions of their General Plans suggests that the Plan is not often referenced for riparian protection guidance. The Water Board should encourage actions that are consistent both with local General Plans and with code requirements. An annual training of General Plan policies for planning department employees would be a good way to ensure that the Plan has a role in the decision-making process.

The Water Board should require jurisdictions to include a clear, outlined vision for the protection of their riparian areas in their General Plans. The General Plan policy must serve as guidance for each jurisdiction, and be known and used for decision-making purposes by the corresponding planning department. Implementation measures must be drafted using the active voice (word choice such as “will” and “require,” not “should” and “encourage”). We found many General Plan policies for riparian protection were written using a passive voice, suggesting that waterways protection was not a significant priority.

### **Buffer Distances**

Estimates of effective buffer distances for sediment and nutrient filtration vary, but most of the scientific studies suggest distances between 50 and 100 feet for this purpose (Jones & Stokes 2002). Although any buffer distance from the top of bank is helpful for maintaining channel stability, a minimum 33-foot riparian buffer is required for contributing to a significant reduction in sediment levels (Corely et. al. 1999, Peterson et. al. 1992, as cited in Jones and Stokes 2002). In Bay Area cities, approximately 38% of stream buffer policies require a 33-foot or greater minimum buffer distance (Appendix D). The buffer distances in the region vary greatly, and it is likely that many were not chosen based upon specific buffer thresholds designed to satisfy water quality considerations. A scientifically based approach can help quantify buffer-induced benefits to water quality, thereby allowing the Board to more easily quantify TMDL reduction amounts when communicating with the region cities.



Preserving headwater drainages is a critical step in environmental protection and must be conveyed. The culverting and filling of these typically ephemeral watercourses will concentrate flows and destabilize creek channels downstream. Within the assorted stream buffer policies we reviewed, “first-order” or “headwater” streams were not *specifically* identified as watercourses to be protected. However, these streams would be subject to protection in the jurisdictions in which buffer policies identify ephemeral streams as part of the stream network. An additional and important level of protection is given to these streams in the jurisdictions that require wider buffer widths with increasing slope. These streams are typically regulated under sections 404 and 401 of the CWA for fill or alteration of the channel.

### **Grading and Hillside Ordinances**

Another possibility for protecting headwater streams is through local grading and hillside development ordinances. Many jurisdictions either prohibit or limit development beyond a particular average slope threshold. These regulations have the effect of incidentally protecting first-order drainages, but are not a guarantee that these headwater streams will be preserved. While a potentially important tool for maintaining the functional integrity of higher-elevation riparian zones and for reducing erosion, these policies are limited to areas that meet a locally determined slope threshold, and therefore, are not substitutes for a stream buffer policy. However, communities that are built-out at lower elevations could provide a significant level of protection for their creeks by implementing protection within their grading policies in lieu of formal stream buffer regulations.

### **The Role of Community Outreach**

Jurisdictions looking to adopt a stream buffer ordinance should, in general, open the process for public participation and comment. Governments that do not address community concerns or provide scientific justification face the possibility of public outcry and backlash similar to what happened in Napa County. Community outreach and education is especially key in areas where lack of information or misinformation has formed a foundation of opposition. This can include areas with strong agricultural communities or areas with expensive hillside lots.

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## **APPENDIXES**

## APPENDIX A

### Riparian Resources and Erosion Control Survey

1. Does your General Plan contain policies about protection of riparian resources?

Do you consider them to be weak, moderate, or strong? Why?

2. Do you regulate land use in riparian zones, beyond State and Federal law? If yes, how?

3. Does your municipality have a zoning ordinance regarding riparian buffers (e.g. biotic resources district, stream conservation area, erosion control ordinance, floodplain regulations)?

- If yes, please answer the following questions:

When was the ordinance first approved?

Do you feel that the ordinance is generally weak, moderate, or strong in protecting the riparian corridor?

How is the regulated stream network defined? (in the General Plan, USGS blue-line streams, other regulatory definition?)

Where is the setback measured from? (stream center line, top of bank, edge of riparian corridor)

What are the various stream categories? (upland, urban, lowland)

What are the setback distances?

What are the provisions for exceptions or variances?

- If no, is your community currently *working* to approve such an ordinance?
- If not, is your community currently *considering* a riparian buffer ordinance?

4. Does your municipality have a heritage tree ordinance?

If yes, please answer the following questions:

Has the ordinance been effective in preserving riparian trees?

Do residents generally comply with the ordinance?

What are the provisions for exceptions or variances?

5. Does your municipality have an ordinance that specifically regulates hillside development?

If yes, please answer the following questions:

Is there a maximum allowable slope for development?

How effective are these regulations at reducing soil erosion (weak, moderate, or strong?)

6. Does your community have unresolved flood hazard related to creeks? Please explain.

Are there any plans for flood control projects?

7. What are the main controversies, if any, regarding riparian protection in your community? (property rights advocates, environmental groups want better protection, etc.)
8. Has there been any litigation regarding your stream protection regulations?
9. How can we get a copy of your General Plan or stream/tree/hillslope regulations?

Additional comments:

## **APPENDIX B**

### **Summaries of Buffer Policies and Stream Protection Approaches**

#### *Oakland, Alameda County*

In December 1997 the City of Oakland amended their Stormwater Ordinance to include a heightened level of protection to the city's many riparian areas. While not a setback policy, the ordinance requires that construction and development projects nearby creeks first obtain a "creek protection permit" from the city. In order to get permit approval, the applicant must meet criteria and guidelines that are intended to either minimize or avoid negative impacts to the creek area and its natural functions. Activities that are typically not allowed by the city include: construction of structures across a creek; agricultural activities on the creek banks; any disturbance of the creek channel and flow; removal of tree canopies, and the installation of structures on the creek bank.

The City is amending the ordinance to include more-specific standards and guidelines for the development of creekside properties. The standards and guidelines will include criteria regarding slope, soils, flows and types of vegetation, and provide guidance on appropriate setbacks and mitigation measures for development. The amended ordinance will also provide a detailed map of creekside properties subject to the policy.

#### *Fremont, Alameda County*

In November 2002, Fremont adopted Measure T that among other things stated, "No development shall be located within a riparian corridor except for otherwise permitted flood control, erosion control, water supply, transportation facilities, fences or hiking or equestrian trails. 'Riparian corridors' are the areas within 200 feet from the center of a permanent or intermittent stream bed." Measure T, however, was geared only at the zone delineated as "Hill Area," which included the Open Space zone and two residential districts. The 200-foot buffer is not applied elsewhere in the city. Other riparian areas in Fremont are protected via the Fremont General Plan and the design review process. A General Plan implementation policy requires that as part of a development application, the "extent and characteristics of riparian corridors shall be carefully assessed to a minimum distance of 100 feet from the center of the creek bed."

*Lafayette, Contra Costa County*

The City of Lafayette has a creek setback policy in their municipal code that prohibits construction of structures within a creek setback area. The creek setback area is determined by calculating a creek setback line based on the creek depth, steepness of bank, and topography of the top of bank. Project plans must show that proposed work is outside the calculated setback area before the city will issue a building permit. Exceptions are granted if a licensed civil engineer specializing in soils analysis certifies that there is no likelihood of a hazard to persons or property resulting from the proposed construction.

From the City of Lafayette Creek Setback Requirements:

- (a) As defined by Section 6-312 and Section 6-355, buildings and structures shall be set back from an unimproved *creek* channel as follows:
  - (1) Channel Depth of Zero through 21 Feet. If the side slopes of the channel are steeper than 2:1 (horizontal:vertical), the width of the structure *setback* is determined by a line measured from the toe of the slope a distance of twice the channel depth plus the appropriate top-of-bank *setback* as follows:

<b>Channel Depth (Feet)</b>	<b>Top of Bank <i>Setback</i> Minimum Width (Feet)</b>
0 – 6	12 each side
6 – 12	15 each side
12 – 18	18 each side
18 – 21	21 each side

If the side slopes of the channel are flatter than 2:1 (horizontal:vertical) the structure *setback* is the appropriate *setback* indicated in the table above, measured from the top of the bank.

- (2) Channel Depth Exceeding 21 Feet. If the depth of a channel exceeds 21 feet, the width of the structure *setback* is determined by measuring from the toe of the slope a distance of three times the channel depth.

### *Fairfield, Solano County*

In 1992, Fairfield updated their stream protection policies to include a Creekside Ordinance that mandated at least a 200-foot “stream environment zone” that includes “the stream bed, stream banks, and a riparian zone at least 50 feet wide, measured from the top of the channel bank.” In practice, the 200-foot requirement can be split between adjacent property owners in a variety of ways, depending on when one owner bought his/her lot and if it was registered with the city before Fairfield’s first ever stream ordinance in the 1970s. The ordinance applies to eight major stretches of creek and does not apply to low-order drainages, although the City “would still consider these setbacks when dealing with smaller scale streams with any significant riparian coverage.”

### *Sonoma County*

Sonoma County zoning code provides “streamside conservation area” protection to all waterways that are designated as “riparian corridors” in the Open Space Element of the General Plan. The width of the conservation area is determined based upon classification of urban, upland, flatland, or Russian River riparian corridors. The corridors in urban and upland areas have a 50-foot from top of bank conservation area, while streams traversing level flatland areas are required to have a 100-foot wide conservation area. Russian River riparian corridor conservation areas extend 200 feet from the top of bank. New buildings cannot be built within the conservation area, unless the lot would be rendered undevelopable as a result of the setback or develop were designed in such a way as to avoid impacts to riparian habitat. Agricultural setbacks are half the distance of the building setbacks.

In terms of setback-width distances, Sonoma County requires one of the greatest in Region 2. Since the policy only protects the corridors identified in the General Plan, many waterways of all types are left unprotected by the zoning code. The General Plan is currently being updated, and many additional streams are proposed to be designated as riparian corridors. The urban and upland riparian corridor widths are also proposed to be widened to 100 feet from top of bank. Planning Commission hearings on these proposals are tentatively scheduled for Fall 2004.



## *Napa County*

The Napa County Conservation Regulations has been in use since 1991. They use slope percentage adjacent to creeks to formulate required setbacks that range from 35–150 feet. Protected waterways include: those designated by “a solid line or dash and three dots symbol” on the U.S. Geological Survey topographic map; watercourses with well-defined channels at least four-feet deep; and banks steeper than 3:1 (horizontal:vertical) with hydrophilic vegetation or specific streams specified by resolution by the County Board of Supervisors.

The Napa County Board of Supervisors voted 3-1 to adopt a Stream Setback Revision Ordinance on April 8, 2003. This ordinance would have, among other things, increased standard stream setbacks for non-residential projects to 100 to 150 feet on all Class I streams depending on slope, 75 to 150 feet on all Class II streams depending on slope, and 25 feet on all Class III streams. Community critics of the policy, led by property owners who felt the ordinance imposed on their land ownership rights, successfully organized a referendum petition, and the Board of Supervisors reversed their adoption of the policy. The Board of Supervisors decided to put the issue before Napa County voters. The Ordinance was presented as Measure P in March 2004, and was voted down with a 65% majority.

## **APPENDIX C**

### **Relevant Factors When Evaluating Stream Buffer Policies**

A city or county with a setback policy is not necessarily more effective at protecting riparian habitat and functions than a city without a policy. The mindfulness and determination on the part of city and county planners to be aware of potential riparian impacts from all development projects is a vital part of riparian protection. Nevertheless, the effectiveness of a given stream buffer or setback policy is a function of several factors, and a successful ordinance will address some or all of these criteria:

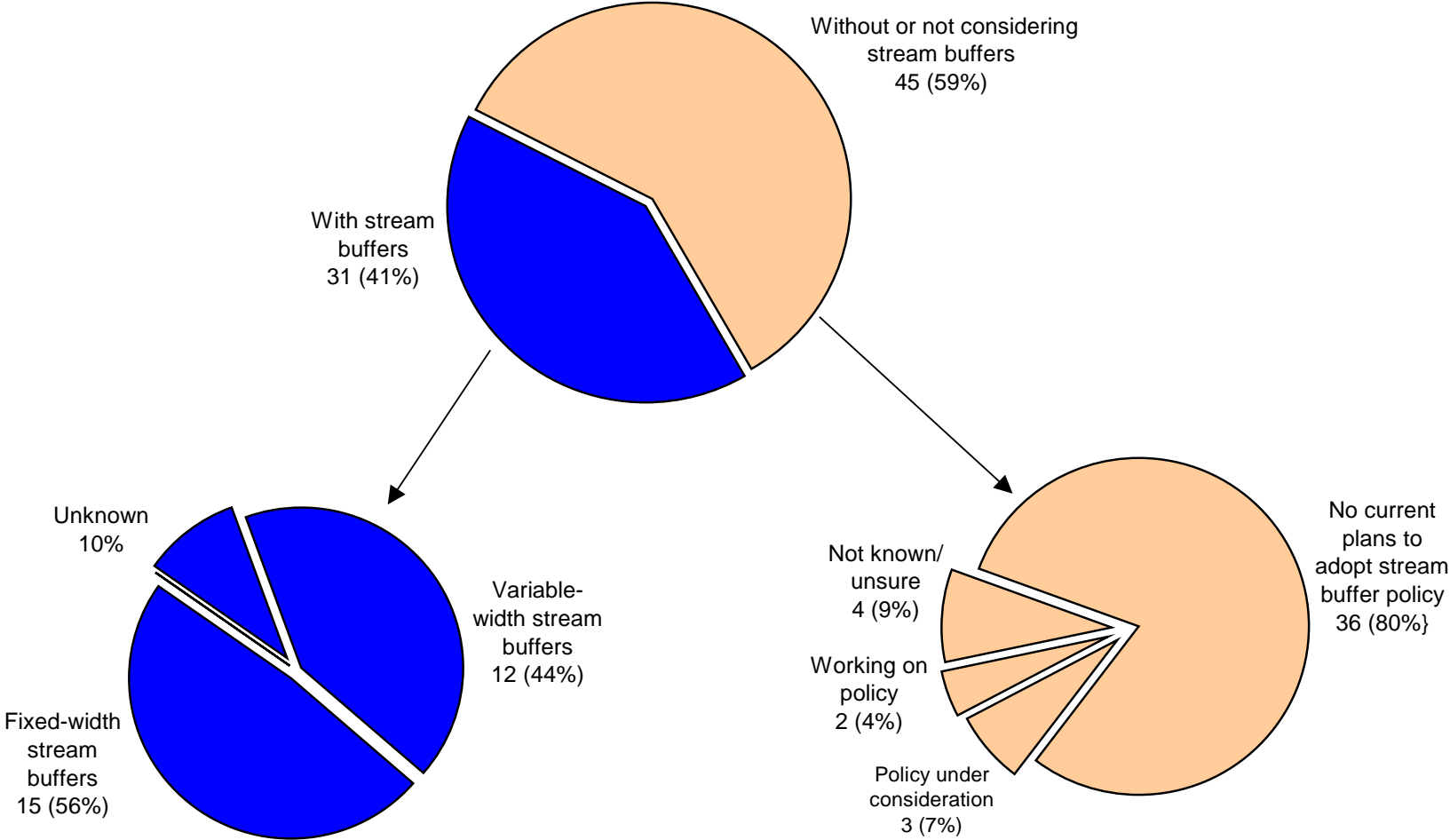
- Buffer width
- Level of enforcement
- Type of watercourses protected
- Breadth of application (i.e., entire city, special districts)
- Provisions for, and frequency of, exemptions and/or variances
- Inclusion of specific directives in General Plan
- Riparian vegetation protection
- Mitigation standards
- Clarity of purpose, goals
- Clarity of definitions

## **Appendix D**

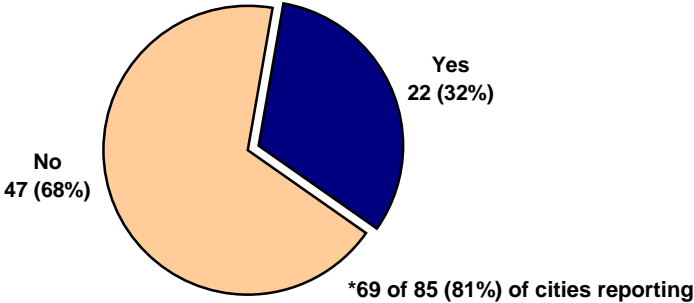
### **Graphical Summary of Results**

# RWQCB Region 2 Cities - Stream Buffers

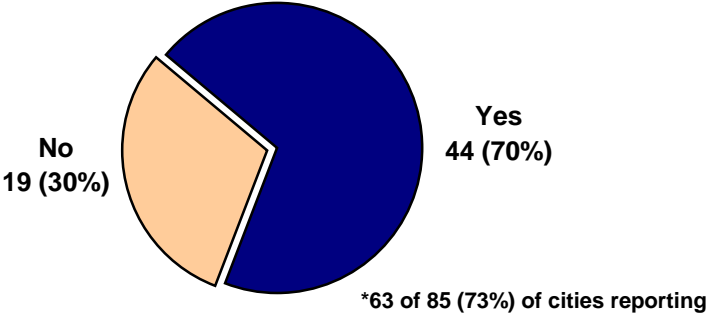
76 of 85 (89%) of cities reporting



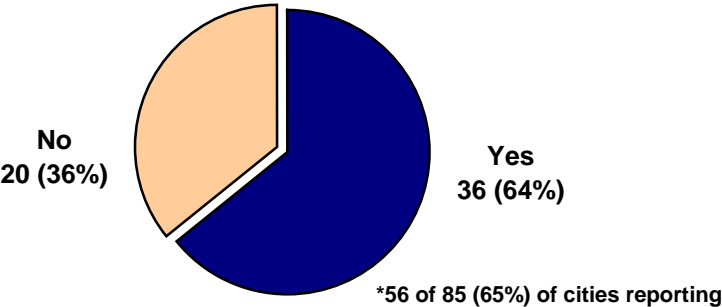
**RWQCB Region 2 Cities - Stream Buffer Protection in General Plan**



**RWQCB Region 2 Cities - Tree Ordinance**



**RWQCB Region 2 Cities - Hillside Ordinance**



Jurisdiction	Ordinance	General Plan Policy	Planning an Ordinance
Alameda	○	○	○
Albany	X	X	n/a
American Canyon	no response		
Atherton	○	○	○
Belmont	○	○	?
Belvedere	○	○	○
Benicia	X	X	n/a
Berkeley	X	X	n/a
Brisbane	○	○	○
Burlingame	○	○	○
Calistoga	X	X	n/a
Campbell	○	○	○
Clayton	○	X	○
Colma	○	X	?
Concord	○	○	○
Corte Madera	○	○	○
Cupertino	X	X	n/a
Daly City	○	○	○
Danville	○	○	○
Dublin	X	X	n/a
East Palo Alto	no response		
El Cerrito	○	○	X
Emeryville	○	○	○
Fairfax	X	X	n/a
Fairfield	X	○	n/a
Foster City	○	○	○
Fremont	X	X	n/a
Half Moon Bay	X	X	n/a
Hayward	○	○	?
Hercules	○	○	?
Hillsborough	no response		
Lafayette	X	X	n/a
Larkspur	○	○	○
Livermore	○	X	?
Los Altos	no response		
Los Altos Hills	X	○	n/a
Los Gatos	○	○	○
Martinez	○	○	○
Menlo Park	○	?	?
Mill Valley	X	○	X
Millbrae	○	○	○
Milpitas	○	○	○
Monte Sereno	○	?	?
Moraga	○	○	○
Mountain View	○	○	?
Napa	X	○	n/a
Newark	○	○	○
Novato	X	X	n/a

Jurisdiction	Ordinance	General Plan Policy	Planning an Ordinance
Oakland	○	?	X
Orinda	X	X	n/a
Pacifica	○	○	n
Palo Alto	no response		
Petaluma	○	?	n/a
Piedmont	○	○	○
Pinole	○	○	○
Pittsburg	○	X	○
Pleasant Hill	○	○	○
Pleasanton	no response		
Portola Valley	X	X	X
Redwood City	○	○	○
Richmond	no response		
Ross	X	○	n/a
San Anselmo	X	?	n/a
San Bruno	○	○	○
San Carlos	X	○	n/a
San Jose	X	X	n/a
San Leandro	no response		
San Mateo	○	?	○
San Pablo	○	X	○
San Rafael	X	X	n/a
San Ramon	X	○	n/a
Santa Clara	○	○	○
Saratoga	X	?	?
Sausalito	X	X	X
Sonoma	X	○	n/a
South S.F.	○	○	○
St. Helena	X	○	n/a
Suisun City	○	○	?
Sunnyvale	○	○	○
Tiburon	X	X	n/a
Union City	○	○	○
Vallejo	○	○	?
Walnut Creek	○	○	○
Woodside	X	X	n/a
Yountville	X	○	n/a

**COUNTIES**

Alameda	X	?	○
Contra Costa	X	X	n/a
Marin	X	X	n/a
Napa	X	?	n/a
San Francisco	no response		
San Mateo	X	X	n/a
Santa Clara	○	X	X
Solano	○	X	?
Sonoma	X	X	n/a

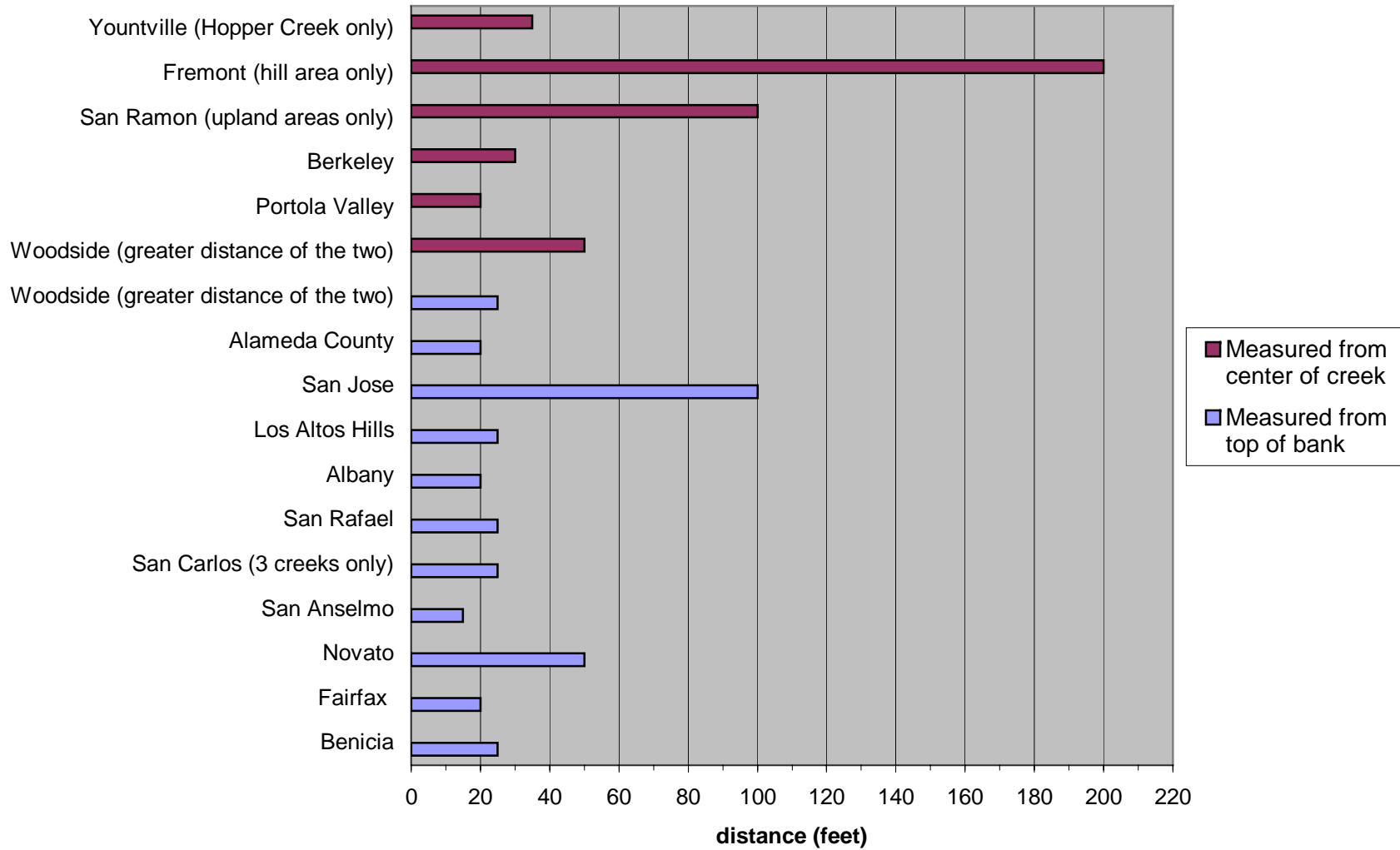
n/a = not applicable

? = unknown

X = affirmative

○ = non-affirmative

### Variation in Bay Area Stream Buffer Distances (fixed width)



### Variation in Bay Area Stream Buffer Distances (variable width)

