

Memorandum

Project: Santa Clara Valley Water District - Stream Maintenance Program

Subject: Mitigation Approach for 2012-2022 SMP Update

Date: February 24, 2012

To: Members of the SMP Inter Agency Working Group (IAWG)

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1. Purpose and Overview

The Santa Clara Valley Water District (SCVWD or District) implements its Stream Maintenance Program (SMP) to ensure that District streams and channels provide flood management functions. The District operates the SMP to balance flood management objectives while also seeking to protect and enhance natural resources. The purpose of this memorandum is to summarize the SMP’s existing mitigation program and describe updates to the mitigation program that support the 2012 SMP Update process.

As described in Sections 2 and 3 below, the existing SMP mitigation program was developed in 2002 to provide defined “up front” programmatic mitigation for sediment removal and vegetation management activities. This original mitigation continues to address SMP’s impacts in perpetuity for maintenance activities and work areas identified in the 2002 program work projections. Sections 4 and 5 describe the proposed approach to address mitigation needs for sediment removal and vegetation management activities in “new” work areas, that is, locations where work was not projected or conducted during the 2002-2011 period. Mitigation for potential impacts to special status species is described in Section 6. The mitigation approach for bank stabilization activities (Section 7) has not changed significantly since 2002, but some treatment techniques have been refined based on implementation experience since 2002. Mitigation monitoring and reporting requirements are summarized in Section 8.

The organization of this memorandum is summarized as follows:

Section 1 Purpose and Overview

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Section 5	Mitigation for New Sediment Removal and Vegetation Management Work Areas 2012-2022
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The District remains committed to providing adequate and effective mitigation for SMP impacts. This memorandum includes some new approaches in how mitigation requirements are identified and tracked. However, all mitigation objectives and activities are consistent with the existing mitigation program that has been in operation since 2002.

Earlier versions of this memorandum (June 2011, November 2011) were reviewed by members of the Program's Inter Agency Working Group (IAWG), consisting of representatives from the U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), San Francisco and Central Coast Regional Water Quality Control Boards (RWQCBs), California Department of Fish and Game (DFG), and the Bay Conservation and Development Commission (BCDC). Written comments were provided on the earlier versions of this memorandum and several in-person meetings were held between July 2011 and January 2012 with the collective IAWG and with individual agency staff to discuss the mitigation approach. This version of the memorandum incorporates revisions based on comments and guidance provided by regulatory staff.

2. Background

In 2002, the District initiated the SMP as a comprehensive multi-year effort to maintain its flood protection channels and associated facilities. Core SMP activities include sediment removal, vegetation management, bank stabilization, management of animal conflicts, and minor maintenance. The primary objective of sediment removal and vegetation management activities is to provide necessary flow conveyance capacity in the District's channels as well as to maintain the functional integrity of its stream facilities and provide ancillary protection such as fire protection. The primary objective of bank stabilization and management of animal conflicts activities is to repair or preserve stable streambanks and levees under the District's jurisdiction. As designed and implemented, the SMP also included several steps to protect and preserve natural resources along the riparian and stream corridors, including tidal reaches, in the program area.

The District conducted CEQA analysis and compliance in 2001-02 and obtained long-term programmatic permits with the following resource and regulatory agencies: USACE, USFWS, NMFS, RWQCBs, DFG, and BCDC.

Most of the permits authorizing SMP activities during the first decade of the program will expire in 2012.

The SCVWD is currently reviewing SMP operations, updating the SMP program manual, conducting a complete CEQA review of the SMP, and renewing its long-term permits.

For the SMP, compensatory mitigation is one element of a comprehensive impact avoidance, minimization, and compensation approach. Project planning, resource evaluations, and exclusionary practices are used to avoid impacts from maintenance activities. Best Management Practices (BMPs) are applied on-site to further minimize impacts. Residual impacts that are neither adequately avoided nor minimized may require compensatory mitigation depending upon the nature of the impact and the regulatory authority involved. In 2002 the District established the following goal for the SMP's compensatory mitigation program:

"The Stream Maintenance Program compensatory mitigation program should establish an optimal set of mitigation strategies, a combination of components that best balance opportunity, feasibility, and cost to provide the maximum benefit to the natural functions of the watersheds and streams of Santa Clara County." (Source: SCVWD Stream Maintenance Program Document, 2002)

3. Summary of Existing SMP Programmatic Mitigation

The SMP's existing programmatic mitigation for sediment removal and vegetation management is based on a comprehensive accounting in 2002 of the potential impacts from maintenance activities on in-stream wetlands, tidal wetlands, riparian vegetation, and other sensitive habitats in the program area. Table 1 summarizes the existing mitigation requirements for on-going SMP activities. The on-going program from 2002 and the existing SMP mitigation program include land acquisition, habitat protection and enhancement, and wetland restoration/creation to mitigate for impacts to in-stream wetlands, tidal wetlands, riparian vegetation, and other sensitive habitats resulting from maintenance activities. Mitigation for impacts to special-status species (including state and federally listed species) is provided separately, and thus references to the mitigation program in this memorandum generally focus on the aforementioned sensitive habitats unless species-specific mitigation is specifically mentioned (as described in Section 6). The mitigation elements shown in Table 1 provide mitigation in perpetuity for projected SMP maintenance activities in the locations that were identified in the 2002 SMP. The SMP mitigation program provides compensatory mitigation for stream maintenance program activities solely, and does not provide mitigation for other capital or construction projects. However, the maintenance of capital projects, once constructed and operating, can be provided through the SMP and its mitigation program.

Impacts from other non-projected maintenance activities such as bank stabilization projects are mitigated on an "as-needed" basis using defined mitigation ratios as maintenance projects occur. Bank stabilization mitigation is discussed below in Section 7.

As shown in Table 1, to date not all of the SMP's mitigation requirements have been met. The District is committed to completing all remaining mitigation requirements, and recognizes that this is an essential requirement of issuing new permits for the next program period 2012-2022. Appendix A includes a letter from the District to San Francisco Bay RWQCB that describes the current status of the SMP mitigation program and presents a plan to meet all of the District's SMP mitigation requirements

identified in the 2002 SMP and the associated permits for the 2002-2012 program period. The District Board has recently approved the purchase of a property (known as the "Castle & Cooke property"). This acquisition will satisfy the final remaining acquisition requirements from the original SMP mitigation period 2002-2012 for California red-legged frog (CRLF) mitigation. The Castle & Cooke property will also complete a portion of the requirements for freshwater wetland mitigation. The District is actively working to acquire additional properties that would meet the District's remaining freshwater wetland mitigation obligation.

While the District is in the process of completing all of the original mitigation requirements, it is important to acknowledge that the original SMP mitigation requirements were based on work estimates ("projections").

Over the course of the 2002-2011 period, the District has worked in fewer areas than were originally projected in the 2002 EIR. SMP work activities to date, compared to the original 2002 work projections, are summarized in the SEIR Project Description (Chapter 2) and in Tables 2-1, 2-2, and 2-3 of the SEIR. Because the District has not conducted all of the work that was projected in 2002, it has not incurred all of the impacts projected in 2002. The estimated impacts from the 2002 projected work amounts were the basis of the mitigation requirements, and as described above, not all of that work was conducted.

As of the end of the 2011 work season (including years 2002-2011), the District has provided more mitigation in both the Santa Clara and Pajaro Basins than what was required, when compared to the actual work that was conducted and the impacts incurred. Table 2 provides a summary of sediment removal impacts incurred to date 2002-2011 and mitigation provided to date. Table 2 compares impacts to mitigation requirements by accounting for three work/projection situations: (1) where work was projected and done; (2) where work was not projected and done; and (3) where work was projected and not done. As shown in Table 2, mitigation accrues if the amount of work "projected and not done" is greater than the amount of work "done but not projected." In other words, if the District overall did less work than they projected, but provided mitigation for the entire projected amount, then there is mitigation provided without associated impacts as shown at the bottom of Table 2. As of the end of the 2011 maintenance season, the District has provided an additional 8.31 acres of freshwater wetland habitat and 22.15 acres of additional tidal wetland habitat in the Santa Clara Basin, and provided additional mitigation of 0.05 acres of freshwater wetland habitat in the Pajaro Basin. These additional mitigation acres that were provided are considered additional to the mitigation that was necessary based on the actual impacts from the work activities that were performed.

The additional (or excess) mitigation is calculated based on work activities performed to date. As a result there are areas where work was projected in 2002, but was not conducted between 2002-2011. However mitigation was still provided for those projected work areas. The District plans to remove these projected work areas (that were never worked in) from the pool of areas that have "mitigation in perpetuity" assigned. The District's overall goal is to refine the projected work areas to areas where work actually occurred (2002-2011), and in so doing, calibrate where mitigation has been provided, to the actual worked areas. Removing these channels from having perpetual mitigation status is necessary in order for the District to apply the unused mitigation toward other "new" channel areas. By removing

the “projected but not done” channel areas (Table 2) from the pool of work areas that have perpetual mitigation status, the District is enabling other “new work areas” to be available to have the additional mitigation applied.

The routine and repeated maintenance areas that have dedicated mitigation provided in perpetuity will be referred as *Permanent Mitigation Areas (PMA)*. This concept is described further below in Section 5.1. Any addition of work areas into the *PMA* pool of areas mitigated in perpetuity would be reviewed by participating regulatory agencies. The District has a goal of developing a long-term mitigation pool that provides mitigation in perpetuity for all projected maintenance activities. It is recognized by the District that implementing and achieving this long-term goal may take several decades. Until such time that the District achieves this goal, the District will also use the “pay as you go” annual mitigation approaches described in Chapter 5, in combination with acquisition efforts, to provide suitable mitigation for the impacts of SMP activities.

The District will complete its mitigation responsibilities as described in the 2002 EIR and permits. As described above, because the original mitigation requirements out-paced the actual maintenance work conducted and related impacts, the District requests to apply the mitigation surplus as a credit toward future maintenance activities. The District is proposing to use the 22.15 acres of additional tidal habitat already provided as credit toward future tidal habitat impacts that are not yet identified or accounted for. Similarly, where applicable, the District would like to apply other surplus habitat mitigation, not allocated or applied to the areas worked between 2002-2012 to future habitat mitigation needs. Applying unused (or surplus) mitigation areas from the 2002-2012 period for new routine maintenance work areas that do not yet have mitigation assigned to them would be reviewed and evaluated on a case by case basis by regulatory staff.

Section 5 below describes the approach to mitigate for impacts caused by routine maintenance activities in new work areas for 2012-2022 (where no maintenance occurred during the period 2002-2011). The mitigation approach includes off-site land acquisition and restoration where possible, similar to the mitigation approach in the first ten years (2002-2012) of the program, with the additional option of on-site and off-site mitigation activities implemented yearly when acquisition-based mitigation is not available. This second category of mitigation would be based on the degree of actual maintenance work conducted (this is referred to as “pay as you go” type mitigation).

The District’s long-term goal is to identify and acquire properties over time that can provide suitable mitigation for all routine SMP sediment removal and vegetation management maintenance activities. In this way, the District will create a long-term “mitigation pool” of acquired lands for maintenance activities.

Table 1. On-going SMP Mitigation Program

		Mitigation Purpose	Mitigation Requirement	Mitigation Completed to Date	Percent of Requirement Completed*
1	Tidal Wetland Restoration	Restore salt ponds to tidal marsh conditions. Provides mitigation for tidal wetland/species impacts.	30 acres	30 acres	100%
2	Freshwater Wetland Creation/ Restoration	Convert or restore areas to seasonal or perennial wetlands. Provides mitigation for non-tidal wetland impacts.	10 ac Santa Clara Basin 4 ac Pajaro Basin	7ac Santa Clara Basin 4ac Pajaro Basin**	70% Santa Clara Basin 100% Pajaro Basin
3	Stream and Watershed Protection	Preserve, protect, and improve streams and associated watersheds. Provides mitigation for non-tidal wetland and CRLF impacts	Freshwater wetland habitat: 820-1080 ac acquired (81 ac credit) for Santa Clara Basin 11 ac credit (138 ac total) for Pajaro Basin CRLF Habitat - 108 ac credit District wide	Freshwater wetland habitat: 10 ac credit (125 ac total) for Santa Clara Basin (will increase to 55 ac credits achieved with Castle & Cooke and Myrtle Canyon) 11 ac credit (138 ac total) for Pajaro Basin** CRLF Habitat – 56 ac credit (will increase to 128 acres with	12% Santa Clara Basin (68% with Castle & Cooke and Myrtle Canyon properties) 100% Pajaro Basin 52% CRLF Habitat

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				Castle & Cooke)***	(100% with Castle & Cooke property)
4	Giant reed (<i>Arundo donax</i>) Control	Control giant reed outbreaks; map, revegetate, educate, and coordinate reed control efforts in County. Provides mitigation for riparian impacts.	125 ac District wide	124.25 ac District wide	99%
5	Invasive smooth cordgrass (<i>Spartina alterniflora</i>) Control	Control invasive cordgrass along tidal shorelines. Provides mitigation for time lag until tidal wetland mitigation is established.	Up to 10 acres in tidal areas	10 acres	100%

* Does not include monitoring period and achievement of final success criteria.

** Approximate acreages - slightly more wetland acreage and less Stream and Watershed Protection acreage were credited in order meet the required 15 credit total in Pajaro Basin

*** This includes the required 108 acres plus a 20 acre penalty.

4. 2012 SMP Update and Mitigation Approach

4.1 New Work Areas for Sediment Removal and Vegetation Management

The SMP employs a variety of impact avoidance and minimization steps to reduce the likelihood of impacts resulting from maintenance, and to avoid/reduce the magnitude or intensity of impacts if they should occur. The SMP also includes detailed Best Management Practices (BMPs) to further avoid and minimize potential impacts caused by maintenance activities. The program's impact avoidance, minimization, and BMP measures are described in the SMP Manual and the 2012 SMP Update SEIR. However, in some cases, there are residual impacts from maintenance activities that are not fully reduced through the application of avoidance, minimization, and BMP measures. Residual impacts are those impacts that may require compensatory mitigation, as guided by regulatory agency jurisdiction and authority.

The existing and on-going SMP mitigation approach is based on sediment removal and vegetation management work projections for the entire Program Area developed in 2002. On that basis, mitigation requirements were developed for anticipated impacts to sensitive communities and habitat for special status species (as shown in Table 1).

The Biology section of the SEIR provides additional description of potential program impacts to special - tatus species. The Biological Opinions (BOs) for the 2012 SMP Update to be issued by NMFS and USFWS, the USACE Section 404 permit, and the CDFG Section 2081 and streambed alteration agreement may result in final refinements to some of the mitigation approaches described here and in the SEIR. Any additional refinements will result in mitigation measures being equally or more effective.

The 2012 SMP Update involves new maintenance work areas. These new maintenance areas are identified in the series of maps presented in Chapter 2 (*Project Description*) of the 2012-2022 SMP SEIR. Table 3 lists the creeks where new maintenance work activities will occur. If a creek or activity is listed in Table 3, it does not mean that the whole creek is subject to maintenance activities, or that a given activity did not occur in some reach of that creek during the period 2002-2011, but that maintenance activities may occur in a new reach of the creek as indicated in the blue segments of the maps of Chapter 2 of the SEIR. Potential residual impacts from maintenance that require mitigation in new work areas are similar in nature to the potential impacts that were identified in the original SMP EIR (2002). The existing and on-going SMP mitigation program will continue to serve as mitigation for work activities projected in 2002. This memorandum describes how additional mitigation will be provided for routine maintenance work in new areas that were not projected in 2002.

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Table 3. SMP 2012-2022 New Work Areas by Watershed and Creek

Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
Coyote Watershed						
	BERRYESSA CREEK	x	x	x	x	x
	CALERA CREEK	x	x	x	x	x
	COCHRAN CHANNEL				x	
	COYOTE BYPASS				x	x
	COYOTE CREEK	x	x	x	x	x
	COYOTE CREEK SECONDARY CHANNEL				x	x
	EVERGREEN CREEK			x	x	
	FISHER CREEK	x	x			
	FLINT CREEK		x		x	
	LOS COCHES CREEK	x	x		x	x
	LOWER PENITENCIA CREEK	x	x	x		x
	LOWER PENITENCIA CREEK SECONDARY CHANNEL	x				
	LOWER SILVER CREEK	x	x		x	
	MIGUELITA CREEK	x	x	x	x	x
	NORTH BABB CREEK	x	x		x	
	NORWOOD CREEK	x	x		x	
	PIEDMONT CREEK		x		x	
	QUIMBY CREEK	x			x	
	RUBY CREEK		x		x	
	SIERRA CREEK	x	x		x	
	SOUTH BABB CREEK		x		x	
	THOMPSON CREEK		x	x	x	x
	TULARCITOS CREEK		x		x	
	UPPER PENITENCIA CREEK	x	x	x	x	x
	UPPER SILVER CREEK	x			x	x
Guadalupe Watershed						
	ALAMITOS CREEK	x	x		x	x
	ALAMITOS DIVERSION CHANNEL	x	x		x	
	CALERO CREEK	x	x	x	x	x
	DAVES CREEK		x		x	
	EAST ROSS CREEK				x	
	GOLF CREEK	x	x		x	
	GREYSTONE CREEK				x	x
	GUADALUPE BYPASS 2	x				
	GUADALUPE BYPASS 3	x				
	GUADALUPE BYPASS 4	x				
	GUADALUPE CREEK	x				
	GUADALUPE RIVER	x	x		x	
	GUADALUPE SECONDARY CHANNEL	x				

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Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
	KIRK DISTRIBUTION SYSTEM				x	
	LOS GATOS CREEK	x	x		x	x
	LYNDON CANYON CREEK					
	MCABEE CREEK			x		x
	PAGE DISTRIBUTION SYSTEM UPPER				x	
	RANDOL CREEK		x		x	
	ROSS CREEK	x	x		x	x
	SANTA TERESA CREEK				x	
	WEST BRANCH RANDOL CREEK		x		x	
Lower Peninsula Watersheds						
	ADOBE CREEK	x	x			
	BARRON CREEK	x			x	
	BARRON DIVERSION CHANNEL					x
	DEER CREEK		x		x	
	HALE CREEK	x			x	
	HENEY CREEK					x
	MATADERO CREEK	x	x		x	
	PERMANENTE CREEK		x		x	
	PERMANENTE DIVERSION CHANNEL		x			
	PROSPECT CREEK				x	
	SAN FRANCISQUITO CREEK	x			x	x
	STANFORD CHANNEL					
	STEVENS CREEK	x	x		x	
Uvas/Llagas Watersheds						
	BODFISH CREEK	x		x		x
	CORRALLITOS CREEK		x			
	EAST LITTLE LLAGAS CREEK	x	x	x	x	
	EDMUNDSON CREEK		x			
	LIONS CREEK		x			
	LLAGAS CREEK	x	x		x	
	LOWER MILLER SLOUGH		x		x	
	MADRONE CHANNEL	x	x		x	
	MATADERO CREEK			x		
	NORTH MOREY CHANNEL		x		x	
	PAJARO RIVER				x	
	PRINCEVALLE DRAIN		x	x	x	
	SOUTH MOREY CHANNEL	x	x		x	
	TENNANT CREEK				x	
	UPPER MILLER SLOUGH		x		x	
	UVAS CARNADERO CREEK	x	x		x	
	WEST BRANCH LLAGAS				x	

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Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
	CREEK					
	WEST LITTLE LLAGAS CREEK		x		x	x
West Valley Watersheds						
	CALABAZAS CREEK	x	x	x	x	x
	DAVES CREEK		x		x	
	GUADALUPE SLOUGH				x	
	MISTLETOE CREEK				x	
	PROSPECT CREEK		x		x	
	REGNART CREEK	x	x		x	
	RODEO CREEK				x	x
	SAN TOMAS AQUINO CREEK	x	x		x	x
	SARATOGA CREEK	x	x		x	x
	SMITH CREEK		x			
	SUNNYVALE EAST CHANNEL	x	x			x
	SUNNYVALE WEST CHANNEL		x		x	x
	WILDCAT CREEK	x		x	x	

Table 4 summarizes projected sediment removal maintenance activities for the 2012-2022 period. These sediment removal activities may include up to 43 miles of creeks and canals in the program area, with approximately 35.4 miles in the Santa Clara Basin and 7.4 miles in the Pajaro River Basin. For the 2012-2022 work period, about 19 miles of new channel areas have projected sediment removal work where work was not previously projected during the 2002-2012 period. There is also about 15 miles of channel length where sediment removal work was previously conducted (2002-2012), but work is not projected in those locations for the 2012-2022 period.

Table 4. Estimated SMP Sediment Removal Activities (2012-2022)

Watershed	2012-2022 Projected Sediment Removal (miles)	New Work Areas for 2012-2022 (miles)	Former Work Areas Not Projected for 2012-2022 (miles)
Santa Clara Basin			
Lower Peninsula	3.9	0.7	2.6
West Valley	3.8	0.9	8.3
Guadalupe	11	8.7	0
Coyote	16.7	5.9	0.7
Pajaro Basin			
Pajaro	7.4	3.1	3.5
Total	42.8	19.3	15.1

4.2 Identifying Mitigation Based on Actual Work Conducted

The District identified the 2012 new work areas based on its current understanding of maintenance needs for the coming 10-year period. However, as observed during the 2002-2011 work period (Table 2), it is highly unlikely that all of the identified potential work areas will have actual work conducted. Because of this issue, and the potential inaccuracy of using projected work estimates developed in 2009-2011 as a basis for defining mitigation requirements until 2022, the District is now adjusting its approach in how mitigation requirements are identified. The District is shifting its approach towards using the actual work areas (versus work area projections) as the basis for identifying mitigation requirements in new work areas.

The 2012-2022 maintenance work projections provided in the 2012-2022 SMP SEIR remain reasonable and very useful estimates of where work will be conducted. The projections represent the District's best estimate of where work will occur. The work projections are "conservative" in that they likely over-estimate where actual work will occur as shown in the maps of Chapter 2 of the SEIR. The work projections are therefore a good basis for considering a potential maximum impact to wetlands and other habitats to develop a suitable mitigation approach that can guide the next decade of the program.

As a result of this revised approach, there are two primary changes to the existing mitigation program for sediment removal and vegetation management activities for the 2012 SMP Update:

1. **Ecologic Services.** In addition to land acquisition-based mitigation projects that provide mitigation in perpetuity (i.e., mitigate for repeat impacts in the same work location), programmatic mitigation for sediment removal and vegetation management will now also include ecologic services-based mitigation projects for individual maintenance projects.¹ These approaches (described in Section 5 below) provide mitigation on a "pay as you go" or incremental basis. Ecologic services-type mitigation projects would only mitigate for an individual work activity, as opposed to mitigating for that type of work activity in that location in perpetuity. Service-based "pay as you go" mitigation would be identified annually based on the annual maintenance workplan (provided in the annual Notice of Proposed Work - NPW²) and verified in the end of year annual Post Construction Report (PCR)³.

¹ "Ecologic services mitigation" refers to mitigation which is not based on land acquisition and management, but instead involves actions to improve the ecological and habitat quality at a given site – for instance, through invasive species removal or ecological restoration.

² The NPW is the document which the District submits annually to the various permitting agencies describing the annual work plan for that year.

³ The PCR is the document which the District submits at the end of the year to the various permitting agencies describing the actual work which was completed during that year.

2. **Project Specific Accounting.** Rather than identifying all the necessary mitigation areas (acreages) for impacts from sediment removal and vegetation management “up front” based on projections, mitigation criteria and metrics will be based on standard unit measures (typically acreages) and ratios, and the mitigation requirement will be identified annually based on the impacts anticipated in that year. This annual mitigation analysis will clearly distinguish mitigation requirements associated with new work areas from those locations where mitigation has already been complete because these areas were projected in 2002 and exist now in the Permanent Mitigation Areas (PMA).

These two adjustments to the mitigation program are further described in Section 5 below. The District will be able to use “pay as you go” mitigation projects/services to provide incremental mitigation annually on an as-needed basis. The District will continue to seek opportunities to purchase lands to address longer-term mitigation needs. The District will now have more flexibility to pursue suitable mitigation opportunities through either long-term land acquisition or annual mitigation project approaches. Additional, or excess, mitigation provided from 2002-2012 where work that was projected, but never completed may potentially be applied to new work areas in need of mitigation support. The District will work with the appropriate regulatory staff to identify, review, and approve the potential application of existing excess mitigation toward new SMP work areas. Likewise, the District will remove original 2002 projected work areas where no work occurred during 2002-2012 (and is not projected to occur in the future) from the PMA. In this way the District will “calibrate” the SMP mitigation effort so that mitigation activities are aligned with actual work conducted.

It is important to note that because the location and extent of bank stabilization activities cannot be predicted, they have never been projected work activities. Since 2002, bank stabilization projects that require mitigation have been mitigated using an annual assessment and “pay as you go” incremental mitigation process. For bank stabilization projects, identifying impacts and necessary mitigation will continue to occur annually depending on what bank work is needed. Section 7 of this memorandum describes bank stabilization mitigation in more detail.

4.3 Procedure for Addressing Maintenance and Mitigation Requirements if Work Needs to Occur Outside of Projected Areas

As described above, the 2012 SMP Update SEIR identifies projected work areas where it is anticipated that maintenance work may occur during the 2012-2022 period. However, it is possible that a maintenance location or activity could arise that was not included in the projected work activities and locations described in the SEIR. The SEIR described such a possibility and evaluated impacts throughout the entire SMP area (i.e., all streams below the 1000-foot elevation contour) to address this possibility. As such, no impacts are anticipated to occur from work conducted outside of the projected work locations that have not already been considered in the SEIR’s impact analysis and related mitigation strategies. That said, this section describes the procedure to identify, review, and confirm mitigation needs for such non-projected maintenance locations or activities, as they arise. A description of this process was requested by participating regulatory agency staff.

- A. Maintenance work locations and activities will be tracked and reported annually through two

reports: the spring season NPW, which provides the specific locations and extent of proposed work during the upcoming maintenance season; and the end of year PCR, which will verify the precise extent of work that actually occurred. Summary work tracking tables will be provided that identify annual proposed work (NPW) and work conducted to date (PCR). Any proposed maintenance locations or activities that were not projected in the 2012 SMP Update SEIR would be clearly identified in the annual NPW.

B. Non-projected work areas and/or activities will be evaluated, tracked, and included or excluded from the annual SMP workplan as follows:

1. *Non-projected work areas or activities (in non-sensitive areas) that are similar and consistent with the Program Manual, SEIR, regulatory permits/approvals, and other environmental compliance documentation as relevant:* The SMP is a long-standing program whose range of activities is now well understood. As such, the Program Manual, SEIR, permits and other regulatory approvals, and other program documents describe a range of activities and environments within the Program Area. If a non-projected work activity or maintenance location were to arise that were entirely consistent with the conditions and analyses provided by the Program's existing environmental compliance documentation, this would be identified in the annual NPW. The proposed maintenance activity or location would be evaluated for the application of standard SMP impact avoidance and minimization procedures, including the application of BMPs and other measures described in the SEIR and Biological Opinions. In the NPW, the District would describe the resource conditions at the proposed non-projected work location and describe how those conditions are consistent and adequately addressed by existing program documentation and measures. This site description would include a basic description of the site's physical setting including the primary physical processes at work, a basic description of the site's biological resources, site photo(s) as necessary, and a description of any site feature/characteristic that may require special attention in relation to maintenance. The District would confirm the consistency of the proposed activity or work location with regulators, and then conduct the maintenance work, track the work for the PCR, and provide necessary mitigation similar to any projected maintenance activity or location.
2. *Non-projected work areas or activities (in sensitive areas) that are similar and consistent with the Program Manual, SEIR, regulatory permits/approvals, and other environmental compliance documentation as relevant (and require no additional impact avoidance, minimization, or BMP measures):* In this case the non-projected work is identified to occur in an area known for sensitive resource conditions. Similar to Case #1 above, the non-projected maintenance activity and location will be evaluated by the District for its consistency with the existing environmental protocols and impact avoidance and minimization approaches as described in the Program Manual, SEIR, regulatory permits/approvals, etc. If the application of standard SMP impact avoidance and minimization approaches would result in consistent impact findings with the SEIR,

regulatory permits/approvals, then the non-projected work area or activity would be considered consistent with the existing Program documentation and the proposed work would be described as such in the NPW. In the NPW, the District would describe the resource conditions at the proposed non-projected work location and describe how those conditions are consistent and adequately addressed by existing program measures. Similar to what is described above for the general non-projected work site, the site description would include a basic description of the site's physical setting including the primary physical processes at work, a basic description of the site's biological resources, site photo(s) as necessary, and a description of any site feature/characteristic that may require special attention in relation to maintenance. What is different in this scenario is that for a particular reason, there is an increased awareness of the site's sensitivity. In this case, the site description might include how any existing BMP measures might be tailored to the specific work site to ensure an effective and more focused approach to impact avoidance or minimization. The District would confirm the consistency of the proposed activity or work location with regulators, and then conduct the maintenance work, track the work for the PCR, and provide necessary mitigation similar to any projected maintenance activity or location.

3. *Non-projected work areas or activities (in sensitive areas) that require additional impact avoidance, minimization, or BMPs to be consistent with terms and conditions of Program Manual, SEIR, regulatory permits/approvals, etc.* In this case it would be concluded that potential impacts at the non-projected maintenance activity or work area cannot be avoided or minimized to a level consistent with the existing SEIR and regulatory permits/approvals, without application of additional measures not currently included in the Program's environmental compliance documentation. In this situation, the non-projected work areas are not suitable for inclusion in the NPW or to be maintained under the SMP authorizations. The District may pursue individual or supplemental environmental review and authorizations for such projects.

4.4 Estimated Wetland and Riparian Habitat Impacts for Maintenance Areas

Table 5 identifies all of the projected areas (not just the new areas) of impact for SMP activities in non-tidal areas to the following riparian vegetation and wetland habitats: woodlands, herbaceous (non-wetlands), wetlands (impacted by instream sediment removal), aquatic wetlands, herbaceous wetlands, shrubs, and other miscellaneous habitats. The District's vegetation based habitat classification system is a hierarchical system based on Sawyer, John, Todd Keeler-Wolf, and Julie Evens, *A Manual of California Vegetation* (California Native Plant Society in collaboration with California Department of Fish and Game, 2009). The hierarchical system developed by SCVWD is described in more detail in Appendix B. Brief and general definitions of these vegetation and habitat classes are provided below and complete descriptions are found in Appendix B:

- Woodlands: Macrogroups under the Mesomorphic forests and woodlands formation class, such as Californian-Vancouverian Montane and Foothill Forest and Vancouverian Rainforest.

- Herbaceous (non-wetland): non-wetland alliances under the Mesomorphic Herbaceous Vegetation formation class, such as perennial grasslands.
- Wetlands (impacted by sediment removal): wetlands in this category are calculated using the field assessed average wetland width for a reach multiplied by the length of the reach. They are categorized as tidal and freshwater wetland, depending on the surface vegetation type.
- Aquatic wetlands: District botanist identified wetland alliances under the Hydromorphic Vegetation (aquatic vegetation) formation class, such as Naturalized Temperate Pacific Freshwater Vegetation.
- Herbaceous Wetlands: district botanist identified wetland alliances under the Mesomorphic Herbaceous Vegetation formation class, such as Salicornia, Chord Grass, Scirpus californicus, brackish/tidal Bulrush-Cattail mapping unit.
- Shrubs: Under the formation class, Mesomorphic Shrub Vegetation, macro groups for shrub include California Chaparral and California Coastal Scrub, alliances include Californian Xeric Chaparral Group, Adenostoma fasciculatum,
- Miscellaneous: the formation class "Miscellaneous" contains alliances such as row crops, orchard, concrete, reservoirs.

The classification system is based on hydromorphic and mesomorphic classes, with sub-units depending on formation, macrogroup, alliance, and wetland presence. The vegetation and hydro-geomorphic classes shown in Appendix B have Program Area acreages assigned based on aerial photo interpretation and field verification. These vegetation and hydro-geomorphic units are the basis for the estimated impacts to the wetlands types shown in Tables 5 and 6 below. As shown in the 5th column from the left in Appendix B, the various vegetation and hydro-geomorphic classes are identified as being either wetland ("Y" for yes) or not ("N" for no). As noted in Table B, some of the "habitat" types included in the miscellaneous category, such as "earth lined channels" or "concrete lined channels", include waters of the State and may be subject to State regulations, even if such areas don't include wetlands. Such areas may potentially also be "other waters of the U.S." that are not wetlands, but would need to be evaluated on a case by case basis to clarify their jurisdictional requirements. Table 6 provides a similar estimate of projected impacts for work in tidal areas. For both Table 5 and Table 6, impacts are identified for the main SMP work activities, including: sediment removal, herbicide, hand removal, discing, mowing, and hand pruning activities. These activities are described in the revised 2012 SMP Manual. Potential impacts are also identified by the principal District watersheds: Lower Peninsula, West Valley, Guadalupe, Coyote, and Pajaro. These watersheds are identified in the maps of Chapter 2 of the 2012 SMP Update SEIR.

Table 5. Projected Impacts by Habitat Type and Activity, non-tidal reaches (acres)

Watershed	Activity Type	Habitat Type						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc.
Lower Peninsula	Sediment Removal	3.587	0.51	2.200	0.000	0.625	0.000	4.084
	Herbicide	6.52	3.253	na	0.000	0.209	0.262	7.765
	Hand Removal	0.064	0.000	na	0.000	0.000	0.000	0.002
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.967	2.659	na	0.000	0.008	0.025	0.604
	Hand Pruning	0.139	0.011	na	0.000	0.000	0.000	0.084
	<i>Lower Peninsula Subtotal</i>		<i>11.277</i>	<i>6.433</i>	<i>2.200</i>	<i>0.000</i>	<i>0.842</i>	<i>0.287</i>
West Valley	Sediment Removal	2.065	3.227	8.530	0.000	0.798	0.059	1.426
	Herbicide	22.639	31.329	na	0.000	2.066	0.321	25.161
	Hand Removal	0.076	0.01	na	0.000	0.000	0.005	0.005
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	1.816	7.644	na	0.000	0.314	0.000	0.358
	Hand Pruning	0.225	0.056	na	0.000	0	0.001	0.102
	<i>West Valley Subtotal</i>		<i>26.821</i>	<i>42.266</i>	<i>8.530</i>	<i>0.000</i>	<i>3.178</i>	<i>0.386</i>
Guadalupe	Sediment Removal	31.89	5.199	14.640	0.000	1.091	2.405	13.654
	Herbicide	42.051	65.511	na	0.000	1.916	1.782	19.619
	Hand Removal	0.237	0.052	na	0.000	0.001	0.015	0.004
	Discing	0.071	1.15	na	0.000	0.000	0.000	0.000
	Mowing	25.006	20.909	na	0.000	1.242	2.914	15.517
	Hand Pruning	0.221	0.046	na	0.000	0.001	0.000	0.003
	<i>Guadalupe Subtotal</i>		<i>99.476</i>	<i>92.867</i>	<i>14.640</i>	<i>0.000</i>	<i>4.251</i>	<i>7.116</i>
Coyote	Sediment Removal	45.564	9.472	28.090	0.009	0.786	2.031	4.702
	Herbicide	30.24	137.874	na	0.001	34.432	1.299	33.286
	Hand Removal	3.175	0.993	na	0.000	0.036	0.069	0.262
	Discing	1.287	5.199	na	0.000	0.635	0	0.226

Table 5. Projected Impacts by Habitat Type and Activity, non-tidal reaches (acres)

Watershed	Activity Type	Habitat Type						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc.
	Mowing	8.151	20.502	na	0.000	0.000	0.567	1.776
	Hand Pruning	11.27	3.138	na	0.000	0.045	0.188	0.586
	<i>Coyote Subtotal</i>	<i>99.687</i>	<i>177.178</i>	<i>28.090</i>	<i>0.010</i>	<i>35.934</i>	<i>4.154</i>	<i>40.838</i>
SF Basin Total	Sediment Removal	83.106	18.408	53.460	0.009	3.300	4.495	23.866
	Herbicide	101.450	237.967	na	0.001	38.623	3.664	85.831
	Hand Removal	3.552	1.055	na	0.000	0.037	0.089	0.273
	Discing	1.358	6.349	na	0.000	0.635	0.000	0.226
	Mowing	35.940	51.714	na	0.000	1.564	3.506	18.255
	Hand Pruning	11.855	3.251	na	0.000	0.046	0.189	0.775
	SF Basin Total	237.261	318.744	53.460	0.010	44.205	11.943	129.226
Pajaro Basin Total	Sediment Removal	5.99	10.763	9.810	0.000	0.022	0.038	3.743
	Herbicide	49.097	86.642	na	0.268	1.083	0.579	10.719
	Hand Removal	4.173	2.239	na	0.047	0.276	0.037	0.442
	Discing	1.731	8.584	na	0.000	0.000	0.000	10.596
	Mowing	12.865	36.979	na		0.286	0.000	6.494
	Hand Pruning	2.334	4.007	na		0.005	0.037	0.111
	Pajaro Basin Total	76.190	149.214	9.810	0.315	1.672	0.691	32.105

Source: SCVWD, 2011

- Notes:
1. Includes areas that were also projected for maintenance (and/or maintenance was conducted) during the 2002-2012 period
 2. Acreages are shown for the total projection of each work activity type, this includes acreages for overlapping work activities at the same location, so potential impacts are over represented.
 3. Acreages incorporate the work area percentage estimate to account for varying work amounts within a reach.
 4. Miscellaneous habitat type includes features/elements as shown in Appendix B (*Vegetation Classification System*)
 5. "Sediment wetland" refers to wetland and aquatic habitats (combined) projected to be impacted by sediment removal, based on calculations performed by the SCVWD taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. The SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP activities were projected in areas mapped by AIS as aquatic habitats (which are summarized in those tables as "aquatic (wetland)" impacts) and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous (wetland)" impacts).

Table 6. Projected Impacts by Habitat Type and Activity, tidal reaches (acres)

Watershed	Activity Type	Habitat Type						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc
Lower Peninsula	Sediment Removal	3.704	0.971	0.370	0.000	0.316	0.069	2.539
	Herbicide	0.000	0.001	na	0.000	0.000	0.000	0.001
	Hand Removal	0.139	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
<i>Lower Peninsula Subtotal</i>		<i>3.843</i>	<i>0.972</i>	<i>0.370</i>	<i>0.000</i>	<i>0.316</i>	<i>0.069</i>	<i>2.540</i>
West Valley	Sediment Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Herbicide	0.048	0.294	na	0.000	0.337	0.000	0.57
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
<i>West Valley Subtotal</i>		<i>0.048</i>	<i>0.294</i>	<i>0.000</i>	<i>0.000</i>	<i>0.337</i>	<i>0.000</i>	<i>0.570</i>
Guadalupe	Sediment Removal	2.82	17.302	18.080	0.000	1.611	0.069	1.892
	Herbicide	0.000	0.000	na	0.000	0.021	0.000	0.000
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
<i>Guadalupe Subtotal</i>		<i>2.820</i>	<i>17.302</i>	<i>18.080</i>	<i>0.000</i>	<i>1.632</i>	<i>0.069</i>	<i>1.892</i>
Coyote	Sediment Removal	0.127	1.231	3.050	0.000	0.541	0.000	2.053
	Herbicide	0.000	0.014	na	0.000	0.18	0.000	0.098
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000

Table 6. Projected Impacts by Habitat Type and Activity, tidal reaches (acres)

Watershed	Activity Type	Habitat Type						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
	<i>Coyote Subtotal</i>	<i>0.127</i>	<i>1.245</i>	<i>3.050</i>	<i>0.000</i>	<i>0.721</i>	<i>0.000</i>	<i>2.151</i>
SF Basin	Sediment Removal	6.651	19.504	21.500	0.000	2.468	0.138	6.484
	Herbicide	0.048	0.309	na	0.000	0.538	0.000	0.669
	Hand Removal	0.139	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
	SF Basin Total	6.838	19.813	21.500	0.000	3.006	0.138	7.153

Source: SCVWD, 2011

- Notes:
1. Includes areas that were also projected for maintenance (and/or maintenance was conducted) during the 2002-2012 period
 2. Acreages are shown for the total projection of each work activity type, this includes acreages for overlapping work activities at the same location, so potential impacts are over represented.
 3. Acreages incorporate the work area percentage estimate to account for varying work amounts within a reach.
 4. Miscellaneous habitat type includes features/elements as shown in Appendix B (Vegetation Classification System)
 5. "Sediment wetland" refers to wetland and aquatic habitats (combined) projected to be impacted by sediment removal, based on calculations performed by the SCVWD taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. The SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP activities were projected in areas mapped by AIS as aquatic habitats (which are summarized in those tables as "aquatic (wetland)" impacts) and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous (wetland)" impacts).

5. Mitigation for New Sediment Removal and Vegetation Management Work Areas 2012-2022

This section describes how mitigation will be provided for sediment removal and vegetation management activities at new channel locations not included in the existing SMP mitigation program. Within these areas, mitigation will be provided for impacts to the following vegetation types: riparian woodlands, sediment wetland, aquatic (wetland), herbaceous (wetland), and riparian shrub.

This section of the memorandum includes the mitigation approaches listed below. These mitigation approaches address impacts as described in the Biological Resources chapter of the SEIR (relevant impact discussions from the SEIR are shown in parenthesis).

- Section 5.1 Acquisition and Restoration Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.2 Invasive Plant Management Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.3 Riparian Restoration and Planting Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.4 Application of Invasive Plant Management and Riparian Planting Programs
- Section 5.5 Mitigation for Tree and Shrub Removals 6-12 Inches (dbh) (Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation; Impact BIO-7: Loss of Ordinance Trees)
- Section 5.6 Instream Habitat Complexity Program (Impact BIO-8: Impacts on Steelhead)
- Section 5.7 Summary of Sediment Removal and Vegetation Management Mitigation

As described in the sections above, the existing SMP mitigation program will continue to serve as on-going mitigation for maintenance work during the 2012-2022 period for areas projected in the 2002-2012 SMP. Using a variety of mitigation approaches, a mitigation “tool box,” the District will provide suitable mitigation for impacts in new work areas. The mitigation programs described in this section are consistent with on-going District mitigation operations. The key addition for the SMP is to now provide both “acquisition” and “pay as you go” mitigation processes for the sediment and vegetation maintenance activities. Increasing mitigation opportunities increases the flexibility for finding suitable mitigation options in any given year. The District remains committed to finding suitable acquisition-type mitigation projects to support the SMP. The mitigation programs described in this section will provide mitigation specifically for the SMP and will not satisfy mitigation obligations for other District actions.

Figure 1 illustrates the decision making process to identify and prioritize mitigation during the 2012-2022 program period. Starting in the upper left corner of Figure 1, maintenance work sites will first be

identified as either being included in the 2002 mitigation program or not. If no “pay-as-you-go” mitigation had been conducted at the site in the last 5 years for vegetation management activities (as described below in Section 5.4), then mitigation will be required and the sequence along the right-hand side of Figure 1 is followed. For sites that require mitigation, a key distinction will be whether there is an acquisition project available that can be applied to mitigate the maintenance work. If so, then an acquisition process will be conducted and the mitigation will be provided in perpetuity as described in Section 5.1 below. If not, then mitigation will be conducted on a “pay as you go” basis. On-site mitigation will be prioritized; if this is not feasible or if better opportunities exist off-site, then off-site locations would be pursued.

The mitigation approaches described below in Sections 5.2 – 5.7 will be considered for on-site application based on an assessment of the maintenance site’s existing ecologic functions and values and what are opportunities and constraints to applying the various mitigation approaches. A mitigation approach for the work site and reach will be developed to prioritize habitat restoration and enhancement activities that best match existing functions (in-kind mitigation), but also have the highest likelihood for success, sustainability, and do not result in an increased maintenance effort. If there is not an opportunity to provide feasible mitigation on-site, then off-site opportunities will be evaluated with a similar priority of matching the off-site mitigation with in-kind functions/services as those that will be affected along the maintenance reach.

5.1 Acquisition and Restoration Program

Consistent with the existing SMP mitigation program, land acquisition and restoration projects can be developed to serve as suitable mitigation for SMP maintenance activities in new work areas. As described in Section 3 above, the existing SMP mitigation program includes several acquisition and restoration elements that provide mitigation in perpetuity for previously defined work areas. Similar to the on-going SMP mitigation program, the District will work with the appropriate regulatory staff to identify, review, and approve the use of acquired lands as suitable mitigation for SMP activities. Such land use and management plans will be reviewed/approved by regional regulatory managers from agencies as necessary. In addition to agencies regulating species requirements, the Executive Officer of the Water Board will also review/approve land use and management plans.

In developing the existing land acquisition and restoration mitigation programs, the District worked closely with regulatory staff and external stakeholders to develop the following guiding principles for mitigation options:

1. Restoration or creation of larger, sustainable sites is preferable to smaller, fragmented sites.
2. Compatible adjacent land uses, especially those in public ownership or other mitigation sites will be evaluated to determine sustainability and suitable size of a mitigation site.
3. The conservation, protection from further degradation, and enhancement of existing habitats is preferable to the creation of artificially supported systems.
4. A watershed-wide, programmatic approach is preferable to a project-by-project approach.

5. Specific watersheds, streams, or stream reaches will be targeted for mitigation, restoration, and enhancement where the most ecological function will be obtained. When looking at ecological function, the net gain in function will be considered in addition to the existing functions. Areas outside of target streams and watersheds can also be considered.
6. Mitigation will match impacts by basin (Santa Clara Basin versus Pajaro River Basin).
7. In-kind mitigation opportunities are preferred over out-of-kind.
8. Out-of-kind mitigation will be considered, however, if it benefits the overall health of streams and watersheds and has cost advantages.
9. Technically and pragmatically feasible program elements, with a high probability of success, are preferable to those elements with a higher risk of failure or are based on speculative technology or feasibility.
10. Proposal elements that can be scaled up or down in size, effort, and cost are preferred over those that are less flexible.
11. Ecologic enhancement⁴ and restoration⁵ activities providing mitigation must result in a net improvement to the site's condition.

These guiding principles will continue to be applied to the identification and selection of potential land acquisition and restoration mitigation projects.

While site-specific land acquisition and restoration mitigation projects are not yet identified to apply as specific mitigation for new work areas under the SMP Update 2012-2022, general classes of such land acquisition mitigation projects are described as follows:

- In-kind preservation and enhancement: The acquired lands provide similar ecologic functions and values to habitat areas impacted by SMP maintenance activities. Higher quality lands/habitats will be preserved. Ecologic enhancement activities may be applied to provide further lift in functions and values. The acquisition and preservation/enhancement of these higher quality lands will occur at a **ratio of 3:1**, meaning 3 acres of land shall be acquired, preserved, and/or enhanced for every 1 acre of impacted habitats due to SMP activities. For

⁴ *Ecological enhancement activities recognize a site's existing physical and biological processes and seek to enhance or improve those processes which may be currently functioning at a less than optimal performance. Enhancement activities may also include improving the site's functions and values, either for the ecosystem as a whole or targeting a particular species or group of species.*

⁵ *Ecological restoration activities evaluate a site's existing physical and biological processes and compare those conditions to either past on-site processes (or conditions at a suitable reference site) and seek to restore (or reintroduce) such processes and forms on-site that have been previously lost or degraded. While restoration activities may look to a site's past or to a suitable reference site, an effective restoration project must operate within the context of the current system and what processes the current system will support sustainably. Similar to enhancement activities, restoration activities may also include restoring the site's functions and values, either for the ecosystem as a whole or targeting a particular species or group of species.*

these lands, the District will prepare and implement a management and monitoring plan which identifies the ecological functions and values which are being preserved, and identifies the management measures that will be implemented to ensure those functions and values are maintained into the future. As a performance standard, the identified functions and values will not be allowed to reduce in quality compared to their state at the time the lands began to function as mitigation.

- In-kind restoration: The acquired lands have good potential to provide similar ecologic functions and values to habitat areas impacted by SMP maintenance activities. However, restorative actions are necessary to lift the quality, functions, and values of the lands to provide a net improvement/benefit that can account as mitigation for SMP impacted habitats. Mitigation for acquisition and restoration lands will occur at a **ratio of 1.5:1**, meaning 1.5 acres of land shall be acquired and restored for every 1 acre of impacted habitats due to SMP activities. These lands would also have a management and monitoring plan developed that would describe the restoration activities, monitoring requirements, and performance standards. The performance standard for the restoration/replanting shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.
- Watershed lands (out-of-kind): These are acquired lands that provide more general conservation, open space, and habitat values, but the acquired lands are not specifically tied or matched in-kind to wetland or riparian habitats impacted by SMP maintenance activities. Acquired watershed lands may include broader habitat communities such as woodland and grassland. Ecologic enhancement activities may be applied to provide further lift in functions and values. The acquisition of more general watershed conservation lands will occur at a **ratio of 8:1**, meaning 8 acres of land shall be acquired and restored for every 1 acre of impacted habitats due to SMP activities. For these lands, the District would prepare and implement a management and monitoring plan as described for the in-kind preservation and management lands, and would adhere to the same performance standards.
- Enhancement or management of land that is owned by other agencies. Under this option, the District would collaborate with owners of land that is currently managed for open space or passive recreation, and implement one of the three bulleted mitigation approaches above. In this situation, the District would not acquire the mitigation lands but would enter into an agreement with the landowners to provide management and financial support toward preserving or improving lands toward beneficial outcomes, including improved habitats. In these cases, a detailed management plan for species would be the responsibility of the District, and not necessarily be managed by the landowner. The mitigation accounting for such “partnership projects”, and how much mitigation would be provided to account for SMP activities, would be reviewed and developed with regulatory staff on a case-by-case basis.

By taking ownership of such mitigation lands, the District would commit these lands to conservation/preservation purposes in perpetuity (providing access and/or maintenance easements as necessary to support existing land functions). Because acquisition lands will be conserved in perpetuity, the mitigation they provide will also serve the SMP in perpetuity. The District shall identify funding mechanisms to support the long-term maintenance and conservation of such mitigation lands and

projects⁶. In Section 6 below, the District's approach to mitigation for potential impacts to specific species (and their habitats) is described. An Incidental Take Permit (ITP) will be issued by DFG to address take according to the California Endangered Species Act (CESA), while the BOs from the USFWS and NMFS will address take according to the Federal Endangered Species Act (FESA).

As described above in Section 3, the District's long-term goal is to acquire enough land to eventually provide all necessary mitigation for SMP vegetation management and sediment removal activities. More specifically, the long-term acquisition of suitable properties will provide mitigation in perpetuity for long-term temporary impacts associated with stream maintenance activities.

In concept, a targeted land acquisition project will provide mitigation per the ratios identified above. Once mitigation lands are acquired, the District will identify which of the "new work areas" now identified under the 2012 SMP Update would be mitigated for (in perpetuity) by the acquired lands. The District will coordinate with regulatory agencies for the review and approval of such acquisitions for use as mitigation on a case by case basis. Similar to providing mitigation for new work areas, this same process of acquiring lands to be applied as mitigation can be used to provide mitigation for other work areas that were not projected. Such "not projected but worked" areas from the 2002-2012 period can be added to the pool of *Permanent Mitigation Areas (PMA)*, that are mitigated for in perpetuity if appropriate mitigation lands are acquired and they provide a good match for such lands.

The *PMAs* will be a set of work areas that are mitigated for in perpetuity. These areas will grow as new work areas are mitigated through the land acquisition and enhancement process. Likewise (as described above), some areas may be removed from the PMA if the District does not have routine maintenance needs in such areas. This would occur where work has never been performed in a specific area, and no need for future work is anticipated in that area. Under such a scenario, previously projected work areas (and their impacts) that are no longer necessary would be removed from the PMA program. Compensatory mitigation that had already been provided for such areas would remain, but would no longer be allocated toward the area to be removed from the PMA. New work areas and activities that do not have mitigation assigned can be added to the PMA by applying this unallocated mitigation. In this way, previously assigned mitigation from the 2002 program for areas where no work occurred (and where no work is forecast) may now be applied to alternative areas that do have projected work activities. As described above, any transfer of mitigation from areas to be removed from the PMA to new areas to be included in the PMA would be reviewed by participating regulatory agencies.

In general, maintenance on acquired lands would be similar in nature to the various activities which are part of the SMP. To the extent that maintenance activities on acquired lands are consistent with SMP

⁶ Mitigation associated with the SMP is funded by the Watershed and Stream Stewardship Fund. The majority of the revenue for the Watershed and Stream Stewardship Fund is ad-valorem 1% property tax (an allocated share of countywide 1% ad valorem property tax receipts). The projected property tax revenue for fiscal year 2011-2012 is \$45 million.

covered activities, they would not require additional permitting. In these cases, maintenance activities on acquired lands will comply with the parameters, limitations and requirements of the 2012 SMP Update. In situations where there might be additional impacts to listed species, then additional permits and authorizations may be necessary from regulatory agencies. However, it is expected that the ITP from the DFG and the BOs from the USFWS and NMFS will authorize incidental take to listed species that might occur during maintenance and management of species-specific mitigation lands.

In summary, the SMP will account for mitigation needs for work activities by either 1) applying PMAs (mitigation in perpetuity); or 2) applying annual pay-as-you-go mitigation.

The sections below describe the District's pay-as-you-go mitigation approach that may be provided annually depending on yearly mitigation needs.

5.2 Invasive Plant Management Program

The primary goal of the Invasive Plant Management Program (IPMP) element of the SMP's compensatory mitigation package is to preserve and improve habitat within Santa Clara County streams and riparian corridors by reducing the population of ecologically impacting invasive plant species. Controlling the spread of invasive plant species is a critical element in improving the ecological health of our streams and watersheds. Invasive plants thrive and spread aggressively, negatively altering resource allocation regimes, wildlife patterns, soil stability and water quality thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and impact access to roads, levees and trails. The IPMP will provide compensatory mitigation for SMP impacts to upland, riparian, freshwater and tidal wetlands from vegetation and sediment management activities, by eliminating or significantly reducing the population of invasive plant species from these affected habitats.

The IPMP will have a two-pronged approach:

- A systematic program with the longer term objective of identifying, prioritizing, and controlling invasive plants throughout the SMP area.
- An opportunistic annual, site-specific approach with the objective to remove invasive plants from individual SMP work sites. As mitigation for SMP activities, each of the SMP maintenance sites will be evaluated for on-site invasive plant removal and control.

The intent is that these two approaches, operating at different yet complimentary spatial scales will enhance the overall ecological health of the SMP's creek ecosystems.

At the systematic program-area scale, the IPMP will develop a priority matrix of invasive plant species that integrates a variety of factors including: the 2006 CAL-IPC ratings, the anticipated rate of spread without management intervention, the feasibility of effective control, impacts to fish and wildlife, impacts to sensitive plant communities, increases in flood threat, increases to fire danger, aggressive growth patterns known to cause structural damage, and impediments to maintenance access. Priority target species will be selected annually from this matrix. Following development of the matrix, the

IPMP will then prioritize locations to implement plant control. High priority sites will include areas where:

- Targeted invasive species are degrading habitat for sensitive fish and/or wildlife species.
- Invasive plant removal and subsequent native habitat colonization will improve connectivity between existing patches of high-quality habitat.
- The upstream extents of invasive plant species distribution (within the SMP area) will reduce the potential for re-invasion of control sites via propagule dispersal from upstream source populations.
- Invasive plant control is technically feasible (e.g., given access constraints) and can be accomplished while minimizing impacts to adjacent aquatic, wetland, and riparian habitats as well as urban development.

5.3 Riparian Planting Program

The primary goal of the riparian planting component of the SMP mitigation package is to compensate for the loss of quality and quantity of native-dominated riparian habitat due to sediment removal and vegetation management. Riparian planting will enhance habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species. Restoration will be accomplished primarily via the revegetation of creek banks and floodplains within the SMP area where the existing physical conditions (i.e., topography, hydrology, and soils) are suitable to establish native-dominated riparian habitat. The planting palette for the Riparian Planting Program is shown in Table 7. This list of species is not inclusive and each revegetation site will be assessed for ecologically appropriate native species. Riparian planting may also include site preparation, including minor grading and topsoil preparation, and incorporation of soil amendments.

Opportunities for riparian planting and restoration will be evaluated at all SMP vegetation management and sediment removal maintenance locations. The District's preference will be to first prioritize riparian planting on-site at maintenance sites, and in this way provide direct on-site mitigation for maintenance activities. Riparian planting and restoration will provide mitigation that directly addresses impacts associated with vegetation management and sediment removal activities as described in the 2012 SMP Update SEIR, as well as providing an opportunity to mitigate for other SMP activities.

Specific revegetation plan details are highly dependent on conditions at each restoration site, particularly with regard to hydrology and soils. Where opportunities for on-site riparian planting and restoration are unavailable or highly constrained, the District will identify off-site locations that can provide suitable mitigation opportunities. Off-site riparian planting restoration sites will be prioritized toward:

- Stream reaches with riparian restoration opportunities for sensitive fish and/or wildlife species.

- Stream reaches where riparian restoration of existing riparian canopy gaps will improve connectivity between existing patches of high-quality riparian habitat.
- Stream reaches with riparian habitat gaps where invasive plant species have been treated to accelerate native riparian plant establishment and inhibit re-colonization by invasive plant species.

Table 7. Riparian Planting Palette for Mitigation Program

Botanical Name	Common Name
TREES	
<i>Acer negundo</i>	Box elder
<i>Aesculus californica</i>	Buckeye
<i>Alnus rhombifolia</i>	White alder
<i>Platanus racemosa</i>	Western sycamore
<i>Populus fremontii</i>	Fremont cottonwood
<i>Populus trichocarpa</i>	Black cottonwood
<i>Quercus agrifolia</i>	Coast live oak
<i>Quercus douglasii</i>	Blue oak
<i>Quercus lobata</i>	Valley oak
<i>Salix laevigata</i>	Red willow
<i>Salix lasiandra</i>	Arroyo willow
<i>Salix lucida</i>	Shining willow
SHRUBS	
<i>Baccharis salicifolia</i>	Mulefat
<i>Cornus glabrata</i>	Brown dogwood
<i>Heteromoles arbutifolia</i>	Toyon
<i>Rhamnus californica</i> CA	Coffeeberry
<i>Salix exigua</i>	Sandbar willow
<i>Sambucus mexicana</i>	Elderberry
LOW PLANTS	
<i>Artemisia californica</i>	California sage
<i>Artemisia douglasiana</i>	Mugwort
<i>Aster chilensis</i>	Chilean aster
<i>Clematis ligusticifolia</i>	Virgin's Bower
<i>Eriogonum fasciculatum</i>	California Buckwheat
<i>Euthamia occidentalis</i>	Goldenrod
<i>Leymus triticoides</i>	Blue wild rye
<i>Mimulus aurantiacus</i>	monkeyflower
<i>Rosa californica</i>	California rose
<i>Rubus ursinus</i>	California blackberry
<i>Symphoricarpos laevigatus</i>	Snowberry

The target species composition, location, and extent of riparian planting and restoration will be related to the ecological functions and values impacted from SMP maintenance activities, such as temporary impacts to riparian vegetation resulting from pruning and selective tree removal. In sum, the benefits of restoration will offset the adverse effects of temporary habitat loss. District staff with

botanical/arboricultural expertise will: (1) select the most appropriate planting area, (2) plant it with appropriate spacing for each species to achieve success, (3) evaluate if excess planting is possible, and (4) decide whether to plant the excess area or not based on site conditions including the likely growth rate of surrounding trees. Excess plantings will be credited for mitigation use by future work activities.

Riparian mitigation plantings are installed based on plant densities found in natural communities and factoring in the site's carrying capacity. For tree species (mature height and spread > 20'), plantings are installed at 12-15' on center (OC). For shrub species (mature height and spread < 20'), plants are installed at 6-8' OC. Using industry standard formulas, planting areas or quantities are calculated to provide mitigation based on *area* impacted or *number of trees/plants* impacted. Grasses, forbs, and herbaceous vegetation are not accounted for in the planting calculation, but in order to provide habitat complexity are typical components of planting projects. Any excess planted will be documented and used toward future impacts.

The performance standard for the riparian planting program shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.

5.4 Application of Invasive Plant Management and Riparian Planting Programs

A mitigation ratio of 1.2:1 (area mitigated to area impacted) shall be applied for habitat impacts from sediment removal and vegetation management activities. A key determinant of setting the ratio at 1.2 acres mitigated to every 1 acre of maintenance impacts is to recognize that the loss of instream wetland vegetation and habitat due to SMP maintenance activities would be temporary. District studies indicate that instream wetland vegetation and wetland habitats impacted due to sediment removal and vegetation management activities recover on average within 1-2 years following maintenance activities (Rankin and Hillman, 2000). Mitigation for impacts to woody vegetation (greater than 6" diameter) is described below in Section 5.5.

Because impacts to wetland vegetation would be temporary and self-recovering, a mitigation ratio of 1:1 might be appropriate. However, because there is a temporal loss of functions between the time when the habitat is impacted and when the mitigation is applied, an additional 20% mitigation requirement would be applied, resulting in a 1.2:1 mitigation ratio. This additional 20% is believed to be adequate to address the temporal loss of functions. The mitigation ratio is not higher than 1.2:1 to account for the temporary nature of impacts to which it applies (e.g., if the impacts stop, the wetland or riparian habitat in the impact area will become re-established). The 1.2:1 ratio is based on recent experience with other flood control channel maintenance programs, such as in Sonoma County where similar routine vegetation management and sediment removal activities are mitigated at a lower ratio of 1.1:1. The Sonoma County Stream Maintenance Program was approved by DFG and the other regulatory agencies that are authorizing the Santa Clara County SMP.

The District can use either the invasive plant management program or the riparian planting program (or a combination of the programs) to achieve this net mitigation target for annual projects. Both of these programs direct address impacts by improving riparian habitat quality.

Mitigation opportunities will be assessed annually at both on-site maintenance work locations and off-site locations within the SMP program area. Required mitigation acreages will be determined annually based on the annual maintenance workplan and its associated impacts to habitat types (i.e., upland, riparian, freshwater and tidal wetlands).

In mitigating for vegetation management projects, invasive plant management or riparian planting mitigation projects shall have a “shelf life” or “warranty” for 5 years. This means that the mitigation required for impacts due to vegetation management activities provides 5 years of mitigation coverage for that maintenance site. In other words, once the invasive plant management or riparian planting mitigation is developed and applied for a specific maintenance project, the District can return to that maintenance site to conduct any vegetation management activity, any number of times, for up to 5 years without necessitating additional mitigation⁷. The District shall monitor invasive plant management and riparian planting mitigation sites in years 1, 3, and 5 and maintain the mitigation site to meet success criteria as described in the mitigation monitoring section below (see Section 8.1). Invasive plant management activities may need to be repeated for maximum effectiveness.

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For riparian planting mitigation areas, the District commits to not impacting such areas for a minimum of 10 years. If the District impacts riparian planting mitigation areas, the impacted mitigation area will be replaced in-kind at a 1.2:1 ratio, and the monitoring clock will be reset for those areas for another 5 years.

This “shelf life” or “warranty” of 5 years only applies to vegetation management work and does not apply to sediment removal activities. Impacts caused by sediment removal activities are mitigated on a “one time, pay as you go” basis. Repeated sediment removal work (if necessary) will require repeated mitigation, unless mitigation lands are acquired (per Section 5.1) that would enable the “new” maintenance area to be mitigated for in perpetuity.

The District shall describe the targeted invasive plant management or riparian planting mitigation activities in the annual NPW and verify implementation of the mitigation in the annual PCR. Planned acreages for mitigation activities, targeted plant species for removal, or targeted species for planting will be described in the NPW. Annual monitoring data for the mitigation sites shall be submitted to overseeing agencies (including USACE, USFWS, NMFS, San Francisco Bay RWQCB, Central Coast RWQCB, DFG, and BCDC) with other SMP monitoring results.

While both on-site and off-site opportunities will be considered, the District preference is to first apply invasive plant management and riparian planting activities on-site along stream channel reaches where other vegetation management maintenance or sediment removal activities are occurring. If on-site invasive plant management or riparian planting mitigation is not necessary at a particular maintenance

⁷ However, the DFG has indicated that mitigation for take of state-listed species will be required for each year in which an area is impacted.

reach, or there are other limits/constraints that prevent invasive plant management from being implemented, then the District will apply the mitigation at suitable off-site locations within the program area. The success criteria will be determined through the Mitigation Feasibility Assessment (MFA) process as described in Section 7.3 below.

5.5 Mitigation for Tree and Shrub Removals 6-12 Inches

Trees and shrubs less than 12" dbh may be removed under the SMP. The removal of trees and shrubs in new work areas, that are less than 6 inches dbh, is mitigated through the invasive plant management and riparian planting programs described above. Impacted maintenance areas from vegetation management and sediment removal activities (that include the removal of trees/shrubs less than 6" dbh) will be mitigated for according to the 1.2:1 ratio as described above.

Removing trees sized 6-12 inches dbh will be mitigated through two ways. First, mitigation will be provided via the invasive plant management and riparian planting programs, provided on an aerial basis at a 1.2:1 ratio, consistent with what is described above. Secondly, specifically for trees 6-12" dbh, individual replacement trees will be planted. Appendix C (*Tree Scoring for Removal of Trees and Shrubs 6 - 12"DBH - April, 2011*) provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol in Appendix C involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) occurs at either 1:1, 2:1, or 3:1 (replacement tree to removed tree) depending on the overall quality and function of the removed tree. These tree replacement ratios are consistent with other recent tree replacement ratios approved by regulatory agencies for the Sonoma County Stream Maintenance Program whereby removed native vegetation is replaced at 2:1 ratio, removed non-native vegetation that provides some benefits is replaced at a 1.5:1 ratio, and removed problematic non-native vegetation does not require replacement mitigation. Chapter 2 of the SMP Manual describes the District's vegetation management and tree removal activities in detail. The performance standard for tree replacement shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.

5.6 Instream Habitat Complexity Program

The District will develop, enhance, or provide in-kind installation of instream habitat complexity features to mitigate for the loss of instream complexity due to annual sediment removal and vegetation management projects, including large woody debris removal activities. The instream habitat complexity mitigation described in this section may also be suitable for application to bank stabilization mitigation projects as described in Section 7 below.

A complex instream and channel bed environment provides habitat heterogeneity, cover, and refugia during high flows. Prior to sediment removal, large woody debris removal, bank stabilization, or other maintenance activities, the affected work area will be surveyed by an SCVWD fisheries ecologist to identify any features that provide high-quality instream complexity for fish. The fisheries ecologist will determine whether such features are of "high quality" based on the presence of one or more of the

following criteria:

- Large woody debris providing cover and refugia from high flow velocities
- Deep pools providing rearing habitat and refugia from high flow velocities
- Cobble/boulder features providing cover, refugia from high flow velocities, and velocities suitable for good invertebrate drift

If such high-quality features must be removed during the proposed SMP activities, compensatory mitigation will be provided by the installation of instream complexity features at a ratio of 1:1 basis (mitigation-to-impact). The 1:1 mitigation ratio can be provided for either the *number* of instream complexity features affected by the maintenance activity or to the *area impacted* by the maintenance work. A District fisheries ecologist will determine which approach is most suitable in determining the required mitigation (number of projects or area). The “number” approach will likely work well for a small instream feature that is difficult to measure, for example an individual woody debris feature. The areal measure approach may work better for a cobble bar feature that has larger or more measurable area.

In practice, either one instream complexity feature will be installed for each one that is removed (number approach); or, an instream complexity feature will be installed with a similar area as the impacted footprint (area approach).

It is also acknowledged that erosion, deposition, tree-falls, and debris mobilization within a few years following the removal of an instream complexity feature will naturally reintroduce some complexity to the stream.

As examples, installing and enhancing instream complexity could include:

- enlarging an existing large woody debris feature or installing a new large woody debris feature
- geomorphically shaping an instream bar or bed feature for improved habitat
- enhancing a pool feature threatened by sedimentation
- enhancing streambed conditions to increase the range of flow velocity and habitat conditions.

The District does not see a need for different mitigation ratios depending on whether new instream complexity is installed or existing complexity is enhanced. Regardless of where this mitigation is performed, the creek will already have some level of instream complexity, so “enhancement” is what is actually being performed, whether through enhancement of existing features (such as a large woody debris feature) or installation of a new feature.

Priority for these mitigation activities will be given to SMP sites where instream features cannot be retained during construction due to conflicting objectives. For example, if a channel pool configuration cannot be retained during a bank protection job and the area is devoid of other complex bed or pool features, then this area will be evaluated for the addition of an instream complexity feature.

In addition to enhancing existing features, new instream features may be developed to achieve several habitat objectives, including: increasing pool habitat in homogenized stream reaches, providing escape cover for rearing and spawning fish, deepening feeding areas in riffle habitat, creating a variety of stream flow velocities for cover, sorting gravel, and providing resting areas for upstream migration. Additionally, improving instream function can benefit other aquatic flora and fauna by improving the overall stream complexity for which these species depend upon for survival. If effective, such new instream complexity features (particularly in highly modified, urban streams) can augment or replace existing structural features required for successful reproduction and rearing of native fish and amphibians in the freshwater environment.

Newly developed instream habitat improvements may use log structures, boulder structures, or a combination of both log and boulder structures to achieve more complex habitats. Possible configurations of boulders or logs include weirs, clusters, single and opposing wing deflectors, spider logs, and digger logs. The construction materials selected for each instream complexity feature would depend upon the target objective and site conditions.

The selected mitigation site will be as close to the impacted reach as is technically feasible. For instream complexity features that are removed by sediment removal or bank stabilization projects, mitigation will be incorporated into the same reach where instream complexity was removed to the extent feasible. The site will be selected with input from the District fisheries ecologist, taking channel capacity and other SMP-related factors into account. The fisheries ecologist will prepare specifications for the mitigation, including size, type, and configuration of the feature. The mitigation will be implemented within one year following the impact. There will not necessarily be a one-year delay, but rather, the District is committed to implementing the mitigation within one year of the impact. Determining the appropriate site for and design of the instream complexity feature may take some time, necessitating this flexibility. As a performance standard, instream habitat improvements shall be maintained to serve designed functions for at least five years, and will be monitored annually to ensure compliance.

5.7 Summary of Mitigation for Sediment Removal and Vegetation Management Activities

Working together, land acquisition and habitat restoration, invasive plant species management, riparian planting and restoration, tree planting to replace 6-12" tree removals, and developing instream habitat complexity projects provide a broad spectrum of natural system functions and values that mitigate impacts from vegetation management and sediment removal maintenance projects. Table 8 summarizes the key attributes of the updated mitigation approach for sediment removal and vegetation management activities.

Table 8. Summary of Mitigation Approach for Sediment Removal and Vegetation Management Impacts in New Work Areas (2012-2022)

Mitigation Type	Mitigation Purpose	Implemented:		Mitigation Location:		Mitigation Amount or Ratio
		Annually	Program Period	Onsite	Offsite	
A Land Acquisition (in-kind preservation/enhancement)	Mitigates in perpetuity for repeat sediment removal and vegetation management activities		X		X	3:1 (acres acquired, preserved, enhanced: acres impacted)
B Land Acquisition (in-kind restoration)	Mitigates in perpetuity for repeat sediment removal and vegetation management activities		X		X	1.5:1 (acres acquired and restored: acres impacted)
C Land Acquisition (watershed lands out-of-kind)	Provides mitigation in perpetuity for repeat sediment removal and vegetation management activities		X		X	8:1 (acres acquired off-site: acres impacted)
D Invasive Plant Management Program	Mitigates for one-time sediment removal or 5 years of vegetation management activities to address temporary impacts to wetlands, instream vegetation, and riparian habitat	X		X	X	1.2:1 (area treated: area impacted) (can occur in combination with Riparian Planting and Restoration)
E Riparian Restoration and Planting Program	Mitigates for one-time sediment removal or 5 years of vegetation management activities to address temporary impacts to native-dominated riparian habitat	X		X	X	1.2:1 (area or # of plants planted: area or # of plants impacted) (can occur in combination with Invasive Species Management)
F Tree and Shrub Plantings	Mitigates for impacts due to removal of individual trees and shrubs 6-12" dbh	X		X	X	1:1, 2:1, 3:1 (Trees planted: trees removed. Mitigation ratio determined by tree scoring protocol provided in Appendix C of Mitigation Memorandum)
G Instream Complexity	Mitigates for one-time removal of instream complexity features and/or one-time impacts to "high quality" instream habitat	X		X	X	1:1 (area or # of features restored: area or # of features impacted)
H Gravel Augmentation in Steelhead Creeks	Mitigates for one-time removal of "high quality" gravels in an area greater than 100 sq-ft	X		X	X	1:1 (acres or sq-ft restored: acres or sq-ft impacted)
BI O Species Targeted Restoration/ Mitigation	Mitigates for impacts to species and/or associated habitat. On a case-by-case basis, may also be	X (as needed)			X	As needed, per permit requirements

Table 8. Summary of Mitigation Approach for Sediment Removal and Vegetation Management Impacts in New Work Areas (2012-2022)

Mitigation Type	Mitigation Purpose	Implemented:		Mitigation Location:		Mitigation Amount or Ratio
		Annually	Program Period	Onsite	Offsite	
	adequate to provide either one-time or in-perpetuity mitigation for non-species related habitat impacts (e.g., general impacts to wetlands, instream vegetation, and riparian habitat).					

Note (a) - because this mitigation is primarily species-targeted, it is described below in Section 6, rather than above in Section 5. However, it has been included in this table because of the general benefits it would provide to aquatic habitat in addition to steelhead.

6. Species-Targeted Habitat Mitigation

In addition to the mitigation described in Section 5 for sediment removal and vegetation management, mitigation will be provided to compensate for impacts to individual special-status species resulting from SMP activities. The species for which compensatory mitigation will be provided, and the form that this mitigation will take, is identified in the current 2012 SMP Update SEIR and will be further refined in BOs for the 2012 SMP Update to be issued by NMFS and USFWS and the ITP to be issued by DFG.

Although SMP activities could result in adverse effects on both individuals and habitat of special status species, mitigation will focus on improvement and/or protection of habitat for these species with the goal of increasing the abundance, productivity, and/or survivorship of individuals, commensurate with the magnitude of the impact. For potentially affected species, the type of mitigation sought will depend on the nature of the impacted habitat (e.g., whether it involves breeding or foraging habitat), the extent of mitigation required, and suitable mitigation locations. The specific mitigation qualities will be linked closely to the functions and values of habitat that are impacted by SMP activities. The 2012 SMP Update SEIR, the BOs from NMFS and USFWS, and the ITP from DFG will be used to refine the criteria, metrics, and/or ratios necessary to provide mitigation, but any refinements will result in mitigation measures being equally or more effective.

To the extent feasible, habitat mitigation for impacts to individual special-status species will dovetail with mitigation efforts to address impacts to wetlands and riparian habitats as described above. Ideally, a given set of mitigation actions can be performed and integrated to compensate for effects on multiple sensitive habitats and resources. Integrating mitigation solutions into joint projects is an efficient approach and provides multiple benefits. For example, riparian habitat restoration along a South County creek may provide compensation for temporary impacts to both riparian habitat and Least Bell's vireo habitat. Similarly, instream complexity or gravel augmentation (described below) activities along a steelhead creek may help address wetland impacts and/or temporary impacts to steelhead. In other instances, however, species-specific mitigation (such as compensatory mitigation for impacts to serpentine species) would not overlap with mitigation provided for impacts to regulated habitats such as wetlands and riparian habitats. In such cases, species targeted mitigation would be planned and implemented independently of other mitigation projects.

The District is in consultation with the USFWS, NMFS, and DFG regarding take approval for impacts to listed species. During these consultations, the District is providing the projected locations, extent, and (where necessary) frequency of impacts to listed species, as they are currently known. The actual locations, extent, and frequency of impacts may differ somewhat from those that are currently projected and described in the Biological Assessments and ITP application; for example, implementation of impact avoidance and minimization, and implementation of specific BMPs, may reduce impacts from those currently projected. As a result, the precise impacts to special-status species, including listed species for which incidental take approval is being sought, will be identified on an annual basis.

During these consultations, the District is also coordinating with each agency regarding the approach to providing mitigation for take of individual listed species, based on each agency's requirements and

standards. The general approach to providing mitigation, in terms of the ways in which mitigation requirements are calculated and the type of mitigation provided (e.g., gravel augmentation and instream habitat complexity for steelhead; habitat preservation, enhancement, and management for other listed species), will be consistent with that described in the EIR. However, the District acknowledges that individual agencies may differ in terms of their requirements. Therefore, details of species-targeted mitigation requirements will be described in the BOs and the ITP.

The specific extent of species-targeted mitigation that would be needed to off-set maintenance activities in a given year will be identified annually using the previously developed criteria, metrics and/or ratios, based on the annual workplan and the specific species and habitats that would be affected. Anticipated impacts to habitat of individual species, and appropriate mitigation, would be identified annually in the NPW. Mitigation would then occur within that maintenance year, to the extent feasible. At year's end, the amount of mitigation provided would then be compared to the actual impacts and resulting mitigation requirements in the PCR to determine whether additional species-targeted mitigation would need to be provided the following year or whether there is excess mitigation that can be credited toward a subsequent year's impacts. However, if mitigation requirements for special-status species can be estimated farther in advance, there is likely some economy of scale that would be realized from pursuit of species-targeted mitigation that would compensate for SMP impacts occurring over two or more years. For example, habitat acquisition, preservation, and/or enhancement may be easier and less costly (on a per-acre basis) to plan and implement over a larger area than over a number of smaller areas. Using larger, consolidated mitigation areas may enable more efficient mitigation planning over several years. In these cases, either annual or multi-year mitigation activities would be identified. In this scenario, species-specific impacts and mitigation would still be tracked and accounted for annually. If a "mitigation credit" exists because the District previously purchased or established a larger mitigation area than previously needed, then the District will track the "mitigation account" through the annual SMP reporting processes (NPW and PCR) and relay this information to overseeing agencies.

The District is seeking incidental take approval from the DFG for Almaden-Calero Canal maintenance, but due to FESA consultation requirements regarding interrelated activities associated with the use of this canal, maintenance along this canal is not included in the FESA consultations. The District may seek to include Almaden-Calero Canal maintenance as a covered activity in the Santa Clara Valley Habitat Plan (for terrestrial species) and the Three Creeks HCP (for aquatic species) to provide FESA take approval. Coverage under these plans would necessitate payment of in-lieu fees to provide mitigation to off-set take of both state and federally listed species. If Almaden-Calero Canal maintenance is included as a covered activity in these habitat plans, once the plans are adopted, satisfaction of species-targeted mitigation via in-lieu-fee payments or other measures contained in these plans would be used to mitigate impacts of maintenance work along the Almaden-Calero Canal. The District will finalize this approach if/when these other habitat plans are adopted.

Gravel Augmentation in Steelhead Creeks

Instream gravel and coarse sediment along a streambed can be a fundamental habitat element to a healthy functioning stream directly supporting life-cycle needs of fish (including steelhead), amphibians

and other aquatic wildlife. Often, gravel and coarse streambed sediment supply is reduced due to dams or other upstream barriers that trap sand, gravel, and coarse bed materials upstream behind the barrier. In addition to curtailing sediment supply, dams, reservoirs, and other upstream barriers also moderate or reduce the magnitude of stream flows such that natural gravel mobilization and transport processes are diminished. Dams or other facilities reduce flow magnitude and duration resulting in less frequent (or non-occurrence) flows strong enough to mobilize sediments along the channel bed.

The District actively removes sediment from stream channels when an accumulation of sediment reduces floodwater conveyance capacity or prevents a facility or structure from functioning as intended. Additionally, the District removes sediment to facilitate fish passage where sediment accretion has created passage impediments for migration or localized movements of fish. As a result of these efforts, general impacts to channel hydraulics, sediment transport and stream morphology may occur. To ameliorate those impacts and restore stream function, the District will implement projects to provide coarse substrate (sand and gravel) back into the creek.

Gravel augmentation provides direct benefits for improving fish spawning and rearing habitat. Gravel augmentation will be applied to mitigate for instream impacts on spawning and rearing steelhead habitat due to sediment removal activities. The general goal of gravel augmentation projects is to improve fish spawning and rearing habitat by enhancing sedimentary materials within the channel bed.

Comment [srw2]: Deleted Srottenborn

SCVWD can reuse watershed-specific gravels collected through sediment removal activities as a source for the gravel augmentation program. SCVWD would collect, sort, separate, and reuse clean, appropriately-sized gravel. When designing a gravel augmentation project, several factors will be considered, including: the existing channel conditions; the grain size distribution of the sediment to be added; the volume of gravel to deposit; the frequency of gravel addition that will be required in light of sediment transport; how the added gravel will interact with to the existing flow regime and/or channel geometry; and the extent of augmentation effects within the channel reach.

Gravel Augmentation Mitigation Commitment

Gravel augmentation will be provided as a mitigation approach for SMP impacts to Central California Coast steelhead (CCC) and South-Central California Coast steelhead (SCCC) spawning habitat. The approach to identifying high quality gravel sites slated for SMP sediment removal activities that would be potentially suitable for gravel augmentation (mitigation) is described below. This approach was developed in consultation with NMFS staff.

1. Identify Gravel Injection Sites: The District will identify on an annual basis (as needed) potential gravel augmentation project sites based on: existing sediment and habitat conditions at the potential site including the range of sediment textures and suitability to receive additional gravel; site hydraulic conditions and the suitability to receive and transport placed gravel; site bedforms including existing bars and other features and the site's ability to receive and accommodate placed gravels; adjacent or downstream structures and infrastructure and the site's ability to receive additional gravel without increasing the flood risk. In addition to these hydro-geomorphic, flood, and structural considerations, the District will also consider the location and

extent of the District's annual SMP sediment removal activities and resulting mitigation requirements. The annual Notice of Proposed Work (NPW) will include the District's recommended location(s) for potential gravel augmentation, submitted for NMFS review. District SMP staff will coordinate with other District staff involved with other gravel augmentation efforts, and will consider how other gravel augmentation efforts (if any) can be integrated in the SMP area, to ensure that gravel augmentation efforts are complementary, or at least not conflicting.

2. Identify Spawning Gravel Volume Impacts and Mitigation Target: Prior to implementing sediment removal projects involving more than 100 ft² of sediment removal along steelhead creeks, a District fisheries biologist will examine the affected channel reach and perform a visual surface assessment of channel bed sediment conditions. Areas that appear from the surface to contain greater than 40 percent gravel/cobble material (where approximate D50 is greater than 0.75 inches (Kondolf and Wolman, 1993); or the dominant gravel size is between 2-3 inches as described in the CDFG *California Salmonid Stream Habitat Restoration Manual 1998*, Steelhead spawning habitat, pp V-22) would be recorded and the surface area measured. To estimate the volume of spawning gravel impact, a basis of one foot of depth will be used for the gravel patches of appropriate sized sediment as described above. The target mitigation volume will be used to compare gravel augmentation provided as mitigation for sediment removal activities. This information will be provided in the annual Post Construction Report (PCR).
3. Implement Gravel Augmentation: Suitable gravel collected from SMP sediment removal projects would be placed at target locations (per #1 above) by October 15th prior to the onset of fall/winter rainy season. Sediment placement would be based upon:
 - a. The annual gravel mitigation requirement in steelhead creeks (per #2 above), and
 - b. An evaluation of the amount of gravel placement suitable without impeding flood conveyance. The placement of gravels on-site shall be limited so as not to result in an increase to the flood risk.
4. Monitor Gravel Augmentation:
 - a. District staff will monitor the gravel augmentation site, including:
 - i. Visual inspection during the mid-winter season following placement to observe how placed gravels were being integrated into stream channel, transported downstream, or deposited into channel bedforms.
 - ii. Visual inspection following end of first winter season to evaluate channel conditions and how placed gravel was integrated into stream channel, transported downstream, or deposited into channel bedforms.
 - iii. Provide a brief summary of channel conditions and photo(s) of the gravel placement site in the following year's PCR.

Gravel augmentation type mitigation will be implemented within one year following the impact. If less than 100 sq.-ft. of gravel qualifies as high quality, no mitigation is necessary. Mitigation for removal of gravel will not be required for three types of activities: sediment removal performed at fish ladders or

at stream gauges, or for projects that will (in the opinion of the SCVWD fisheries ecologist, with NMFS concurrence) enhance fish passage.

7. Bank Stabilization Mitigation

7.1 General Approach

Stabilizing and repairing eroding stream channel banks and levees is a routine SMP activity. Based on the maintenance work conducted from 2002-2010, the District stabilizes about 0.94 mi of stream channel banks or levees on average per year. While bank stabilization is routine and expected, the specific work locations are not certain until after each winter season. As a result, this type of maintenance (unlike sediment removal and vegetation management) is not a projected work activity. Rather, bank stabilization maintenance needs are assessed annually on an as-needed basis. Site-specific mitigation for bank stabilization projects is also determined on an annual basis depending on the identified work need.

The 2002 SMP Manual included Appendix E *Programmatic Impact Assessment and Mitigation for Routine Bank Protection Activities* (July, 2001) that described the mitigation approach for bank stabilization used during the 2002-2012 program period. The 2002 mitigation approach identified revegetation mitigation ratios of 1:1, 2:1, or 3:1 for treatment impacts depending upon the bank repair technique and the resulting change to the creek ecosystem. Bank repair treatments that used more hardened materials resulted in higher mitigation ratios.

For the 2012 SMP Update, the District has slightly revised and reorganized the list of suitable SMP bank stabilization treatments (Table 9). The general approach to bank stabilization and its mitigation is consistent with the 2002 program. Table 9 identifies the SMP's 13 bank stabilization treatments (and variations), shows mitigation ratios, describes whether the technique uses softscape or hardscape elements, and notes whether the technique requires review by regulatory agencies. The bank stabilization techniques shown in Table 9 are described in detail in the 2012 SMP Manual.

Table 9. SMP Bank Stabilization Methods (2012 SMP Update)

I.D. No.	Method	Mitigation Ratio	Hard-/Softscape	Requires Plan Review by Agencies
1	Earth Repair	1:1	Soft	No
1A	Earth Repair with Buried Rock	1:1	Soft	No
2	Live Construction	1:1	Soft	No
2A	Live Construction with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No

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2B	Live Construction with Log Toe	1:1	Soft	No
3	Contour Wattling	1:1	Soft	No
3A	Contour Wattling with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Soft	No
3B	Contour Wattling with Log Toe	1:1	Soft	No
4	Brush Mattress (Brush Layering)	1:1	Soft	No
4A	Brush Mattress (Brush Layering) with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
4B	Brush Mattress (Brush Layering) with Log Toe	1:1	Soft	No
5	Surface Matting (Erosion Mats)	1:1	Soft	No
5A	Surface Matting (Erosion Mats) with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
5B	Surface Matting (Erosion Mats) with Log Toe	1:1	Soft	No
6	Add Rock to Invert	1:1	hybrid	No
6A	Rock Cross Vanes	1:1	hybrid	No
6B	Root Wads and Boulders	1:1	hybrid	No
6C	Live Log Crib Walls	1:1	Soft	No
6D	Log Revetment	1:1	hybrid	No
7	Cellular Confinement System	2:1	Hard	Yes
8	Rock Blanket	2:1	Hard	Yes
8A	Boulder Revetment	2:1	Hard	Yes
8B	Boulder Revetment with Soil and Vegetation	1:1	hybrid	Yes
9	Articulated Concrete Blocks	3:1	Hard	Yes
9A	Articulated Concrete Blocks with Planted Areas	2:1	Hard	Yes
10	Concrete Crib Walls	3:1	Hard	Yes
11	Sacked Concrete	3:1	Hard	Yes
12	Gunite Slope Protection	3:1	Hard	Yes
13	Earth with Rock Toe on Grass Lined Channels ^a	2:1 ^p	Soft/hybrid	No

(a) Grass lined channels are those where grass is the predominant or sole vegetation, and that contain no significant riparian structure. The NPW submittal will include photographs and descriptions to justify use of this line item.

(b)- No mitigation is necessary if rock toe is placed below bankfull depth and the project includes some instream element of instream complexity (in addition to the toe rock).

The District favors using biotechnical techniques (as appropriate for site conditions) that use soil, vegetation, or other organic materials as a softscape approach to stabilize eroding stream banks. As shown in Table 9, softscape approaches use willow plantings, contour wattling, brush mattresses, root wads, log crib walls, and earthen soil banks to provide the benefits of effective erosion control and natural resource enhancement. When implemented, these softscape approaches are combined with additional vegetation plantings (see Table 7 – riparian planting palette) to enhance the riparian habitat along the bank.

Some of the mitigation ratios shown in Table 9 include lower ratios than the original mitigation ratios from the 2002 SMP EIR. The rationale for lowering some bank stabilization mitigation ratios is rooted in 10 years' experience of the on-going SMP (2002-2011), where it has been observed that the resource values and functions of streambank sites requiring repair and stabilization is typically very low. Bank stabilization sites typically exhibit conditions of unstable earthen erosion, with no vegetation or vegetation of low value (such as early seral invasive vegetation colonizing the destabilized site). District biologists and geomorphologists have observed that historically, bank stabilization sites have had poor baseline conditions due to a variety of reasons including that some sites have been historically prone to bank erosion due to their location and position, hydraulic forces, and poor shear strength of their earthen materials. Based on several years' observations of typically poor quality existing conditions at bank stabilization sites, the District is proposing to use mitigation ratios that more accurately represent the mitigation requirement for the loss of ecologic functions/values due to the maintenance activities.

The District's primary concern is that the relative baseline of functions/values provided at eroded bank sites is lower than justified by the 3:1 mitigation ratios currently in use since 2002 for certain bank treatments. The District considers the eroded bank condition as the baseline condition upon which maintenance and repair will be conducted, and from which the opportunity exists to improve ecologic functions of the site. The proposed revised mitigation ratios, including ratios of 1:5 and 2:1 are more appropriate for the given baseline conditions. It is important to note that not all bank stabilization projects necessarily have negative impacts. Depending upon the situation, some bank stabilization projects result in a net environmental benefit when considering the functions and values of the existing bank condition (baseline) compared to the post project condition. Notably, if left untreated, eroding and destabilized streambanks will generally become progressively more severe with increased erosion and flooding risks. Beneficial bank stabilization projects, particularly approaches that use softscape or biotechnical techniques are typically "self mitigating" and do not require additional revegetation or other mitigation.

Depending on the size, functions, and values of the natural resources developed at the bank repair site, beneficial bank stabilization projects may provide mitigation credit toward future bank protection activities, or if appropriate, provide mitigation for other types of maintenance impacts. The balance of

mitigation credit for bank stabilization activities, including credit that has accumulated during the current program, will be reported by watershed every year in the PCR.

As shown in Table 9, the District does retain hardscape bank stabilization treatments within the SMP for specific locations and conditions which require a higher level of resistance for erosive shear forces. For example, the softscape approaches shown in Table 9 can be combined with selective rock use (typically at the toe of the bank where erosive forces are greatest) to provide added shear strength. The outer bends of channels where flow velocities and shear stresses are greater are also common locations for using hardscape.

The District also acknowledges that certain hardscape techniques shown in Table 9 such as 9 (articulated concrete blocks), 9A (articulated concrete blocks with planted areas), 10 (concrete crib walls), and 12 (gunite slope protection) have had minimal or no application in the SMP since 2002. However, it is the preference of District staff engineers to retain such techniques in the Program in the event that specific hydraulic conditions at a bank stabilization site may require such hardscape approaches.

As stated above, the District's preference and priority is to first consider use of softscape approaches, and only use hardscape where absolutely necessary. As Table 2-3 of the SEIR suggests, softscape or hybrid bank solutions were used by the about District 77% of the time during the 2002-2010 period. As evidenced by the District's past record of prioritizing softscape or hybrid approaches over full hardscape bank approaches (see Table 2-3), having such hardscape techniques available in the SMP does not necessarily lead the District to their use and application.

The District will continue to track and monitor the use of both softscape and hardscape bank stabilization treatments as described below. To further refine the control on the use of hardscape, the program will not install more than 50% of the total area of bank stabilization projects with hardscape. The District will indicate in its annual reporting the type of bank stabilization treatments used according to the hardscape, softscape, and hybrid categories. This means that the total area of all hardscape elements divided by the total area of all bank stabilization projects will not exceed 50%. This calculation results in a percent of hard elements within all bank stabilization jobs, and accurately reflects the proportion of hard and soft methods overall. Calculated in this way, the program in 2002-2010 has installed roughly 20% hardscape.

Where on-site mitigation is not feasible for bank stabilization projects, particularly for lower valued streams, mitigation will be targeted at higher valued streams. The Mitigation Feasibility Assessment (MFA) process is discussed below in Section 7.3.

Where appropriate based on site conditions, the mitigation components described in Section 5 above for sediment removal and vegetation management activities will also be used to support mitigation activities at bank stabilization project sites.

Through the SMP reporting process, the District has submitted annual PCRs to the overseeing permitting agencies since 2002, and this process will continue through 2022. These annual reports document where bank stabilization projects occur, their length, type, mitigation requirement, mitigation

accounting balances, resource inventories conducted, and pre/post construction photographs. The District has also monitored and documented conditions at mitigation sites for bank stabilization projects and reported the quality and status of the mitigation sites. The District provides monitoring reports following years 1, 3, and 5 for selected bank stabilization projects (see Section 8.1 below for more detail).

Mitigation credit from excess riparian planting in watersheds over the first part of the program (2002-2012) has been consistently reported in annual PCRs. This program of apportioning credit to the appropriate locations will continue. The previously accumulated credit will be carried forward into the new program.

7.2 Mitigating for Hardscape

As discussed above, some bank stabilization sites will require hardscape treatments. It is important to note that for the treatments listed in Table 9 with hardscape elements, there is a range of actual hardened features. Some treatments have bio-technical approaches on most of the bank slope, but include a limited amount of rock to protect the toe of the bank. This mixed approach is exemplified by techniques 2A (live construction with boulder toe), 3A (contour wattling with boulder toe), 4A (brush mattress with boulder toe), and 5A (surface matting with boulder toe). Mitigation ratios for softscape solutions that have boulder toe placement are higher if the rock placement does not include plantings between rocks.

Mixed softscape/hardscape approaches enable bio-technical treatments and vegetation on most of the bank slope and are different than other more traditional hardscape approaches such as articulated concrete blocks (9), concrete crib walls (10), sacked concrete (11), gunite (12), and earth repair with buried rock (1A) which create a more uniformly hardened bank environment.

The rock toe used in grass lined channels (13) is specifically intended to provide a more stable solution in grass lined channels with higher flow velocities. Earthen banked projects in grass lined channels have historically been prone to failure. The careful placement of rock at the toe of grass lined bank repairs is intended to make them more successful. Because these channels are often lower biological value, a lower mitigation ratio is proposed for the application of rock in grass lined channels. Application of this method is subject to annual approval.

Revegetation will occur according to the mitigation ratios shown in Table 9. Revegetation requirements are calculated by the square footage of the bank stabilization project. Revegetation plantings will be incorporated into the site as appropriate to the stabilization design and the existing site conditions (see Mitigation Feasibility Assessment discussion in Section 7.3 below). While revegetation is currently used as the predominant mitigation method for bank stabilization sites, the other mitigation approaches described in this memo would also provide mitigation. For the hardened bank stabilization areas that cannot be directly planted, additional mitigation will be necessary. Additional mitigation may also be provided through installing instream complexity features in the channel adjacent to the bank stabilization project (see Section 5.6 above).

Stream functions and habitat values that require mitigation due to hardscape include:

- Loss of instream escape cover provided by undercut banks, large boulders, tree roots, downed trees, and other structural elements; (instream complexity)
- Reduction in hydraulic variation and complexity due to flow interaction non-hardened banks;
- Loss of velocity refuge provided by earthen features along the bank;
- Loss of shading and water temperature moderation provided by mature riparian shrubs and trees; and/or
- Loss of overhanging escape cover provided by shrubs and grasses near the stream edge.

Potential impacts to special status aquatic species are described in the SMP SEIR. As necessary, mitigation to these aquatic species due to bank stabilization projects will be provided through species specific mitigation that will be assessed annually (see Section 6 above).

7.3 Mitigation Feasibility Assessment (MFA) – Revegetation Component

One of the important lessons learned from implementing the SMP during 2002-2010 is that the success criteria for revegetation mitigation projects should carefully consider existing site conditions and constraints. The Mitigation Feasibility Assessment (MFA) process was designed to provide a consistent assessment methodology that can guide mitigation design and success criteria based on what type, degree, and quality of revegetation the site will support.

The MFA process begins with a broad evaluation of the existing conditions at the mitigation site. Depending upon which bank treatment will be used, the target mitigation site may be at the same location where the bank stabilization work will occur, or it may occur at an off-site location. The MFA assessment includes evaluating site hydrology, flow velocity, soils and soil moisture, aspect, slope, adjacent land use, site access, presence of invasives, presence of rare/listed species, maintenance needs, animal damages, human activity, and the potential revegetation design. Based on this assessment the site is categorized as having either a high, medium, or low revegetation potential. Each of these categories is based on the presence or absence of existing opportunities and constraints at the site. Planting species appropriate to the site conditions can promote a more successful and efficient revegetation program. If a site is identified as having poor conditions yet is still desirable to plant, lower success criteria will be established to account for the poorer site conditions. This will enable some replanting prior to seeking off-site mitigation. If the MFA identifies the project location as a highly constrained site, then off-site mitigation will be considered to ensure greater revegetation success.

The MFA process is designed to provide ecologically feasible mitigation success criteria, given site specific conditions and the proposed revegetation palette. The District may support revegetating a highly constrained creek bank that will rarely meet typical success criteria. Therefore, lower success criteria will be allowed to facilitate replanting on ecologically challenging sites. Project sites with fewer constraints will meet standard success measures more easily and will continue to be held to those

higher standards. The MFA approach will be formalized to provide the District with flexibility to revegetate a broader range of sites without committing to futile replanting efforts. The MFA approach is based on the experience gained through planting several constrained bank stabilization sites during the 2002-2012 period.

8. Mitigation Monitoring and Reporting

8.1 Monitoring

This section describes monitoring approaches for the mitigation programs discussed above. The proposed mitigation monitoring and reporting program builds on the existing monitoring program. All monitoring programs are intended to be adaptively managed and implemented in conjunction with input and support from regulatory agencies. Monitoring reports will be provided to the resource agencies.

Monitoring Protocols

Since the SMP inception in 2002 the District has developed surveying and monitoring protocols as part of the routine implementation of the program. The District conducts annual field inspections of their streams to determine the needs for maintenance activities. They track all maintenance activities conducted by stream reach, and all restoration and mitigation efforts implemented to address maintenance impacts. The District maintains an extensive database, including a GIS mapping database, to document and track annual maintenance and mitigation activities. The District's existing monitoring protocols and corresponding databases will meet the monitoring needs of the updates to the mitigation program as described in this memorandum. For proposed new mitigation efforts not directly addressed by an existing monitoring protocol (or entry into the existing database system), the District will expand the database and develop monitoring protocols.

Monitoring requirements for species-specific mitigation projects will be refined as directed by regulatory permit conditions and guidance.

Bank Stabilization Monitoring

Each year in the NPW, the District will identify bank stabilization sites to be monitored in years 1, 3, and 5 after construction. The monitoring sites will include 50% of the bank stabilization sites implemented in the Pajaro Watershed (Central Coast Regional Board) and up to 10 other sites per year from the 4 other watersheds in the Santa Clara Basin (San Francisco Bay Regional Board). Monitoring reports for bank stabilization sites will be submitted for the duration of the program period (2012-2022) for a total of 60 sites and 180 reports in the Santa Clara Basin. This monitoring will include a visual observation erosion conditions upstream and downstream of the site (i.e., 200 feet), conditions of the bank stabilization repair, and conditions of vegetation planting. In addition, 2 sites per year in the Santa Clara Basin will be selected for additional monitoring of peak flows and water levels during storm events. Bank stabilization monitoring reports will be submitted to resource agencies annually.

Duration of Revegetation Mitigation Monitoring

Monitoring revegetation mitigation project sites that involve restoration plantings will be conducted for five (5) years following planting, or until survival (percent canopy cover) success criteria are met. Success criteria will be determined through the Mitigation Feasibility Assessment (MFA) as described above in Section 7.3. Information collected on restoration plantings will include the number and species planted at each site, square footage of area planted, estimated percent canopy cover, number or percent of planted trees and shrubs surviving, and observations on whether recolonization of invasives occurs after removal. Note that percent cover canopy will not be reported likely until year 5 or at which time canopy has developed significantly enough to describe.

Instream complexity and gravel augmentation projects will be monitored annually up to five years, to evaluate and describe their functioning.

Selected bank stabilization projects will be monitored following years 1, 3, and 5 and will be reported on annually. Post construction monitoring efforts will enable the District to evaluate the success of each bank stabilization project.

Success Criteria for Plantings

Success criteria for shrubs and trees planted in riparian areas above bank repair sites will be determined through the MFA process (Section 7.3). In the event of poor plant survival, corrective measures will include replanting to reach the pre-determined success criteria, via the MFA, as needed based on scheduled monitoring activities. Such remedial measures will be monitored for a 5-year period following implementation to ensure that the project is successful. For instance, if remedial activities were taken during the fifth year after project implementation, monitoring of these remedial measures would continue until year 10. If they did not meet success criteria at that point, additional measures would be required or new mitigation would be provided elsewhere should a project not be capable of meeting success criteria.

Success criteria for bank stabilization and riparian planting and revegetation projects are described in the Mitigation Feasibility Assessment implementation document.

Success Criteria for Invasive Plant Management

In areas where the District conducts invasive plant management mitigation activities the District will monitor conditions in years 1, 3, and 5 following mitigation. The success criterion for invasive plant management mitigation will be species specific to ensure the appropriate control method, timing, and frequency. Control work for certain invasive species may require several years of treatment to be effective.

Success criteria will be developed for each site based on site specific conditions and target species. Many interconnected factors go into determining the level of success that can be expected. Each proposal for invasive management will be reviewed annually with permitting agencies and will include the following elements:

1. Description of the target species including the suggestions for an optimal management

approach based on the available published literature and local professional expertise.

2. Discussion of site constraints as certain sites may have limitations in the techniques that can be used for invasive plant management due to regulatory and/or ESA concerns.
3. Discussion of control timeframes and strategies. Different species require different repeat treatments to be effective. Therefore, the success strategy might be laid out over a period of time for difficult to control species.
4. Discussion of site specific success strategies. Adjacent invasive plant populations will have a significant effect on individual site success. It might be desirable to manage an invasive plant at a particular site, but if there is an adjacent invasive population that is off of District property, the potential for success is less. However, it might still be desirable to treat the invasive with a containment strategy. For example, maintaining a pickleweed population with lepidium all around it.

8.2 Mitigation Reporting

Mitigation planning, design, implementation, and monitoring activities will be notified and reported to the relevant permitting agencies through the course of the regular program communications, including submittal of the SMP annual Notice of Proposed Work (NPW) and Post-construction Report (PCR). These reports will include a discussion of mitigation activities associated with the SMP. The District will also annually complete a Wetland Tracker Form⁸ to provide information on maintenance work in wetland locations.

Mitigation information to be included in the NPW will include a description of mitigation activities planned for the coming year including locations, lengths, areas, and other project details. The NPW will also include a schedule for implementing mitigation activities and a statement describing the status of permit approvals necessary to perform the project (if applicable). As needed, reporting for land acquisition and restoration projects will include a description of how the proposed off-site mitigation will address SMP related impacts. Table 10 provides an example summary mitigation notification table that will be included in the annual NPW to identify, notify, and track the given year's proposed mitigation projects.

Permitting agencies will have the opportunity to review and comment on the proposed annual mitigation approach. The annual mitigation activities will be consistent with the mitigation approaches

⁸ *The Wetland Tracker (www.californiawetlands.net) provides free public access to information about the location, size, sponsors, habitats, contact persons, and status of wetland restoration, mitigation, creation, and enhancement projects in the San Francisco Bay Area. It also provides information on the location and condition of wetlands around the state. The San Francisco Regional Water Quality Control Board has integrated the Wetland Tracker into its regulatory process, and completion of the Wetland Tracker form is now a condition for 401 permitting. The Wetland Tracker has been integrated into the wetlands portion of the State Water Resources Control Board.*

and requirements described in this document and the SMP Manual.

Each year, the District will submit a PCR on SMP activities including summary descriptions of the maintenance activities conducted in the past year. The annual report will also include status reporting on the program's mitigation activities, including the submittal of follow up monitoring reports from previous mitigation projects. Table 11 provides an example mitigation summary table that will be included with the annual PCR to identify and track the given year's mitigation projects, as well as the status of other mitigation projects that require on-going reporting. The mitigation activity section of the PCR will include a comparison with success criteria, and describe efforts to meet those criteria. Individual tree replacement planting for the removal of 6-12 inch dbh trees will be reported annually through the PCR.

Reporting requirements will apply according to the duration of monitoring requirements, as described above. Once projects have fulfilled the 5-year monitoring requirement and meet the appropriate success criteria, they would no longer need to be reported in the annual PCR.

Table 10. Example Mitigation Notification Provided in Annual Notice of Proposed Work (NPW)

20XX Project List	Total Project Length (ft)	Total Project Area (ac)	Potential Impact to Freshwater Wetlands ⁹ (ac)	Potential Impact to Tidal Wetlands ¹ (ac)	Potential Impact to Riparian Habitat ¹⁰ (ac)	Potential Impact to Instream Features ¹¹ (ac)	Impacts Covered by 2002 Mitigation Program, or through other land acquisition, or (for vegetation management activities) has location been previously mitigated in last 5 years? (Y/N)	If NO, were Impacts Projected for 2012-2022? (Y/N)	Onsite Mitigation (Type and area restored)	Offsite Mitigation or Acquisition (Type and area restored)
Sediment Removal										
Sed Project 1		0.02	0.02		-	N/A	Y			
Sed Project 2		1.0	1.0	-	-	N/A	N	Y	Invasive Plant Management (1.2 ac treated at 1.2:1 ratio)	
Sed Project 3		0.6	0.3		-	-	N	N, however impacts consistent with CEQA/permit documents (an assessment would be attached for agency review/approval)		Acquisition in-kind preservation/enhancement (0.9 ac at 3:1 ratio)
Sed Project 4		0.75	0.5				N	Y		Acquisition In-kind restoration (0.75 ac acquired at 1.5:1 ratio)
Sed Project 5		0.52	0.5	-		0.02	N	Y	Riparian Planting (0.6 ac planted at 1.2:1 ratio) Instream new LWD feature (0.02 ac at 1:1 ratio)	
<i>Total 2002 Program</i>		0.02	0.02	-	-	-			-	-
<i>Total 2012 Program</i>		2.87	2.3		-	0.32			Invasive Plant Management: 1.2 ac Riparian Planting: 0.6 ac Instream LWD: 0.02 ac	Acquisition in-kind preservation/enhancement: 0.9 ac acquired Acquisition In-kind restoration: 0.525 ac acquired
Vegetation Management¹²										
Veg Project 1		1.0	0.2		0.8		Y	-	-	-
Veg Project 2		2.5	0.5		2.0		N	Y	Riparian Planting (3 ac at 1.2:1 ratio) Individual Tree Planting for removal of trees 6-12" dbh (15 trees planted ⁵)	
Veg Project 3		1.54	0.04		1.5		N	Y	Riparian Planting (1.5 ac at 1.2:1 ratio) Invasive Plant Management (0.348 ac treated at 1.2: ratio)	
<i>Total 2002 Program</i>		1.0	0.2		0.8				-	-
<i>Total 2012 Program</i>		4.04	0.54		3.5				Riparian Planting: 4.5 ac Invasive Plant Management: 0.6 ac treated Trees planted (15)	-

⁹ Wetland Impacts include: Aquatic, Herbaceous, and Sediment wetlands, as projected in impact Tables 5 and 6 for tidal and non-tidal stream reaches.

¹⁰ Riparian Habitat Impacts include: Woodland, Herbaceous (non-wetland), and Shrub impacts, as projected in impact Tables 5 and 6 for tidal and non-tidal stream reaches.

¹¹ Instream Features include presence of "high quality" large woody debris, deep pools, cobble/boulder features, and potential spawning gravel, as determined according to the protocols described in Section 5.6 and 6 (gravel augmentation discussion).

¹² Vegetation management activities requiring mitigation are: herbicide application, hand removal, discing, mowing, and hand pruning.

⁵ Replacement tree planting based on mitigation requirements/ratios described in Appendix C, *Tree Scoring for Removal of Trees and Shrubs*

Table 11. Example Annual Mitigation Tracking Provided in Annual Post Construction Report (PCR)

20XX Mitigation Project Types	Mitigation Project Name	Description	Total Onsite Mitigation Completed	Total Offsite Mitigation Completed
Land Acquisition (in-kind preservation/enhancement)	Project 1	Covers Stream Reaches A1 and A2		0.9 ac
Land Acquisition (in-kind restoration)	Project 2	Covers Stream Reach B3		0.525 ac
Land Acquisition (watershed lands out-of-kind)	NA	NA		
Invasive Plant Management Program	Creeks X and Y	Blackberry removal	1.8 ac	
Riparian Planting and Restoration	Creeks R and S	Native XX species planted	4.5 ac	
Tree Planting	Creek M	Native XX tree species planted	15 trees	
Instream Complexity	Creek T	New LWD Structure	0.2 ac	

Ongoing Monitoring of Mitigation Projects (2012 – current)	Project Name	Description	Monitoring Year	Comments
Invasive Plant Management Program	Creek X	Blackberry removal and revegetation conducted in 20XX	1 of 5	
	Creek XX	Arundo removal and revegetation conducted in 2014	3 of 5	Site in good condition
	Creek XXX	Blackberry removal and revegetation conducted in 2012	5 of 5	Site meets success criteria
Riparian Planting and Restoration	Creek R	Native XX species planted	1 of 5	
	Creek S	Native species planted at bank stabilization project XX	1 of 5	
	Creek XXX	Native XX species planted	3 of 5	5 plants required replanting
Tree and Shrub Planting	Creek M	Native XX tree species planted	1 of 5	
Instream Complexity	Creek T	New LWD Structure	1 of 5	