

Purpose

The purpose of the Novato Watershed Program is to identify opportunities to integrate flood protection goals with creek and wetland restoration elements. This process includes evaluating alternatives that would reduce flood protection maintenance costs and impacts and be resilient to sea level rise. This first phase of work would produce a unified hydrology and hydraulics model to evaluate alternatives and a Geographic Information Systems based database to identify restoration opportunities. Once the multi-benefit alternatives are identified, it is anticipated a revenue measure would be proposed to fund implementation. This work would also support efforts to secure grant funds.

Background

In 2006, the Marin County Flood Control District completed the final phase of a 15 year, multi-phase flood control project that provides protection from the 50-year storm event along the lower reaches of Arroyo Avichi, Warner, and Novato Creeks. The floods of 2006 revealed that additional work along lower Novato Creek could reduce potential flooding impacts to Nave Gardens and downtown Novato. During the 2006 floods, downtown Novato would have experienced flooding had the levee at Deer Island basin not been breached. Flood protection in downtown Novato is currently predicated on an expensive sediment removal program that must be performed every four years within a 1.2 mile reach of lower Novato Creek at a cost of \$1M+. This approach is not economically or ecologically sustainable and this watershed program process seeks to reduce the scope and frequency of this sediment removal while maintaining the level of flood protection. This program seeks to provide the County and its partner agencies, City of Novato, North Marin Water District and the Novato Sanitary District, with alternatives that reduce sediment input from upstream sources and rely on the inherent ability of Novato Creek to scour its channel and transport more sediment to the Bay.

Bank erosion along Novato Creek is extensive above Grant Avenue. This reach exhibits active erosion and many property owners are requesting a comprehensive approach to stabilization work. This study would provide the modeling tools to assess long term solutions that are consistent with work completed to date and that would improve habitat conditions.

Stakeholder Outreach

The watershed program will utilize a collaborative, iterative process to develop an integrated flood protection and habitat restoration program. The Marin County Board of Supervisors recommended establishing stakeholder committees at three levels to support community outreach and to provide overall program direction (*a complete list of committee members is included at end of this document*). A broad community outreach program is also recommended.

Community outreach will be developed around these key messages:

- Working at the watershed scale acknowledges the mutually dependent interactions and linkages between our ridgetops, the valley floor, creeks, wetlands and San Pablo Bay.
- The watershed approach acknowledges the need to work collaboratively to identify solutions to reducing flood hazards, maintain local water supply, recycled water operations, and improving fish and wildlife habitat.
- Implementation at the watershed scale takes time and is implemented in tandem with both public and private projects and the maintenance and rehabilitation of aged existing infrastructure.

Description of Watershed Stakeholder Committees

Policy Advisory Committee - This group of elected officials is comprised of the District County Supervisor, two representatives from the participating city council and the Board of Directors of the participating agencies. This committee provides policy input on program direction and community issues and will meet 1-2 times per year.

Operations and Finance Committee - The participating District managers and/or city manager and the Marin County Public Works director will use these meetings to evaluate progress and prioritize funding strategies and will meet 3-4 times per year.

Technical Working Group (TWG) - This group will include staff of participating State, Federal and local regulatory and participating agencies and community members with a science and technical background. The group will be responsible for the review of watershed products and provide input on issues, needs and watershed priorities. This group will include conservation and watershed groups, homeowners' associations and other technical experts within their respective watersheds. This group will meet at least quarterly to provide input and to review the development of work products

Community Outreach

Targeted community meetings, presentations at various local boards and homeowners associations and utilization of the watershed program website (www.marinwatersheds.org) will support communication to the community at large. The program website provides dedicated information about the watershed and is regularly updated with notices about workshops, meetings, proposals and projects.

Project Description and Outcomes

Novato is home to the Flood Control District's largest flood control zone and the largest flood control project in the County was completed in 2006. In Novato, the District has commitment and financial support from all the agencies representing flood control, stormwater, water supply and recycled water as the County of Marin, the City of Novato, North Marin Water District, and the Novato Sanitary District have agreed to partner on this process. However, infrastructure in the lower reaches is aging, the lower channel must be dredged every four years at a cost of \$1 million, bank erosion is extensive on the main stem of Novato Creek and the 1984 flood fee sunset years ago. Currently, the District collects maintenance fees (\$9/parcel for single family homes) that generate about \$250,000 annually. This fee was approved by the voters in 1984 and is scheduled to be collected in perpetuity.

This program will seek opportunities watershed wide to improve our operations and maintenance in a manner that is informed by sea level rise projections while we identify alternatives that would improve the creek's ability to transport sediment to the bay. The process considers the restoration of watershed health and function as a basic tenet to ensure our projects are eligible for the broadest range of funding at the State and Federal levels.

This phase of the program will produce planning tools to guide the development of viable flood reduction alternatives:

- **Hydrology and hydraulics (H&H) study**
This deliverable will provide a unified hydrology and hydraulics model of Novato Creek and limited major tributaries, storm drain modeling for the Nave Gardens neighborhood, hydrologic modeling of the Novato Creek watershed and the development of conceptual project alternatives modeled for their benefits (including sea-level rise scenarios), Technical input will be provided via the technical work group. A RFP was released in October. We received 11 proposals and have short listed four. **Status: Contract awarded to KHE (Kamman Hydrology & Engineering)**
- **Alternatives Analysis**
This deliverable will provide criteria and evaluation of three alternatives that support multiple benefits such as flood protection, water quality improvements and habitat restoration.
- **GIS-based mapping and database development**
Staff will use existing GIS data (publicly-owned parcels, existing creek restoration sites, STRAW sites, stream data, fishery data) to develop a watershed-scale database and maps to assist with project prioritization. **Status: Ongoing**

Draft Schedule

2012

February: Consultant team begins Novato Watershed H&H Study work

March: Existing survey data review begins

April: Data collection and review; geomorphic and sediment assessment to support hydraulic model development

June: TWG meeting #3 to introduce consultant team and scope of work

October: Hydrology model development

November: TWG and Advisory Board meetings

December: Hydrology model developed

2013

February: TWG and Advisory Board meetings

April: Nave Gardens Storm Water Management Model (SWMM) developed; Opportunities and Constraints memo

Expenditures

Watershed Hydraulic Study and Alternatives Analysis	\$300,000
Surveying	\$100,000
HEC-HMS Hydrology Model	\$100,000
Creek habitat assessment	\$100,000
Outreach and Stakeholder process	\$80,000
Total	\$680,000

Revenue

County of Marin	\$340,000
City of Novato	\$140,000
North Marin Water District	\$100,000
Novato Sanitary District	\$100,000
Total:	\$680,000

List of committee members

Policy Advisory Committee (PAC)

Supervisor Judy Arnold
Novato City Council: Jeanne MacLeamy
North Marin Water District: Rick Fraithe and Jack Baker
Flood Zone 1 Advisory Board: Ernie Ganas and Dietrich Stroeh
Novato Sanitary District Board members (*tbd*)

Operations and Finance Committee

Chris DeGabriele, General Manager, North Marin Water District
Beverly James, Manager-Engineer, Novato Sanitary District
Michael Frank, City Manager, Novato
Craig Tackabery, Assistant Director of Public Works, County of Marin

Technical Working Group

City of Novato: Public Works Jason Nutt
North Marin Water District: Drew McIntyre, Chief Engineer
Novato Sanitary District: Sandeep Karkal
Flood Zone #1 Advisory Board: Bill Long
Marin County Flood Control District: Tracy Clay, Pat Balderama
County of Marin Community Development Agency: Tom Lai
State Coastal Conservancy: Tom Gandesbery
Marin County Open Space District: Mischon Martin, Elise Holland
Friends of Novato Creek: Sue Lattanzio
Bel Marin Keys Community Service District: Carey Parent
Marin Conservation League: Susan Stompe
UC Cooperative Extension: David Lewis
Marin Sonoma Mosquito Abatement District: Erik Hawk
Novato Creek Homeowners: Gerry Godwin
State and Federal Resource agencies: Army Corps of Engineers, BCDC, Regional Board, Department of Fish and Game

Draft Schedule

2013

May: TWG and Advisory

Board meetings

June: Hydraulic model

developed; Proposed

Community Meeting

July: TWG meeting

August: Conceptual

alternatives development;

Advisory Board and

Community meetings

November: TWG and

Advisory Board meetings

December: Hydraulic

modeling of alternatives;

Draft Alternatives

Assessment Report;

Community Meeting

2014

January: Final Novato

Watershed Hydraulics Study
and Alternatives Analysis

Watershed staffing

Roger Leventhal, Associate Engineer

- Project Manager, manages KHE (consultant) hydraulics study, develop hydrology model for Novato Creek Watershed. Responsible for review of hydraulic modeling products and for providing input into the development of alternatives.

Chris Choo, Senior Planner

- Manage contracts and track consultant budget. Coordinate meetings with Technical Working Group and public outreach through the website.

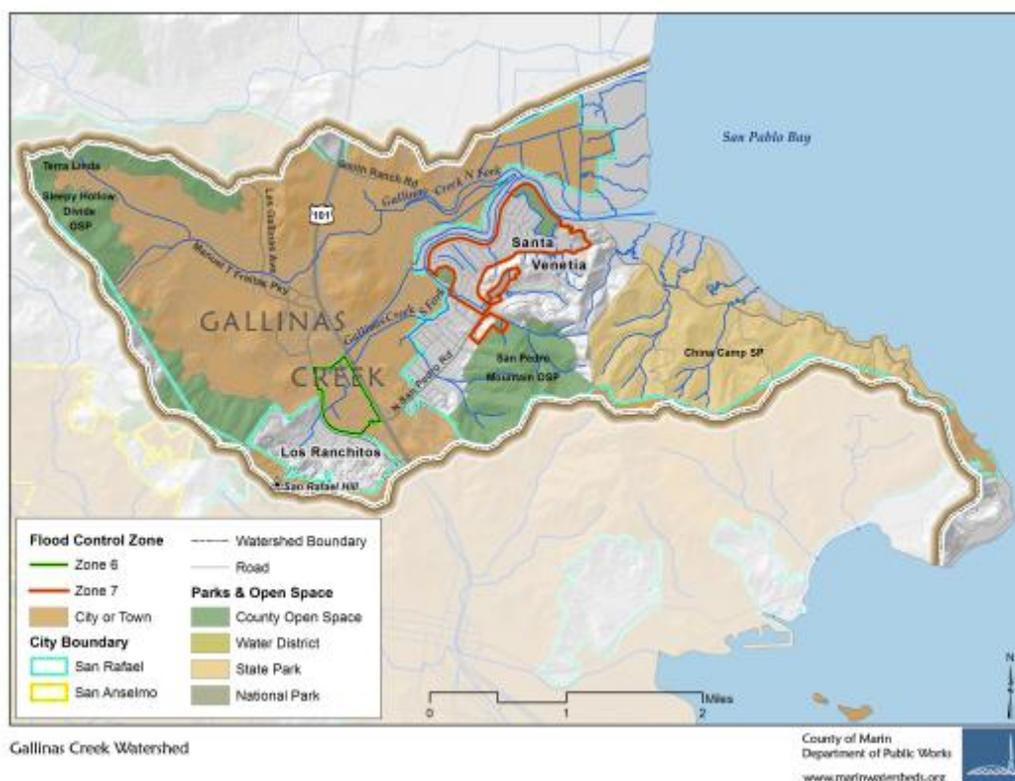
Laurie Williams, Senior Planner

- Develop GIS database to support project planning and prioritization. Work with contractors to provide DPW data and to incorporate contractor datasets into Public Works databases. Prepare maps for website and stakeholder meetings.

Liz Lewis, Principal Planner

- Manage overall schedule, deliverables, and budget and coordinate communication with partners and County Departments. Coordinate financial strategy with partners.

DRAFT



Purpose

The Board of Supervisors authorized the Department of Public Works to begin implementation of a County-wide Watershed Program on May 13, 2008. The purpose of the Watershed Program is to provide a framework to integrate flood protection and environmental restoration with public and private partners to protect and enhance Marin County's watersheds. In the Las Gallinas Creek Watershed, this program would seek to identify opportunities that provide the following benefits:

- Develop cost effective solutions to reduce flooding damages that threaten communities, local economies, and public services
- Improve navigational access to lower Las Gallinas Creek
- Protect, enhance and restore sensitive creek and wetland habitat and water quality
- Identify multi-benefit type projects that will improve the County's ability to compete for State and Federal funding
- Identify projects that are resilient to sea level rise
- Evaluate the beneficial re-use of dredged material for wetland restoration, levee maintenance and shoreline protection within lower Las Gallinas and Miller Creeks
- Reduce ecological impacts of flood maintenance activities

The Las Gallinas watershed program would identify and describe the recommended watershed improvement measures and provide details on project feasibility, sequencing, preliminary costs and funding strategies. It is anticipated that some type of revenue measure will be required to implement the recommended measures.

DRAFT

Background

The 5.6 square mile Gallinas Creek watershed has two main drainage basins. The north fork is the larger of the two drainages and flows from the ridgeline through Santa Margarita Valley and the community of Terra Linda to its confluence with South Gallinas Creek near McInnis Park. South Gallinas Creek is fed by several small tributaries that originate in the San Rafael Hills and San Pedro Ridge and flow through the communities of San Rafael Meadows, Los Ranchitos and Santa Venetia.

Las Gallinas Creek – North Fork

During the construction of the Terra Linda housing development in the late 1950s and 60s, portions of Gallinas Creek and its tributaries were channelized and lined with concrete. Prior to the construction of the concrete channel, the Freitas family reported steelhead using the large pools in the creek. No steelhead have been observed in the upper reaches of Gallinas Creek since the channel was straightened and lined with concrete. The concrete lining of Gallinas Creek generates high water temperatures, which leads to excessive algal growth and poor water quality entering the Gallinas Creek Slough.

Moving downstream of Highway 101, development becomes progressively denser, with the lowland areas east of Highway 101 supporting neighborhoods, industrial and commercial development. Portions of these lowland areas are within FEMA's mapped 100 year flood plain. While these areas may not have been impacted from the floods of 2005/06, sea level rise poses a potential threat to this area. There have been local efforts to restore wetlands in this area. Audubon completed a small wetland restoration project on State Lands during the 1990s. The north fork of Gallinas Creek joins the south fork at McInnis Park.

Las Gallinas Creek – South Fork

There are two designated County Flood Zones that drain to the south fork of Gallinas Creek: Flood Zone #6 and Flood Zone #7.

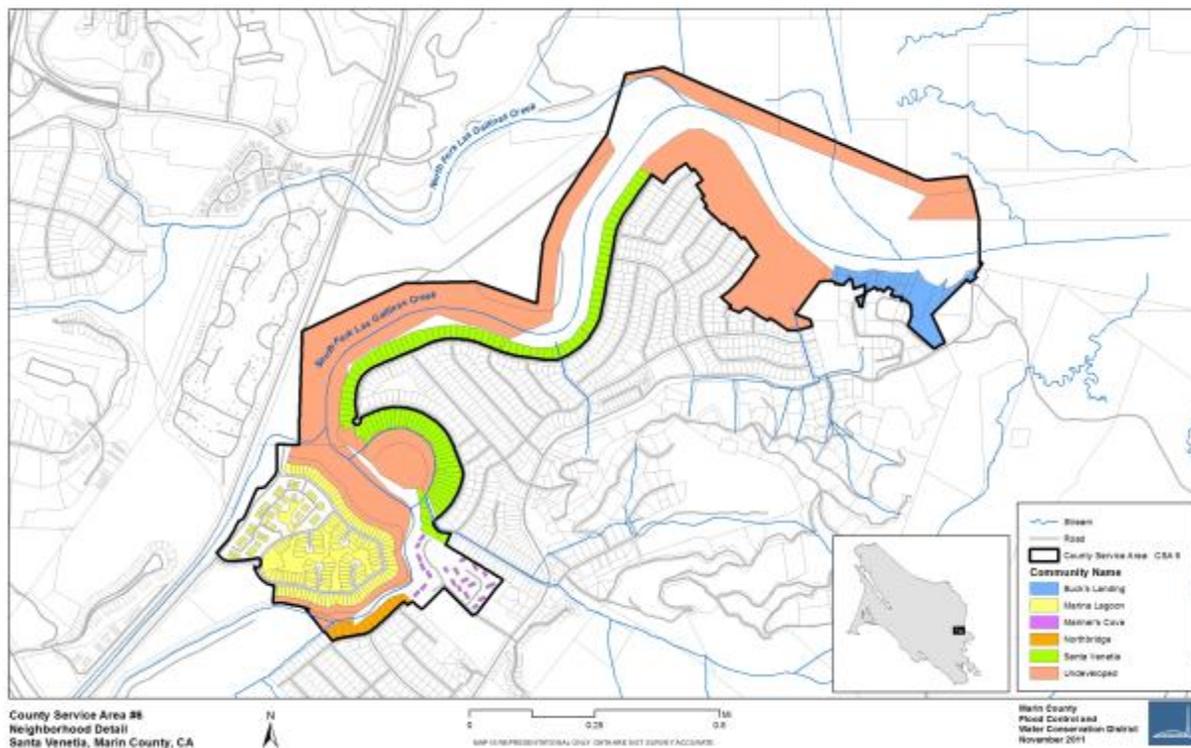
Flood Zone #6 was established after construction of the San Rafael Meadows subdivision in the 1960s. This is a very small zone located just west of Highway 101 across from the County Civic Center. Houses were built in a low-lying area and experienced frequent flooding until improvements were made. In the early 2000s, during the construction of a new subdivision project a majority of the stormwater causing the flooding was rerouted around the community thereby eliminating a significant cause of flooding in the zone. Moreover, the Flood Zone #6 area was annexed by the City of San Rafael. The City now owns and is responsible for the maintenance of the Zone's drainage facilities.

Flood Zone #7 is comprised of the unincorporated community of Santa Venetia, east of 101 along San Pedro Road. Santa Venetia was one of the first developments in Marin County to be constructed on fill over bay mud and occurred in an era before the County had the authority to regulate or control development. Due to the low initial elevation of the fill and the compressible nature of the underlying bay mud, the area has subsided and is now below the high tide level. To protect themselves from tidal flooding of Las Gallinas Creek, the residents of Santa Venetia formed Flood Control Zone #7 in 1962. The annual maintenance program for facilities includes pump stations and levees, as well as other drainage facilities in the Zone.

Though the Santa Venetia neighborhood did not flood during the 2005 New Year's Eve storm, sea level rise, land subsidence and aging infrastructure remain key flood protection challenges. Stormwater is collected via pipes and discharged into Las Gallinas Creek via a series of five pump stations. Four million dollars of potential flood protection improvements have been identified within Santa Venetia alone. The most pressing identified infrastructure need in Santa Venetia is the replacement of Pump Station No.2. It is recommended that the

DRAFT

pump be rebuilt to improve its reliability and to increase its pumping capacity to handle the 100-year storm event (It currently can handle flows up to the 10-year event.) A special election was held in 2010 to fund flood protection improvements in Flood Control Zone 7 including the replacement of Pump Station No. 2, improvements to Estancia Ditch, and additional levee studies. The tax measure was not approved. The District is now investigating the feasibility of pursuing revenue sources for the replacement of Pump Station No. 2.



County Service Area No. 6 in the Las Gallinas Watershed

Homeowners along the tidal reaches of Gallinas Creek also desire creek access and a navigable channel. The community formed CSA #6 (see figure above) in the 1960s to dredge the channel for navigation and flood protection. The community is working to raise the funds to perform another round of maintenance dredging. Preliminary plans and cost estimates have been developed. The estimated dredging construction costs exceed funds available and will require additional funds to implement.

Mouth of Las Gallinas Creek

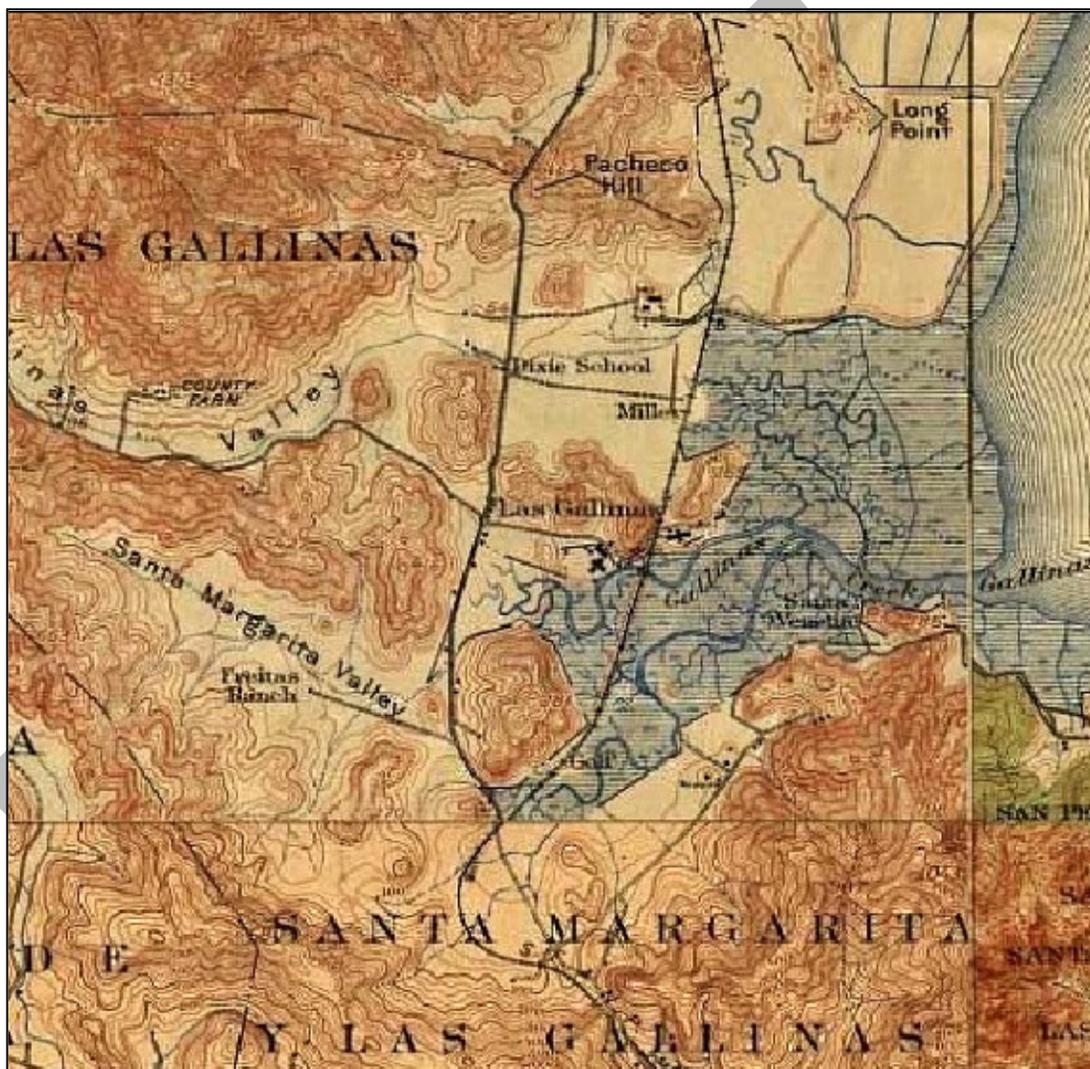
The mouth of Las Gallinas Creek is bordered by County and State Park lands. The beneficial re-use of sediment from the dredging of Las Gallinas Creek could be used to restore diked baylands to functional tidal marsh. The Army Corps of Engineers prepared a preliminary restoration plan for the McInnis Park Wetland Restoration Project in 2001, under Section 206 WRDA 1996 as an element of the San Pablo Bay Watershed Restoration Plan. Suggested restoration actions include levee breaching, marsh plain and channel grading and invasive species removal.

Tidal marsh restoration in the Gallinas Creek system would restore ecosystem function and processes, as well as provide critical habitat for the endangered California clapper rail and salt marsh harvest mouse. The opportunity exists to evaluate alternatives that could improve any project's resiliency to predicted sea level rise scenarios.

DRAFT

Miller Creek – Baylands

The tidal reaches of lower Miller Creek, which shares its outlet to San Pablo Bay with Las Gallinas Creek will be considered as part of the Gallinas Creek Watershed Program study area. Historically, Miller Creek discharged out onto a large flood plain without a clear channel connection to the bay. In the 1920s, Miller Creek was rerouted, channelized, and leveed to provide space for agricultural fields. The current alignment rerouted the creek to the south and placed it into a narrow, leveed channel with two 90-degree bends before reaching San Pablo Bay. Las Gallinas Valley Sanitary District uses the creek as their discharge point during winter months at the downstream bend. Because these two creeks share a floodplain along San Pablo Bay, a concurrent planning effort to evaluate sediment movement, tidal prism and tidal marsh restoration is practical, sensible, and cost-



effective.

Historical map of the wetlands at the mouths of Gallinas and Miller Creeks

Stakeholder Outreach

The watershed program will utilize a collaborative, iterative process to develop an integrated flood protection and habitat restoration program. The Marin County Board of Supervisors recommended establishing stakeholder committees at three levels to support community outreach and to provide overall program

DRAFT

direction (*a complete list of recommended committee members is included at end of this document*). A broad community outreach program is also recommended.

Community outreach will be developed around two key messages:

- 1) The watershed approach is the practical and desired alternative to identifying cost effective solutions for improving flood protection; and
- 2) Implementation at the watershed scale takes time and does not take precedence over the maintenance and rehabilitation of aged existing infrastructure.

Description of Gallinas Watershed Stakeholder Committees

Policy Advisory Committee - This group of elected officials is comprised of the District County Supervisor, two representatives from the participating city council and the Board of Directors of the participating agencies. This committee provides policy input on program direction and community issues and will meet 1-2 times per year.

Operations and Finance Committee- The participating District manager and/or city manager and the Marin County Public Works director will use these meetings to evaluate progress and prioritize funding strategies and will meet 3-4 times per year.

Technical Working Group- This group will include staff of participating State, Federal and local regulatory and participating agencies and community members with a science and technical background. The group will be responsible for the review of watershed products and provide input on issues, needs and watershed priorities. This group will include conservation and watershed groups, homeowners associations and other technical experts within their respective watersheds. This group will meet at least quarterly to provide input and to review the development of work products

Community Outreach

Targeted community meetings, presentations at various local boards and homeowners associations and utilization of the watershed program website (www.marinwatersheds.org) will support communication to the community at large. The program website provides dedicated information about the watershed and is regularly updated with notices about workshops, meetings, proposals and projects.

Program Description and Outcomes

The Watershed Program will build upon existing studies and develop new analytical tools to evaluate and quantify the extent of flooding and to evaluate the range of proposed solutions. This process will be summarized in a final report. The final report will also include recommendations on how to leverage local funds to attract State and Federal grant funds. The final report will provide an assessment of and describe the type of local revenue measures that could support project implementation.

The following is a description of the proposed tools and outcomes. An excellent overview of existing conditions and relevant studies is available at www.marinwatersheds.org.

Analytical Tool Development

The District has identified the general causes of flooding within the watershed but focused modeling and analysis will provide the ability to refine the engineering analysis required to develop conceptual designs for improvements and to get a better idea of the costs associated with implementation.

DRAFT

The following tools will assist with the identification and review of a range of alternatives:

Hydrology and hydraulics models - An understanding of how much water is moving through the watershed (hydrology), how fast it moving and where it is going (hydraulics) is critical to quantifying flooding impacts and identifying solutions. The development and use of computer models to quantify stormwater runoff and channel flow are the industry standard used to describe flooding. These modeling tools will allow us to identify areas that need increased flood protection and to understand how channel and floodplain modifications will influence the ability of the channel to carry flood flows.

Flood Zone 7 is actively engaged in a process with the Army Corps of Engineers (ACOE) to evaluate the levees that protect Santa Venetia. As part of this evaluation, the ACOE developed the following types of models:

- A hydrology model that develops flood flows from the watershed into the north and south forks of Las Gallinas Creek.
- A hydraulics model for the south fork of Las Gallinas Creek that evaluates both tidal and creek water surface elevations under flood flow conditions
- In addition, the Corps performed an evaluation of direct coastal flooding impacts under current and 50-year sea level rise conditions

Additional model refinements may be driven by the alternatives analysis.

In addition to the creek channel models described above, there are also specific stormwater models to evaluate flow in low-lying developed areas where the majority of flow is routed via roads and a storm drain system to stormwater pump stations. This type of model could be useful for evaluating storm flows in Santa Venetia because flood control practices rely on an underground storm drain system, pump stations and three direct stormwater bypasses to deliver runoff to Las Gallinas Creek. A stormwater drainage system model for Flood Zone #7-Santa Venetia could improve the efficiency of pump operations by providing information on pumping capacity and to evaluate the optimal distribution of flows to the five pump stations. This type of modeling would also evaluate stormwater pipe capacity and identify constriction points.

At the end of this phase, we will have a watershed based hydrology and hydraulics models of Las Gallinas Creek and limited tributaries that will allow us to review conceptual project alternatives for their benefits including an evaluation of sea-level rise scenarios.

Schedule

2012

Jan: Meeting with Supervisor Adams to present Outreach Strategy
Staff begins to implement outreach strategy

Meetings with stakeholders

Feb: Flood Zone Advisory Board meeting

SVNA community meeting

May: Flood Zone Advisory Board meeting

July: Initiate watershed specific studies

Aug: Technical Work group meeting #1

Technical work group meetings and watershed related work thru Dec 2013

DRAFT

Geomorphic and Sediment Assessment in Tidal Areas - Levees bordering lower Las Gallinas and Miller Creeks have greatly reduced the tidal prism (volume of water that moves in and out on each tide cycle) thereby reducing the ability of the channels to transport sediment out of the system. This has resulted in sediment deposition in the tidal reaches of the creek and a loss of depth for boating access. This assessment will seek to identify a channel width and alignment that maximizes the creek's ability to transport sediment to the Bay based upon geomorphic analysis of similar systems in the Bay. This information will be used to inform future creek dredging needs and extent of dredging. It will also benefit management of sediment flow to better protect sewer plant infrastructure and outfalls.

GIS-based mapping and database development- A geographic information system database will be developed to evaluate opportunities to restore creeks and wetlands. Existing data will be used to develop a watershed-scale database and maps to assist with project prioritization.

Conceptual Alternatives Development

One of the primary goals of this watershed program is to identify cost effective alternatives for maintaining or improving the level of flood protection. Utilizing the tools developed through the watershed program the District and the community will be able to evaluate a range of alternatives to identify practical and sustainable projects. The models will be used to analyze and develop the full range of feasible measures consistent with the program goals. Preliminary costs, flood protection benefits and habitat impacts and/or enhancements will be clearly identified through this process.

The watershed approach considers the development of multi-benefit projects as a basic tenet to ensure that project priorities are eligible for the broadest range of funding at the State and Federal levels.

Final Report

This document will describe the identified alternatives and documentation for each. Maps and graphics will support this analysis and the report will include recommendations and process for pursuing implementation, establishing priorities and funding.

Program Budget

Expenditures	Cost
Calibration of USACE Hydrology Model	\$20,000
Surveying	\$45,000
GIS Mapping	\$10,000
Hydraulic modeling	\$40,000
Stormdrain modeling (<i>Santa Venetia only</i>)	\$60,000
Geomorphic/Sediment Study	\$40,000
Alternatives analysis	\$60,000
Final Report	\$45,000
Project Management	\$25,000
<u>Stakeholder Outreach</u>	<u>\$27,500</u>
Total	\$392,500

DRAFT

Revenue

County of Marin	\$80,000
City of San Rafael (<i>proposed</i>)	\$80,000
Flood Zone 6	\$12,500
Flood Zone 7	\$80,000
CSA 6	\$60,000
Las Gallinas Valley Sanitary District	\$80,000
Total	\$392,500

Status of Local Agency Participation

To date we have received commitment and financial support from the following agencies:

- County of Marin
- Las Gallinas Sanitary District
- County Service Area 6
- Flood Zone 6
- Flood Zone 7

We are still pursuing commitment and financial participation from the following agencies:

- City of San Rafael

Recommended list of committee members

Policy Advisory Committee (PAC)

Supervisor Susan Adams

City of San Rafael council member: to be determined (tbd)

Las Gallinas Valley Sanitary District: tbd

Flood Zone 7 Advisory Board: Michael Perani

CSA 6: tbd

Operations and Finance Committee

Las Gallinas Sanitary District-General Manager-Engineer

City of San Rafael-tbd

Craig Tackabery, Assistant Director of Public Works, County of Marin

Technical Working Group

City of San Rafael Public Works: Kevin McGowan

Las Gallinas Sanitary District: tbd

Flood Zone #6: Board Chair or their delegate

Flood Zone #7: Jacqueline Garcia

Marin County Flood Control District: Tracy Clay, Neal Conatser

County of Marin Community Development Agency: Tom Lai

State Coastal Conservancy: Tom Gandesbery

Marin County Open Space District: Elise Holland

Las Gallinas Creek Watershed Council: Emily Dean

Marin Sonoma Mosquito Abatement District: Erik Hawk

Marin Municipal Water District: tbd

SMART: John Nemeth

Miller Creek Watershed Stewards: tbd

DRAFT

Santa Venetia Neighborhood Association: tbd

Contempo Marin homeowner: tbd

Marin Lagoon homeowner: tbd

North San Rafael Coalition of Residents: tbd

State and Federal Resource agencies: Army Corps of Engineers, BCDC, Regional Board, Department of Fish and Game

Public Works Watershed staffing

Primary roles and responsibilities:

Liz Lewis, Principal Planner

- Manage overall schedule, deliverables, and budget; coordinate communication with partners and County Departments

Roger Leventhal, Associate Engineer

- Manage technical consultant team and peer review of Army Corps products such as the H&H modeling and related products.

Neal Conatser, Assistant Engineer

- Manages Army Corps modeling effort and the County's levee studies; manages the cost sharing agreement with the Army Corps of Engineers.

Hugh Davis, Associate Engineer

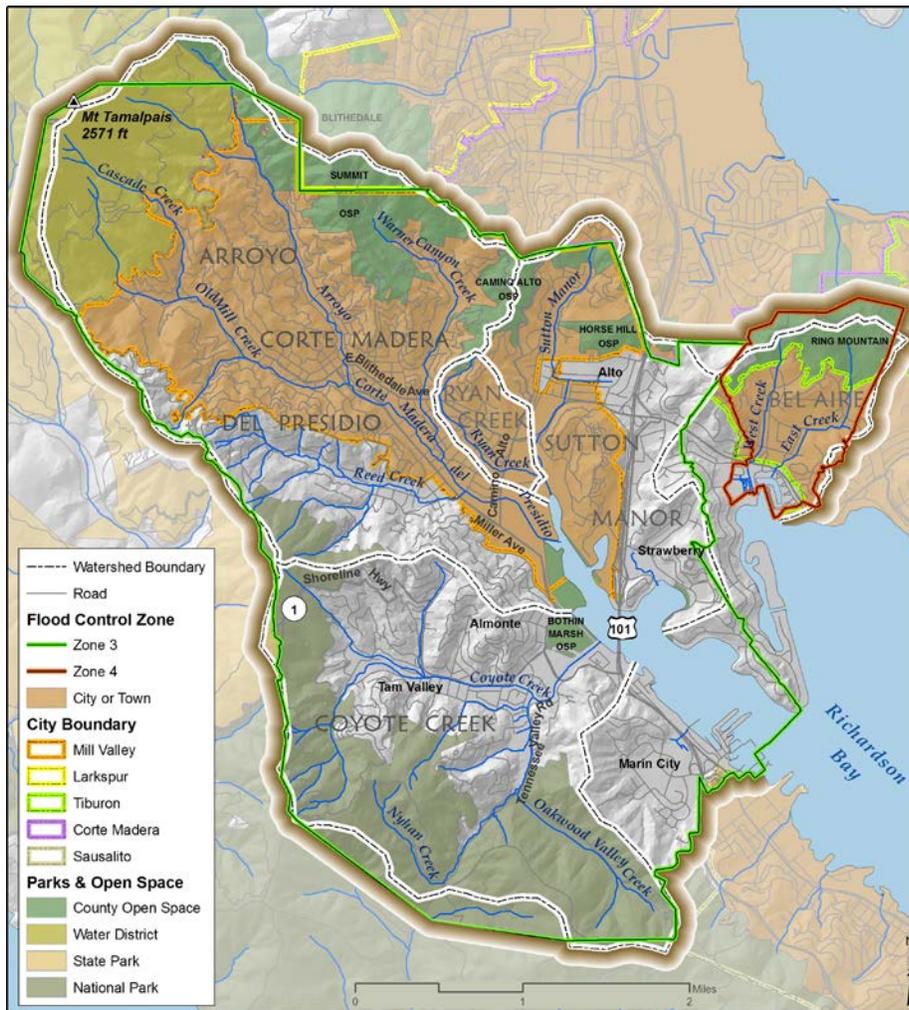
- Assist with conceptual levee design and geotechnical review

Chris Choo, Senior Planner

- Coordinate meetings public outreach through the website and with stakeholders.

Laurie Williams, Senior Planner

- Develop GIS database to support project planning. Prepare maps for website and stakeholder meetings.



Purpose

The Southern Marin Watershed Program is a collaborative effort of the City of Mill Valley, the County of Marin, and Flood Control Zones 3 and 4. The purpose of the Watershed Program is to provide a framework to integrate flood protection and environmental restoration with public and private partners to protect and enhance Marin County’s watersheds and to identify solutions that will enhance and protect the diverse habitat of the lands that drain into Richardson Bay. The Board of Supervisors authorized the Marin County Department of Public Works to begin implementation of a county-wide Watershed Program on May 13, 2008.

This document summarizes the content and scope of the Southern Marin Watershed Program.

Numerous studies were produced over the decades to identify and guide the construction of projects to reduce flood damage in the southern Marin watersheds that drain to Richardson Bay. A primary task for the Southern Marin Watershed Program will be to develop a Watershed Master Plan (WMP) that integrates flood protection needs with opportunities for creek and water quality enhancements.

The WMP will identify opportunities that provide the following benefits:

- Develop cost effective solutions to help reduce flooding
- Protect, enhance, and restore sensitive creek and wetland habitat and water quality
- Identify multi-benefit projects that will improve the ability to compete for state and federal funding
- Identify the impacts of sea level rise and develop project concepts that could be adapted to rising tides
- Evaluate the beneficial re-use of dredged sediment from Coyote Creek and other sediment removal projects for wetland restoration, levee maintenance, and shoreline protection
- Improve efficiency of existing flood maintenance operations

The purpose of the WMP is to provide a comprehensive road map for future project implementation. This summary describes the scope and budget for development of the WMP and the stakeholder process that will be implemented to support this work.

Background

The low lying areas bordering Richardson Bay have experienced periodic flooding for decades. The County Board of Supervisors formed both Flood Control Zone 3 and Zone 4 during the late 1950s to address the flooding experienced along the low-lying areas bordering Richardson Bay. The WMP study area addresses 14 square miles draining to Richardson Bay including the sub-watersheds of Arroyo Corte Madera del Presidio, Coyote Creek, Ryan Creek, Sutton Manor Creek, and East and West Creeks.

Numerous facilities and channels have been constructed to address flooding including eight (8) stormwater pump stations, an earthen and concrete levee system, and several drainage improvements. In addition, sediment removal is regularly implemented as well as annual vegetation maintenance activities. The Marin County Flood Control and Water Conservation District also maintains two stream gauges, a weather station, and holds numerous easements and properties in order to maintain these channels and structures.

The City of Mill Valley evaluated opportunities to increase the level of flood protection within the Arroyo Corte Madera del Presidio watershed in response to the 2005/06 floods. Based on these studies, over \$70 million dollars in flood control projects have been identified for planning and implementation. This process will help the City and residents to evaluate these recommendations so that alternatives can be prioritized.

An overview of existing conditions and relevant studies is available at www.marinwatersheds.org.

EPA Grant

In 2010 the County received nearly \$370,000 in grant funds from the EPA's 2010 San Francisco Bay Water Quality Improvement Fund for improvements to the Richardson Bay watershed. Richardson Bay has been listed as being impaired by pathogens related to measured high levels of coliform bacteria. The EPA funds will be used to reduce the potential for coliform bacteria to reach Richardson Bay. Funding will include work to restore creek-side vegetation along a tributary to Warner Creek in Boyle Park to increase filtration with native vegetation and to conduct outreach in the community. Funding will also support the Richardson's Bay Regional Agency's efforts to develop a houseboat and marina monitoring plan.

Program Description and Outcomes

The Southern Marin Watershed Program will build upon the decades of existing operations and improvements. A suite of analytical tools will be used to identify and prioritize a range of flood protection alternatives that integrate habitat restoration benefits. These analytical tools and the process for developing and evaluating the proposed project alternatives will be summarized in the WMP.

The WMP will also include recommendations for how to fund the proposed work, including a discussion of local revenue measure options and describe opportunities to leverage local funds to attract state and federal grant funds.

The District has identified the general causes of flooding within the watershed and a general description of flooding will be included in the WMP.

A description of the individual tools and methods to be used are described below.

Hydrology and Hydraulics Models

An understanding of how much water is moving through the watershed (hydrology), how fast it is moving, and where it is going (hydraulics) is critical to quantifying flooding impacts and identifying solutions. The development and use of computer models to quantify stormwater runoff and channel flow are the industry standard for describing flooding and analyzing proposed solutions. These modeling tools will allow us to identify areas that need increased flood protection and to understand how channel and floodplain modifications will influence the ability of the channel to carry flood flows. Utilizing existing flow models or developing new ones will provide the ability to refine the engineering analysis required to develop conceptual design alternatives and to get a better idea of the costs associated with implementation

The watershed based hydrology and hydraulics models will allow staff and the Technical Working Group to review conceptual project alternatives for their benefits including an evaluation of sea level rise scenarios.

Climate Change Adaptation Scenarios

The Richardson Bay watershed is one of the most highly susceptible areas of Marin County to the impacts of climate change. Rising tide levels in San Francisco Bay will result in more direct wind-wave shoreline erosion (wave energy increases as the square of water depth) as well as increased river flooding as the stormdrain system is unable to drain against the tidal backwater. Short duration rainfall intensities are anticipated to increase and will exacerbate stormwater flooding as well as landslides and soil erosion in the upper watershed.

The Master Plan will begin the process of organizing and planning for climate change in the watershed. The WMP will include a synthesis of the range of projections for Bay sea level rise and an evaluation of the potential impacts on existing and proposed flood protection projects. The WMP will consider a range of potential adaptation strategies, for example:

- Higher, larger levees
- Outboard habitat transition zone levees
- Buffer zones and beaches
- Detention basins
- Raising and floodproofing structures
- More pump stations
- Planned retreat

The WMP will provide the technical studies that allow community decision makers to frame their planning decisions on where to devote financial resources over the next thirty to one-hundred years.

Alternatives Analysis

One of the primary goals of the Watershed Program is to identify cost effective alternatives for improving the level of flood protection. The hydrology and hydraulics models will be used where appropriate to evaluate the proposed alternatives in each watershed. Utilizing these tools, the District and the Technical Working Group will be able to evaluate a range of alternatives to identify practical and sustainable projects. The models will be used to analyze and develop the full range of feasible measures consistent with the program goals. Preliminary costs, flood protection benefits, and multi-benefit projects will be clearly identified through this process and in the WMP.

The watershed program considers the development of multi-benefit projects as a basic principle to ensure that the identified alternatives are eligible for the broadest range of funding at the state and federal levels.

A series of technical memorandums describing the design methodology and results of the various flow modeling efforts will form the foundation of the WMP. These memorandums will contain the engineering details for technical review by agencies, partners, and interested parties. Opportunities for increased flood protection, restoration, and habitat benefits will be identified and evaluated.

A set of flood protection and habitat restoration criteria would be developed to evaluate and prioritize the recommendations and to identify integrated projects. These criteria would also consider project feasibility, sequencing and existing flood protection objectives. The alternatives analysis would also include a thorough treatment of climate change and sea level rise issues. The WMP would include a general description and conceptual drawings to illustrate the proposed design alternatives.

GIS-based Mapping and Database Development

Staff will compile existing Geographic Information Systems or GIS data (publicly-owned parcels, stream data, locations of current and past restoration sites, and fisheries data) into a watershed-scale restoration opportunities database. The database will be used to analyze restoration needs and to support the identification of multi-benefit projects. The projects will be prioritized based on the GIS analyses and the modeling results and described in the WMP.

Financial Strategy

The goals of the financial strategy are to review budgetary needs for the operation and maintenance of existing assets and to define a strategy for annual funding of a reserve amount suitable to address long-term projected needs. Additionally, alternatives for funding recommended projects will also be described including different revenue measures, available reserves from existing funding sources, and potential grant opportunities, among others.

Watershed Master Plan

The Watershed Master Plan will provide a comprehensive, integrated strategy for flood protection and environmental restoration that will serve as a guiding document for the next thirty years. A thirty year time frame is recommended in light of the State of California predictions that San Francisco Bay is likely to experience a sea level rise of about 16 inches by 2050.

The Plan will describe the proposed alternatives, recommendations for project sequencing, and identify multi-benefit projects that both enhance flood protection and habitat. This type of integrated approach to flood and creek management is consistent with current state and federal grant guidance to identify projects that are multi-purpose and multi-benefit in nature.

Staff is undertaking a systematic review of existing conditions. Prior work is being assessed and data gaps will be identified. The WMP will allow the District and partner agencies to answer the following questions:

1. Which previously defined improvements should be considered?
2. Are there improvements that have not yet been defined, but should be considered?
3. What information is needed before improvements can be designed?
4. How can District projects, both constructed and planned, effectively address the potential impacts posed by climate change and sea level rise?

5. Do the District's monitors and gauges provide it with the data necessary to develop hydrology and hydraulics suitable for the design of its construction projects?
6. Are there projects which present opportunities for increased flood protection, fish passage, and/or riparian restoration?
7. Do current maintenance efforts ensure the effective operation and optimum use of existing facilities?
8. Where will the District or partner agencies need to pursue new easements or fee title acquisition to support future maintenance and project implementation?

This information and the supporting data will be summarized within the WMP. Consideration of sea level rise scenarios and future adaptation will be included in this effort. Engineering and technical work will be led by County staff with consultant assistance to supplement the existing hydrology and hydraulic analysis where needed.

The WMP will also include recommendations for leveraging local funds to attract state and federal grant funds and describe the type of local revenue measures that could support project implementation.

The major findings of the WMP will be published in a user-friendly web-based "booklet format" to effectively communicate findings and recommendations to partner agencies and the community. The goal is to summarize and communicate key findings and recommendations in a concise, graphics rich format.

Stakeholder Process

The WMP will be developed via a collaborative, iterative process. The Marin County Board of Supervisors established stakeholder committees at three levels to support community outreach and to provide overall program direction (*a complete list of recommended committee members is included at end of this document*). Broad community outreach is provided through the Program's website www.marinwatersheds.org, the stakeholder process and community meetings.

Description of Stakeholder Committees

Policy Advisory Committee - This group of elected officials is comprised of the District County Supervisor, two representatives from the participating city council, two representatives from each of the appointed flood zone advisory boards and the board of directors of the participating agencies. This committee provides policy input on program direction and community issues and will meet 1-2 times per year.

Operations and Finance Committee- The participating city manager and the Marin County Public Works director will use these meetings to evaluate progress and prioritize funding strategies and will meet 3-4 times per year.

Technical Working Group- This group will include staff of participating state, federal, and local regulatory and participating agencies and community members with a science and technical background. The group will be responsible for the review of watershed products and provide input on issues, needs, and watershed priorities. This group will include conservation and watershed groups, homeowners associations, and other technical experts within their respective watersheds. This group will meet at least quarterly to provide input and to review the development of work products.

Community Outreach

Communication to the community at large will be supported by targeted community meetings, presentations at various local boards and homeowners associations, and utilization of the Watershed Program website (www.marinwatersheds.org). The program website provides dedicated information about the watershed and is

regularly updated with notices about workshops, meetings, proposals, and projects. The website platform integrates the Watershed Program with Flood Control and the resources of our MCSTOPPP website.

Community outreach will be developed around these key messages:

1. Working at the watershed scale acknowledges the mutually dependent interactions and linkages between our ridge tops, the valley floor, creeks, and Richardson Bay.
2. The watershed approach acknowledges the need to work collaboratively to identify solutions to reducing flood hazards and improving habitat.
3. Implementation at the watershed scale takes time and is performed in tandem with the on-going maintenance and rehabilitation needs of existing infrastructure.

Tentative Schedule of Meetings and Milestones

2012	
July	Develop a summary of previous studies and existing conditions and data gaps (Tech Memo #1)
Aug	TWG meeting to review scope, format, and schedule of WMP, and Tech Memo #1
Sep	PAC meeting to discuss preliminary hydrology results (Tech Memo #2) and draft climate change mapping strategies
Oct	TWG meeting to review hydrology modeling and strategies for climate change mapping and adaptation
Nov	Community meeting proposed
Dec	Development of integrated project criteria
2013	
Apr	PAC meeting to review existing conditions hydraulics modeling results, sea level rise projections and review the list of potential project alternatives
May	TWG meeting to review existing conditions, hydraulics modeling results, sea level rise projections, and the list of potential CIP project alternatives to be further evaluated
Sep	PAC meeting to review recommended alternatives and financial strategy report
Oct	TWG meeting to review H&H for alternatives analysis
Dec	Release draft WMP for TWG and PAC review
2014	
Feb	TWG meeting to review draft WMP
Apr	PAC meeting to review draft WMP
May	Community meeting proposed
Jul	Final WMP released

Proposed Budget

Expenditures

Existing Conditions and Data Gaps	\$55,000
Watershed Hydrologic Modeling	\$60,000
Hydraulic Modeling (inc. sea level rise scenarios)	\$70,000
Climate Change Assessment and Adaptation Strategies	\$33,000
GIS Habitat Mapping	\$35,000
Surveying	\$75,000
Alternatives Analysis	\$40,000
Master Plan	\$180,000
Financial Strategy	\$22,000
Project Management	\$30,000
Stakeholder Process	\$30,000
Outreach (inc. website)	\$40,000
Equipment	\$10,000
Total	\$680,000

Revenue

County of Marin	\$100,000
City of Mill Valley	\$100,000
Flood Control Zone 3	\$240,000
Flood Control Zone 4	\$240,000
Total:	\$680,000

Stakeholder Committees

Policy Advisory Committee (PAC)

Supervisor Kate Sears

Mill Valley City Council: Shawn Marshall and Garry Lions

Flood Control Zone 3 Advisory Board: Linda Rames and Curry Ecklehoff

Flood Control Zone 4 Advisory Board: Jerry Thayer

Operations and Finance Committee

James C. McCann, City Manager, Mill Valley

Craig Tackabery, Assistant Director of Public Works, County of Marin

Technical Working Group

City of Mill Valley: Public Works: Jill Barnes and Bianca Gomez

City of Mill Valley Planning: Mike Moore

City of Mill Valley Parks: Rick Misuraca

Flood Control Zone 3: Shawn McGhie and Robert Burton

Flood Control Zone 4: Bob Rogers

Marin County Flood Control District: Hannah Lee, Tracy Clay

County of Marin Community Development Agency: Tom Lai

State Coastal Conservancy: Tom Gandesbery

BCDC: tbd

Marin County Open Space District: Elise Holland

Marin Municipal Water District: Greg Andrew

Mill Valley Streamkeepers: Betsy Bikle

Richardson Bay Audubon Center: Brooke Langston

Local science expertise: Joan Florsheim

Tamalpais Community Service District: Jon Elam

Marin City Community Service District: to be determined

Strawberry Recreation District: to be determined

Homestead Valley Community Association: to be determined

CalTrans: to be determined

Mill Valley Fire Department: to be determined

Corte Madera Fire Department: to be determined

State and Federal Resource Agencies: US Army Corps of Engineers, Fish and Game, Regional Board as needed

Watershed Program Staffing

Liz Lewis, Principal Planner

- Manage overall schedule, deliverables development, program budget, and communication with partners
- Provide input and review of WMP technical memorandums and other deliverables

Roger Leventhal, P.E. Associate Engineer

- Manage the Watershed Master Plan (WMP) study process
- Draft the WMP and manage development of related maps and graphics
- Update hydrology and hydraulics models for Coyote Creek and Arroyo Corte Madera del Presidio
- Develop hydrology and hydraulics calculations and models for the remaining sub-watersheds in Richardson Bay as-needed
- Provide briefings and updates to partners and local jurisdictions
- Coordinate review of draft documents with management, counsel, and stakeholders and facilitate discussion in technical work group meetings
- Manage and review consultant products related to development of the WMP technical memorandums and other deliverables

Neal Conatser, Assistant Engineer

- Initiate pilot asset management pilot effort
- Develop financial strategy to support project implementation
- Provide input and review of WMP technical memorandums and other deliverables

Chris Choo, Senior Planner

- Coordinate outreach and meetings with the Technical Working Group
- Manage EPA grant reports and deliverables
- Provide input and review of WMP technical memorandums and other deliverables
- Conduct habitat assessments and support data analysis

Laurie Williams, Senior Planner

- Develop GIS database to support restoration project planning and prioritization
- Prepare maps for website and stakeholder meetings
- Support asset management pilot project

Rob Carson, Planner

- Support the tasks funded through the EPA grant for Richardson Bay and develop and manage the Quality Assurance Protection Plan and Monitoring Plan for precipitation monitoring