

## 4.9 HYDROLOGY AND WATER QUALITY

### 4.9.1 Setting

#### a. Regional Hydrology.

Watersheds. The MBSST Network would traverse through nearly every watershed in Santa Cruz County, and be located where the watersheds drain, due to its coastal location. A list of the watersheds within the MBSST Network is provided below. Because several watersheds fall within more than one reach of the MBSST Network, the watersheds are listed in order from north to south, rather than by reach.

- *Waddell*
- *Swanton Bluffs*
- *Scott Creek*
- *Davenport*
- *San Vicente Creek*
- *Liddell Creek*
- *Laguna Creek*
- *Majors*
- *Baldwin Wilder*
- *San Lorenzo River*
- *Arana Gulch – Rodeo*
- *Soquel Creek*
- *Aptos Creek*
- *Pajaro River*
- *Watsonville Slough*
- *San Andreas*

The watersheds cover almost all of Santa Cruz County, except for the less than 20 acres that are within the Año Nuevo Creek Watershed and the Pescadero Watershed. Each watershed consists of numerous tributaries, with over 50 tributaries combined.

All of these watersheds are within the jurisdiction of the Central Coast Regional Water Quality Control Board (RWQCB). The RWQCB establishes requirements prescribing the quality of point and nonpoint sources of discharge and establishes water quality objectives through the Water Quality Control Plan for the local basin. A point source is defined as waste emanating from a single, identifiable point such as a wastewater treatment plant. A nonpoint source of discharge results from drainage and percolation of activities such as agriculture and stormwater runoff.

Groundwater. Groundwater supplies account for approximately 80 percent of the countywide water supply. Most groundwater is contained in permeable geologic basins, typically referred to as aquifers. There are three major groundwater basins in the County: the Santa Margarita, Purisima, and Aromas Basins. In the Pajaro Valley (Aromas Groundwater Basin), agricultural water use far exceeds sustainable yield (County of Santa Cruz, 2012). In other parts of the County, development contributes to the overdraft through demand, but also because development covers the ground surface with impervious layers that greatly reduce groundwater recharge. Negative consequences of overdraft include declining groundwater levels, a decrease in groundwater quality, reduced streamflow, and seawater intrusion along the coast that destroys wells (County of Santa Cruz, 2012).

Typically, an aquifer receives most of its water inflow from areas known as recharge areas. These are the areas where the aquifer is exposed at the ground surface and the water moves more freely downward through the aquifer materials. This is in contrast to locations where aquifers underlie layers of finer sediment (such as clay). The County of Santa Cruz designates

the areas where an aquifer is exposed at the ground surface and allows water to move downward into the aquifer as Primary Groundwater Recharge (PGR) zones (County of Santa Cruz, 2012). As such, these areas are given special consideration and protection from development. This protection allows the aquifers to maintain an adequate quantity and quality of groundwater recharge. No section of the MBSST Network falls within a PGR zone.

#### **b. Flood Hazards.**

FEMA Flood Hazard Zones. The Federal Emergency Management Agency (FEMA) establishes base flood heights for the 100-year flood zone. The 100-year flood zone is defined as the area that could be inundated by the flood which has a one percent probability of occurring in any given year. Figures 4.9-1a through 4.9-1c show the FEMA 100-year flood hazard zones in each reach of the MBSST Network and a discussion of these areas is provided below.

*Northern Reach.* There are several areas within the 100-year flood hazard zone throughout the northern reach of the MBSST Network. The various flood hazard zones in the northern reach emanate from the various streams that cut down through the Santa Cruz Mountains and outlet in the Pacific Ocean, as shown in Figure 4.9-1a.

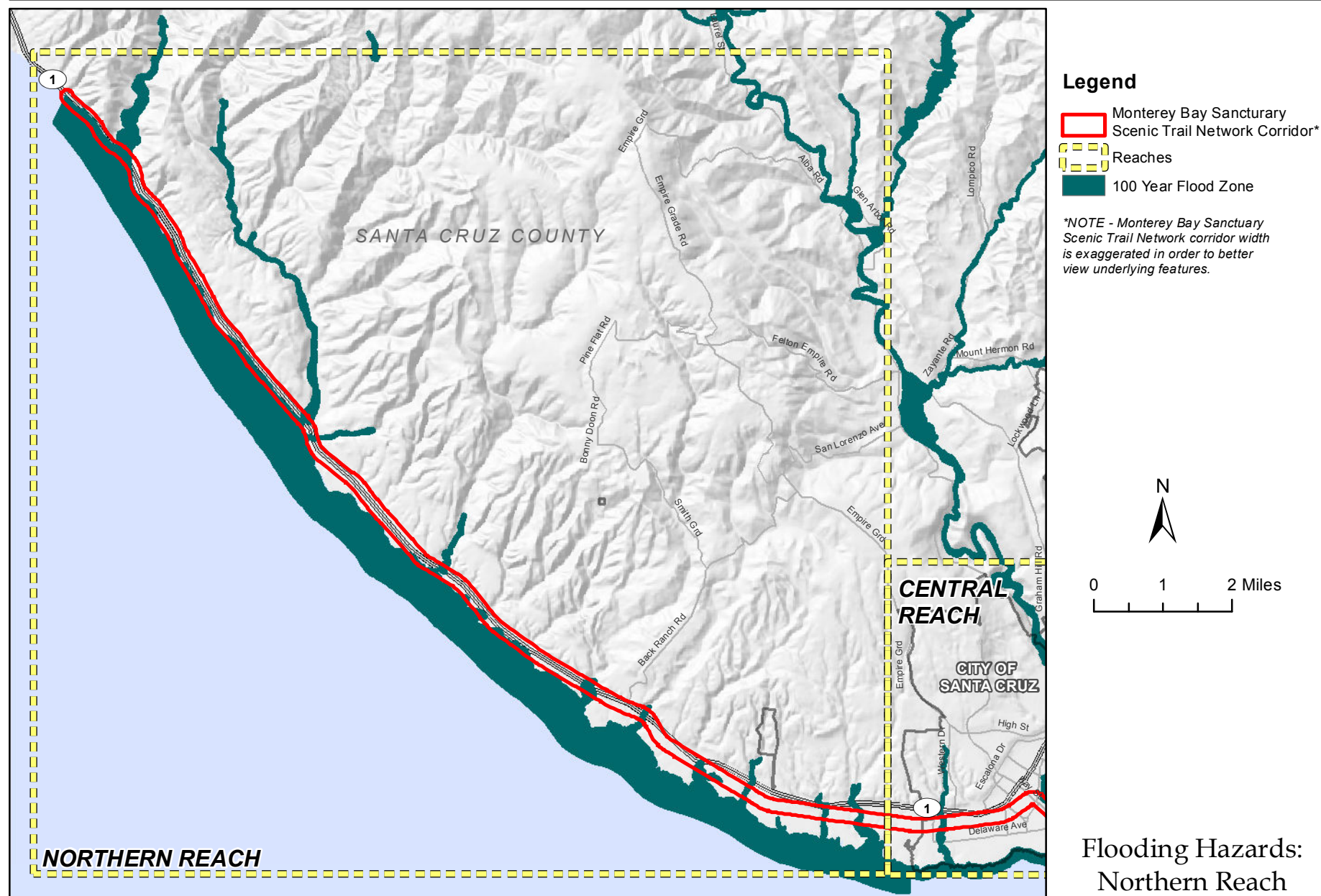
*Central Reach.* There are very few areas of the central reach that are within the 100-year flood hazard zone. These areas are primarily limited to the river mouths of the San Lorenzo River, Arana Gulch, and Soquel Creek, as shown in Figure 4.9-1b.

*Watsonville Reach.* A large portion of the Watsonville reach falls within the 100-year flood hazard zone surrounding the Pajaro River, between the Pajaro Dunes area and the City of Watsonville, as shown in Figure 4.9-1c.

Tsunami and Seiche. A tsunami is a series of waves generated by an impulsive disturbance in the ocean or in a small, connected body of water. Tsunamis are produced when movement occurs on faults in the ocean floor, usually during very large earthquakes. Sudden vertical movement of the ocean floor by fault movement displaces the overlying water column, creating a wave that travels outward from the earthquake source. An earthquake anywhere in the Pacific can cause tsunamis around the entire Pacific basin. Since the Pacific Rim is highly seismically active, tsunamis are not uncommon (City of Santa Cruz, September 2011).

California is at risk from both local and distant source tsunamis. Eighty-two possible or confirmed tsunamis have been observed or recorded in California since recording of such events began. Most of these events were small and only detected by tide gages. Eleven were large enough to cause damage and four events resulted in deaths. Two tsunami events caused major damage (City of Santa Cruz, September 2011).

Even though the potential for a large tsunami may be low or possibly uncertain, the potential outcome of such a tsunami could be substantial damage and loss of life. Several active and potentially active earthquake faults are located within or near Santa Cruz County (refer to Figure 4.6-1 in Section 4.6, *Geology/Soils*). Even a moderate earthquake occurring in or near any of the nearby faults could result in local source tsunamis from submarine landsliding in Monterey Bay (City of Santa Cruz, September 2011). Figures 4.9-2a through 4.9-2c illustrate

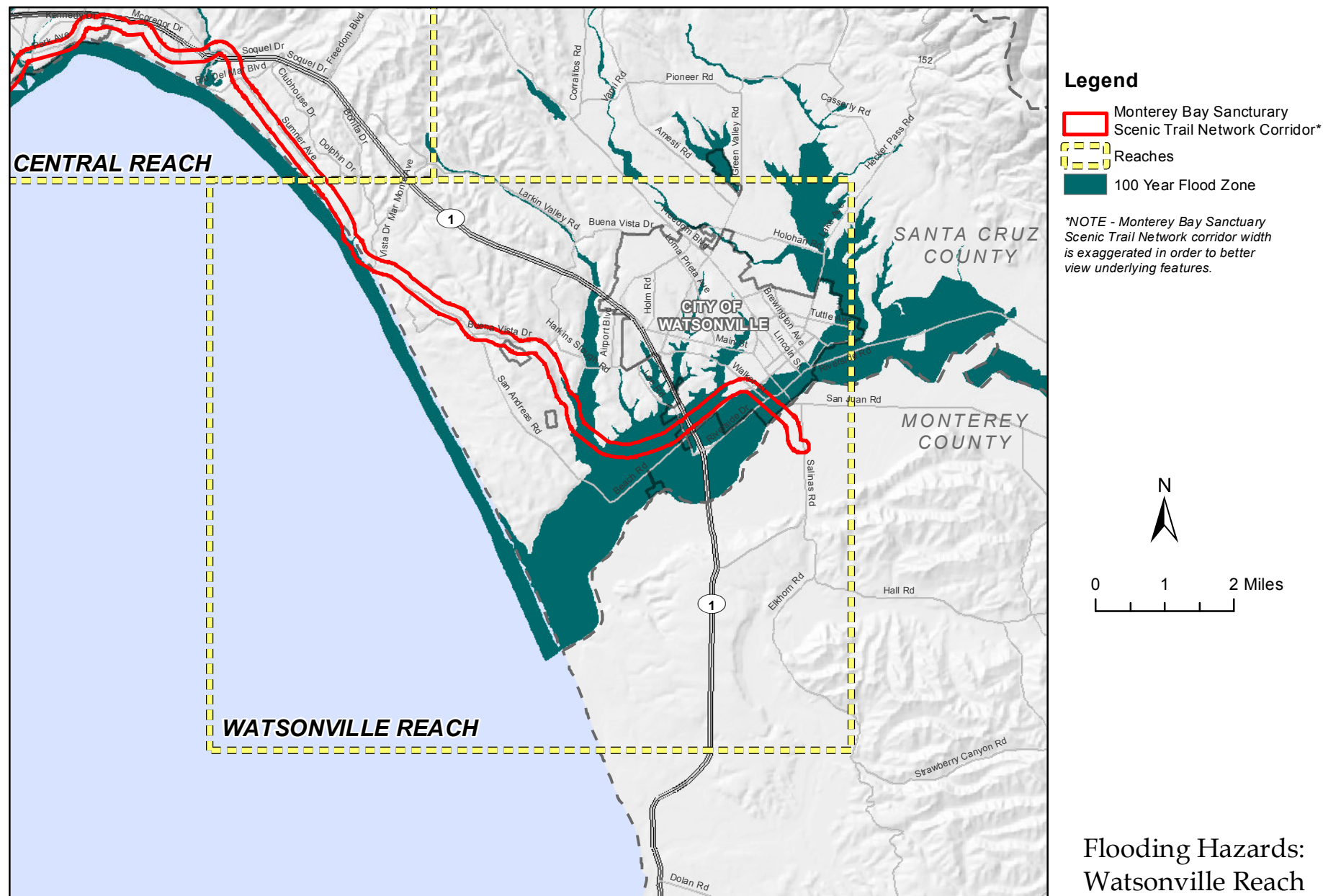


Flooding Hazards:  
 Northern Reach

Figure 4.9-1a

***RTC***





Base map source: RRM Design Group, 2012. Additional data provided by the County of Santa Cruz 2012.

Figure 4.9-1c

tsunami inundation zones in Santa Cruz County. A description of the zones within each reach of the MBSST Network is provided below.

*Northern Reach.* There are two small areas subject to flooding from tsunamis in the northern reach, located in the Waddell Creek and Scott Creek areas (refer to Figure 4.9-2a).

*Central Reach.* There are a several areas of the MBSST Network in the tsunami run-up zone in the central reach, including the areas near the San Lorenzo River and the Arana and Rodeo Gulches (refer to Figure 4.9-2b).

*Watsonville Reach.* Only a small segment of the Watsonville reach is near a tsunami run-up zone in the La Selva Beach area (refer to Figure 4.9-2c).

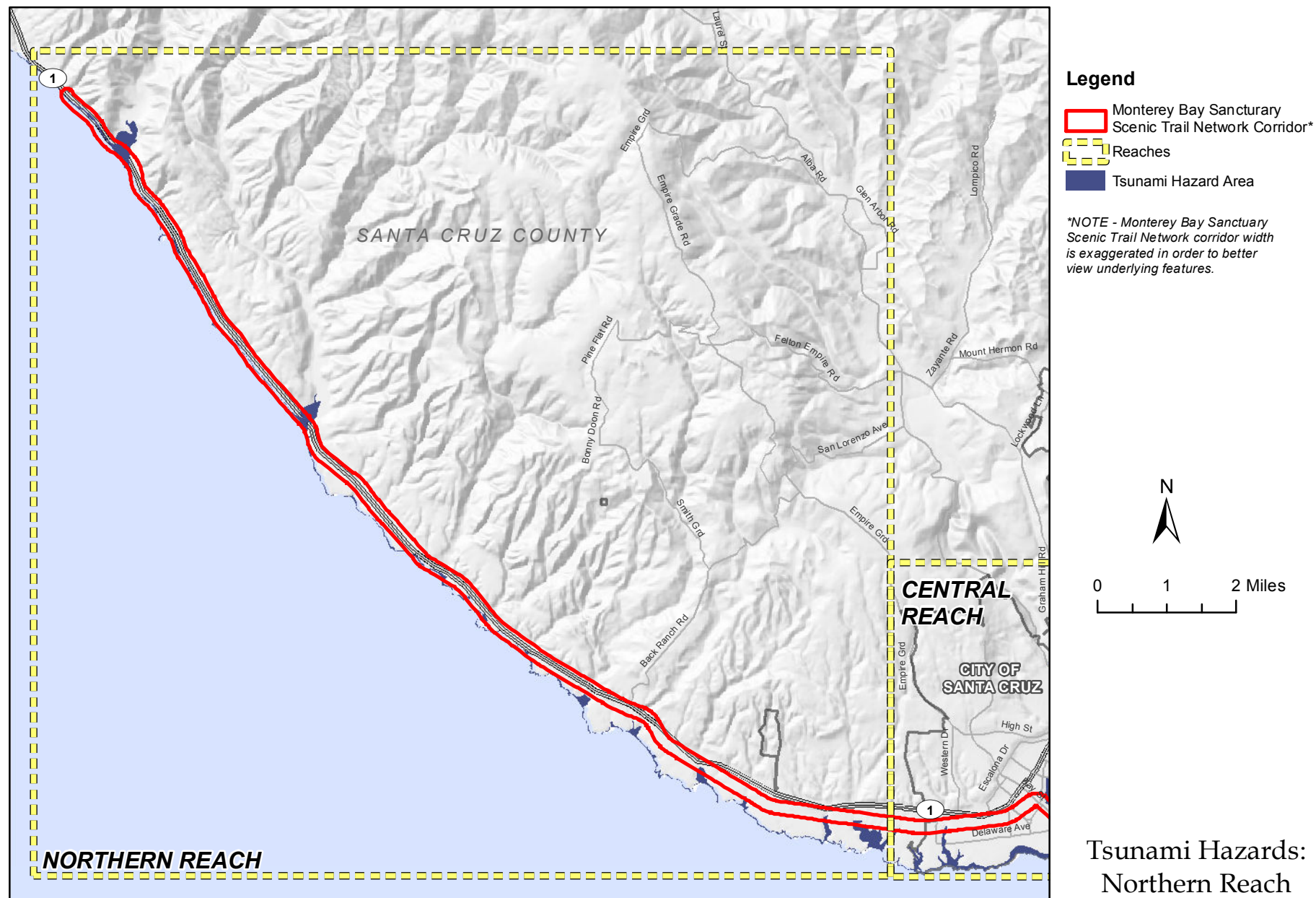
Seiches are also a potential hazard in Monterey Bay. Seiches are standing waves in an enclosed or partially enclosed body of water, such as a bay. Seiches are caused by a disturbance to the body of water, such as wind or barometric pressure changes, seismic activity, or tsunamis. Oscillations induced by seiches can cause larger than normal waves, resulting in flooding along coastal areas. Seiche hazards are limited to the central and Watsonville reaches of the MBSST Network, which are within the Monterey Bay. Because the northern reach does not abut an enclosed water body, seiche would not be considered a potential hazard.

Sea Level Rise. According to *The Impacts of Sea-Level Rise on the California Coast*, prepared by the California Climate Change Center (CCCC) (May 2009), climate change has the potential to induce substantial sea level rise in the coming century. The rising sea level increases the likelihood and risk of flooding. The study identifies a sea level rise on the California coast over the past century of approximately eight inches. Based on the results of various global climate change models, sea level rise is expected to continue. The California Climate Adaptation Strategy (December 2009) estimates a sea level rise of up to 55 inches by the end of this century. The majority of the MBSST Network is located along coastal areas that could be subject to sea level rise. Figures 4.7-1a through 4.7-1c in Section 4.7, *Greenhouse Gas Emissions/Climate Change*, illustrate the predicted effects of sea level rise on the 100-year flood zone. Impacts related to sea level rise are discussed therein.

### **c. Stormwater Drainage.**

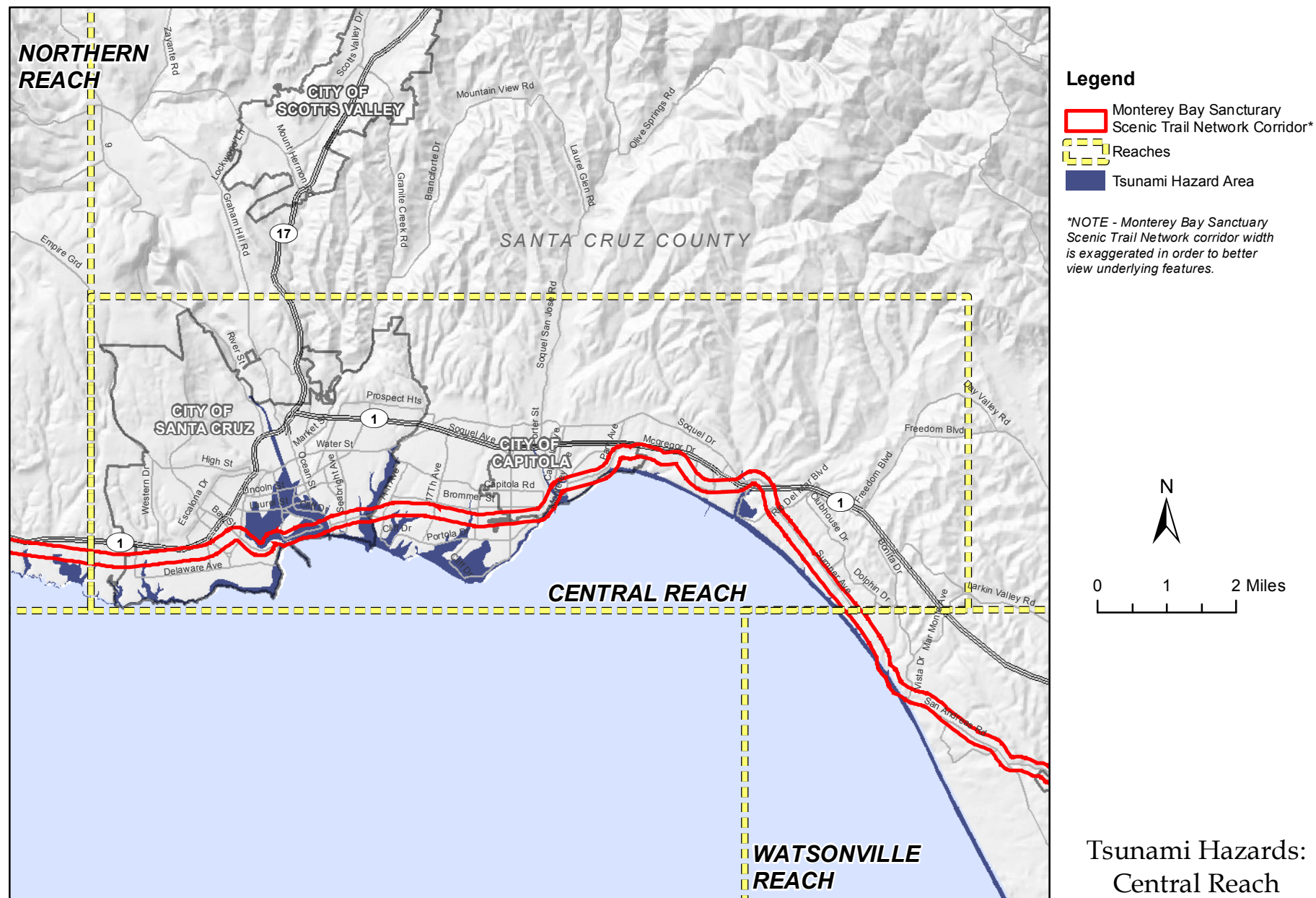
Storm water runoff is one of the leading causes of pollution in surface waters. In fields and forests, most rain is absorbed by the soil or is taken up by plants and trees. Rainwater that flows overland is called storm water runoff. However, developed urban areas contain many impervious surfaces like roofs, parking lots, and streets. This increase in impervious coverage can cause both water quantity and quality problems. The added impervious coverage prevents rain from infiltrating into the ground and concentrates the runoff so that most of the water rapidly runs off the property and into storm drain systems, creeks or the ocean in unnaturally large amounts.

Storm water can quickly become polluted by picking up chemicals, fertilizers, soil, and litter while traveling overland. Even low concentrations of pollutants that accumulate on roads, parking lots, and sidewalks can be transported into nearby streams, rivers, wetlands, and the



Tsunami Hazards:  
Northern Reach

Figure 4.9-2a



Base map source: RRM Design Group, 2012. Additional data provided by the California Natural Resources Agency, 2012.

Figure 4.9-2b



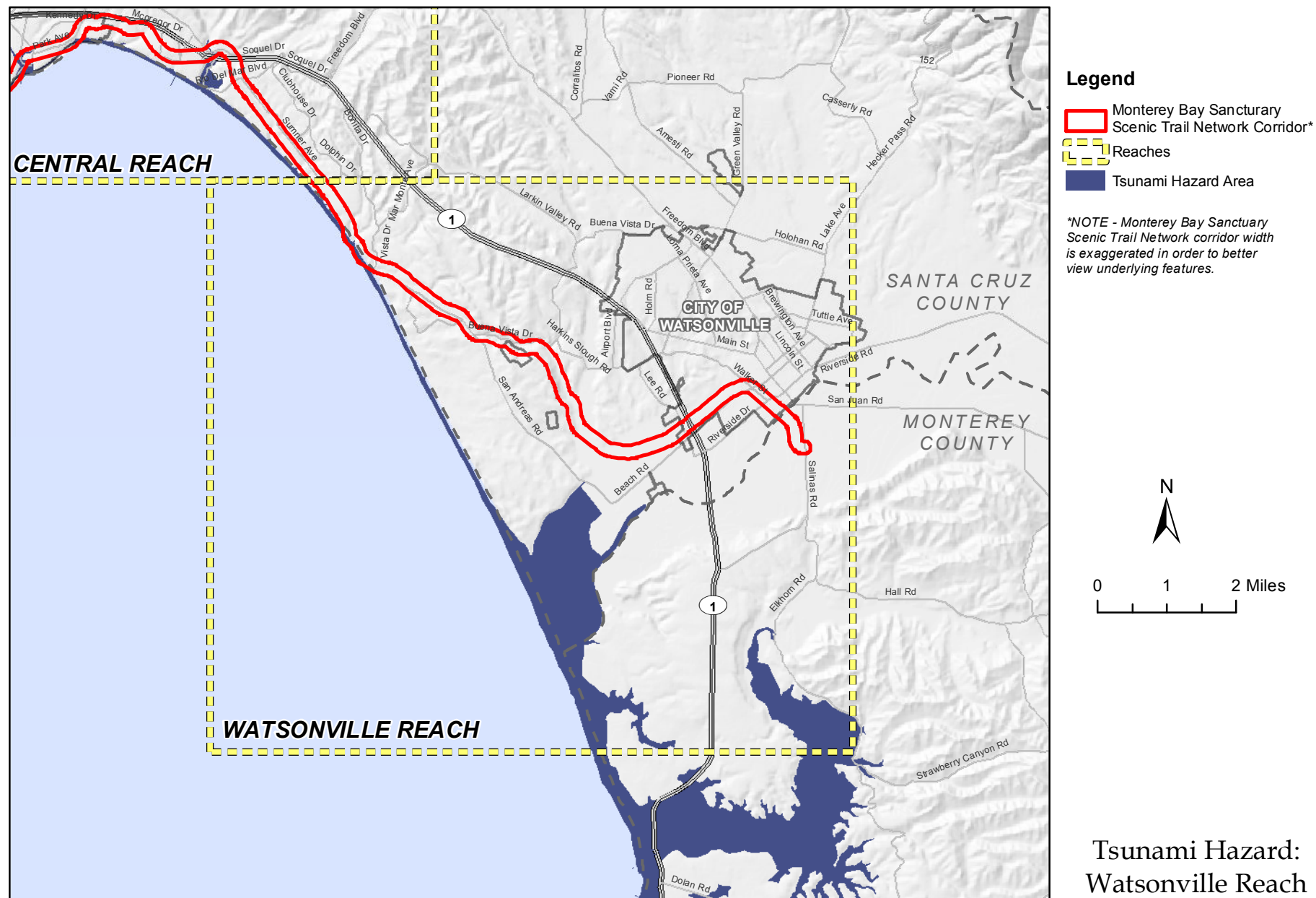


Figure 4.9-2c

ocean potentially causing water quality problems. Storm water pollution is non-point source pollution, meaning the sources are varied and widespread.

Northern Reach. The northern reach consists largely of coastal bluffs and rural areas within unincorporated Santa Cruz County. Stormwater drainage in this area is controlled by the numerous streams and natural drainages to the Pacific Ocean. According to the County of Santa Cruz GISWeb Application (2012), there is no storm drainage infrastructure in this reach.

Central Reach. The central reach of the MBSST Network is an urbanized area of the trail corridor. Drainage infrastructure is present throughout this urban area, with drainage directed toward natural drainage features, including the San Vicente Creek, the San Lorenzo River, Soquel Creek, and Aptos Creek (County of Santa Cruz, 2012). These natural drainages outlet into Monterey Bay.

Watsonville Reach. Similar to the northern reach, the Watsonville reach includes many rural areas where the natural drainages serve to conduct stormwater to their outlet in Monterey Bay. There is some stormwater drainage infrastructure in the more urbanized areas of this reach, such as the City of Watsonville (County of Santa Cruz, 2012). Stormwater infrastructure conveys stormwater to natural drainages, such as the Pajaro River and its tributaries.

#### **d. Regulatory Setting.**

##### Federal.

*Clean Water Act (CWA).* The CWA, enacted in 1972, regulates the discharge of pollutants to waters of the United States from any point source. Section 401 of the CWA requires water quality certification for any activity, including the construction or operation of a facility, which may result in any discharge into navigable waters (Title 33 CFR §1341). Section 404 of the CWA requires a permit for the discharge of dredged fill material into navigable waters at specified disposal sites (Title 33 CFR §1344). In 1987, amendments to the CWA added Section 402(p), which establishes a framework for regulating non-point source stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). The NPDES stormwater program is further described below under the “State Regulations” subsection.

*Federal Emergency Management Agency (FEMA).* FEMA is a former independent agency that became part of the new Department of Homeland Security in March 2003 and is tasked with responding to, planning for, recovering from, and mitigating against disasters. Formed in 1979, FEMA is responsible for determining flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers studies and approved agencies studies and for coordinating the federal response to floods, earthquakes, hurricanes, and other natural or man-made disasters. FEMA also provides disaster assistance to states, communities and individuals. FEMA distributes the Flood Insurance Rate Maps (FIRMS), which identify the locations of special flood hazard areas (SFHAs), including the 100-year flood zone. Executive Order 11988 (Flood Plain Management) links the need to protect lives and property with the need to restore and preserve natural and beneficial flood plain values. Specifically, federal agencies are directed to avoid conducting, allowing, or supporting actions on the base floodplain unless the agency finds that the base floodplain is the only practicable alternative location. Similarly, Department of Transportation (DOT) Order 5650.2, which implements Executive Order 11988 and was issued



pursuant to the National Environmental Policy Act of 1969, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973, prescribes policies and procedures for ensuring that proper consideration is given to avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs, and budget requests.

State.

*Water Board.* The California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB) have the responsibility in California to protect and enhance water quality, both through their designation as the lead agencies in implementing the Section 319 non-point source program of the federal Clean Water Act, and through the state's primary water pollution control legislation, the Porter-Cologne Water Quality Control Act. The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. All projects resulting in discharges, whether to land or water, are subject to Section 13263 of the California Water Code and are required to obtain approval of Waste Discharge Requirements (WDRs) by the RWQCBs. Land and groundwater-related WDRs (i.e., non-NPDES WDRs) regulate discharges of privately or publicly treated domestic wastewater and process and wash-down wastewater. WDRs for discharges to surface waters also serve as NPDES permits, which are further described below.

The Central Coast (Region 3) office of the RWQCB guides and regulates water quality in streams and aquifers throughout the central coast of California and the Monterey Bay region through designation of beneficial uses, establishment of water quality objectives, and administration of the NPDES permit program for stormwater and construction site runoff. The RWQCB is also responsible for providing permits and water quality certifications (Section 401) pursuant to the CWA.

All dischargers of waste to waters of the State are subject to regulation under the Porter-Cologne Act and the requirement for WDRs is incorporated into the California Water Code. This includes both point and non-point source (NPS) dischargers. All current and proposed NPS discharges to land must be regulated under WDRs, waivers of WDRs, a basin plan prohibition, or some combination of these administrative tools. Dischargers of waste directly to state waters would be subject to an individual or general NPDES permit, which also serve as WDRs. The RWQCBs may issue individual WDRs to cover individual discharges or general WDRs to cover a category of discharges. WDRs may include effluent limitations or other requirements that are designed to implement applicable water quality control plans, including designated beneficial uses and the water quality objectives established to protect those uses and prevent the creation of nuisance conditions. Violations of WDRs may be addressed by issuing Cleanup and Abatement Orders or Cease and Desist Orders, assessing administrative civil liability, or seeking imposition of judicial civil liability or judicial injunctive relief. Construction activity on projects that disturb one or more acres of soil, or less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject

to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Program (SWPPP). The SWPPP should identify stormwater collection and discharge points, drainage patterns across the project, and best management practices (BMPs) that the discharger will use to protect stormwater runoff and the placement of those BMPs.

As mandated by Section 303(d) of the federal Clean Water Act, the SWRCB maintains and updates a list of “impaired water bodies” (i.e., water bodies that do not meet State and Federal water quality standards). This list is known as the Section 303(d) list of impaired waters. The State is then required to prioritize waters/watersheds for development of Total Maximum Daily Load (TMDL) regulations. This information is compiled in a list and submitted to the U.S. Environmental Protection Agency for review and approval. The SWRCB and RWQCBs monitor and assess water quality on an ongoing basis. According to the 2010 Integrated Report [CWA Section 303(d) List/305(b) Report], the following water bodies in the MBSST Network vicinity currently do not meet water quality standards:

- *Pacific Ocean from Point Año Nuevo to Soquel*
- *San Vicente Creek*
- *Moore Creek*
- *San Lorenzo River Lagoon*
- *Carbonera Creek*
- *Branciforte Creek*
- *Arana Gulch*
- *Rodeo Creek Gulch*
- *Soquel Creek*
- *Nobel Gulch*
- *Porter Gulch*
- *Aptos Creek*
- *Harkins Slough*
- *Gallighan Slough*
- *Watsonville Slough*

*California Building Code (CBC).* The California Building Code provides standards for building construction, including design guidelines and specifications to meet earthquake standards.

*Caltrans Highway Design Manual.* The Caltrans Highway Design Manual provides design guidelines and standards for the construction of bicycle and pedestrian facilities, including bridges.

#### Local.

*Santa Cruz County.* The Santa Cruz County Department of Environmental Health Services (EHS) monitors water quality within the County. EHS also works with the RWQCB to regulate and monitor water quality. Chapter 16.24 of the Santa Cruz County Code (2012) also includes policies for the protection of water quality regarding increases in turbidity and settleable solids. In addition, Chapter 7.79 of the County Code provides regulations for runoff control, including compliance with NPDES stormwater discharge permits.

The County of Santa Cruz, in conjunction with the City of Capitola, has also adopted a Stormwater Management Program (SWMP), which provides guidelines for preventing stormwater pollution. The SWMP (2010) includes six minimum measures, including public education and outreach, public involvement and participation, illicit discharge detection and



elimination, construction site stormwater runoff control, post construction stormwater management in new development/redevelopment, and pollution prevention/good housekeeping for municipal operations.

The Santa Cruz County General Plan (1994) also provides the following objectives and policies to protect surface water quality and groundwater:

- Objective 5.4      *Monterey Bay and Coastal Water Quality. To improve the water quality of Monterey Bay and other Santa Cruz County coastal waters by supporting and/or requiring the best management practices for the control and treatment of urban run-off and wastewater discharges in order to maintain local, state, and national water quality standards, protect County residents from health hazards of water pollution, protect the County's sensitive marine habitats and prevent the degradation of the scenic character of the region.*
- Policy 5.4.1      *Protecting the Monterey Bay National Marine Sanctuary from Adverse Impacts. Prohibit activities which could adversely impact sensitive habitats of the Monterey Bay National Marine Sanctuary, including the discharge of wastes and hazardous materials. The main sources of concern are wastewater discharge, urban runoff, toxic agricultural drainage water, including that originating outside of Santa Cruz County, and the accidental release of oil or other hazardous material from coastal tanker traffic.*
- Policy 5.4.14      *Water Pollution from Urban Runoff. Review proposed development projects for their potential to contribute to water pollution via increased storm water runoff. Utilize erosion control measures, on-site detention and other appropriate storm water best management practices to reduce pollution from urban runoff.*
- Objective 5.5a      *Watershed Protection. To protect and manage the watersheds of existing and future surface water supplies to preserve the quality and quantity of water produced and stored in these areas to meet the needs of County residents, local industry, agriculture, and the natural environment.*
- Objective 5.5b      *San Lorenzo River Watershed Management. To restore, manage, and protect the San Lorenzo River Watershed to maximize the quality and quantity of water resources in that basin.*
- Objective 5.5c      *Least Disturbed Watersheds. To protect the Least Disturbed Watershed areas that support the remaining clear running streams to preserve their water supply, recreation, and the wildlife support values.*
- Objective 5.7      *Maintaining Surface Water Quality. To protect and enhance surface water quality in the County's streams, coastal lagoons and marshes by establishing best management practices on adjacent land uses.*
- Policy 5.7.1      *Impacts from New Development on Water Quality. Prohibit new development adjacent to marshes, streams and bodies of water if such development would cause adverse impacts on water quality which cannot be fully mitigated.*

- Policy 5.7.2      *Minimum Septic System Setback from Natural Waterways. Prohibit installation of septic tanks or leach fields within 100 feet of all natural waterways including perennial or intermittent streams, seasonal water channels and natural bodies of standing water.*
- Policy 5.7.5      *Protecting Riparian Corridors and Coastal Lagoons. Require drainage facilities, including curbs and gutters in urban areas, as needed to protect water quality for all new development within 1,000 feet of riparian corridors or coastal lagoons.*
- Policy 5.7.6      *Maintaining Saltwater Inflow to Coastal Lagoons. Prohibit new development, site alteration or road projects adjacent to coastal lagoons unless it can be demonstrated that such projects will not restrict, impound or otherwise interfere with the natural drainage patterns and tidal circulation.*
- Policy 5.7.7      *Stormwater Discharge Permit Requirements. Once the State and Regional Water Quality Control Boards promulgate new stormwater discharge permit requirements for municipal and industrial stormwater systems, obtain appropriate permits for all existing storm drainage systems and proposed drainage facilities and adhere to best management practices.*
- Objective 5.8a      *Groundwater Protection. To protect the quantity and quality of the County's groundwater resources through an integrated program of land use regulation and runoff management in groundwater recharge areas, careful water quality monitoring and management of extractions consistent with long-term sustainable water supply yields.*
- Objective 5.8b      *Overdrafted Groundwater Basins. To act directly and coordinate and work with relevant water purveyors and agencies to eliminate long-term groundwater overdraft in all water basins where overdraft has been documented.*
- Objective 6.4      *To protect new and existing structures from flood hazards in order to minimize economic damages and threats to public health and safety, and to prevent adverse impacts on floodplains, and maintain their beneficial function for flood water storage and transport for biotic resource protection.*
- Policy 6.4.1      *Geologic Hazards Assessment Required in Flood Hazard Areas. Require a geologic hazards assessment of all development proposals within the County's flood hazard areas in order to identify flood hazards and development constraints.*
- Policy 6.4.2      *Development Proposals Protected from Flood Hazard. Approve only those grading applications and development proposals that are adequately protected from flood hazard and which do not add to flooding damage potential. This may include the requirement for foundation design which minimizes displacement of flood waters, as well as other mitigation measures.*



- Policy 6.4.3      *Development on or Adjacent to Coastal Bluffs and Beaches. Allow development in areas immediately adjacent to coastal bluffs and beaches only if a geologist determines that wave action, storm swell and tsunami inundation are not a hazard to the proposed development or that such hazard can be adequately mitigated. Such determination shall be made by the County Geologist, or a certified engineering geologist may conduct this review at applicant's choice and expense. Apply Coastal Bluffs and Beaches policies.*
- Policy 6.4.4      *Locate Public Facilities Outside Flood Hazard Areas. Require new utilities, critical facilities, and non-essential public structures to be located outside the 100-year flood and coastal high hazard areas, unless such facilities are necessary to serve existing uses, there is no other feasible location, and construction of these structures will not increase hazards to life or property within or adjacent to the floodplain or coastal inundation areas.*
- Policy 6.4.9      *Septic Systems, Leach fields, and Fill Placement. Septic systems and leach fields to serve previously undeveloped parcels shall not be located within the floodway or 100-year floodplain. The capacity of existing systems in the floodway or floodplain shall not be increased. Septic systems shall be designed to avoid impairment or contamination. Allow the placement of fill within the 100-year floodplain in the minimum amount necessary, not to exceed 50 cubic yards. Fill shall only be allowed if it can be demonstrated that the fill will not have cumulative adverse impacts on or off site. No fill is allowed in the floodway.*

*City of Santa Cruz.* The City of Santa Cruz Municipal Code Chapter 16.19 is the Storm Water and Urban Runoff Pollution Control ordinance for the City. The ordinance provides the legal framework by which the City maintains stormwater pollution prevention, including BMPs. Chapter 24.14.050 of the Santa Cruz Municipal Code includes provisions for drainage control and Chapter 24.14.400 provides regulations for flood plain management.

The City of Santa Cruz has also developed a comprehensive SWMP (2009) to fulfill the requirements for the Phase II NPDES General Permit for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems (MS4 General Permit) and to reduce the amount of pollutants discharged in urban runoff. The SWMP includes eight programs to achieve this goal, including runoff control policies, outreach and education efforts, site visits, and the implementation of BMPs.

The City of Santa Cruz General Plan 2030 (2012) also includes the following goals and policies:

- Goal CC 5      *A sustainable and efficient stormwater system.*
- Policy CC5.1.1      *Implement the City's stormwater quality program.*
- Policy CC5.1.2      *Maintain clear flow of the storm drain system.*
- Policy CC5.1.5      *Strive to contain drainage within each drainage basin.*



<u>Policy CC5.1.8</u>	<i>Require new development to maintain predevelopment runoff levels.</i>
<u>Policy CC5.1.9</u>	<i>Reduce stormwater pollution.</i>
<u>Goal HZ6</u>	<i>Protection from natural hazards.</i>
<u>Policy HZ6.4</u>	<i>Avoid or reduce the potential for life loss, injury, and property and economic damage from flooding.</i>
<u>Impl. HZ6.4.1</u>	<i>Address the effects of global warming through changes in land use and building codes for low-lying areas that may be flooded by increases in sea levels and storm violence.</i>
<u>Impl. HZ6.4.5</u>	<i>Continue to reduce flooding hazards in areas with flood potential.</i>
<u>Impl. HZ6.4.6</u>	<i>Regulate and provide guidelines for construction and development in flood plains.</i>
<u>Impl. HZ6.4.7</u>	<i>Restrict or prohibit uses in undeveloped flood areas, and maintain flood plain and floodway regulations in developed flood areas.</i>
<u>Impl. HZ6.4.8</u>	<i>Minimize the alteration of natural flood plains, stream channels, and natural protective barriers that accommodate or channel floodwaters.</i>
<u>Impl. HZ6.4.9</u>	<i>Control filling, grading, dredging, and other development that may increase flood potential.</i>
<u>Impl. HZ6.4.10</u>	<i>Limit the amount of impervious surface in flood-prone areas.</i>
<u>Policy HZ6.6</u>	<i>Avoid or reduce the potential for life loss, injury, and property and economic damage to the city from tsunamis and dam failure.</i>
<u>Impl. HZ6.6.1</u>	<i>Continue to enhance emergency management systems and develop patrol activities to ensure early warning for evacuation of areas susceptible to natural flooding, tsunami inundation, seiches, or dam failure.</i>

*City of Capitola.* The City of Capitola Municipal Code Chapter 17.50 provides policies and standards for development in the floodplain district. As previously mentioned, the City of Capitola, in conjunction with the County of Santa Cruz, has also adopted a SWMP, which provides guidelines for preventing stormwater pollution.

The Capitola General Plan is currently being updated, and a Public Review Draft General Plan is anticipated for June 2013. The current General Plan, adopted 1989, includes the following policies regarding water quality and flooding:

<u>Policy 13</u>	<i>The City shall, as a condition of new development, ensure that run off does not significantly impact the water quality of Capitola's creeks and wetlands through increased sedimentation, biochemical degradation, or thermal pollution.</i>
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Policy 17                      *(Tsunamis) Measures to mitigate possible flooding shall be submitted for all new structures that will be occupied by the public located in areas as shown on Map VII-3.*

*City of Watsonville.* The City of Watsonville Municipal Code Chapter 2, Section 9-2 provides policies and standards for floodplain management. Chapter 6, Section 7-6, of the City of Watsonville Municipal Code also provides policies and standards for development regarding drainage and runoff.

The City of Watsonville has also developed a Stormwater Management Plan (2009) that provides detailed information on programs and policies aimed at protecting and enhancing the water quality of local sloughs and creeks.

An updated City of Watsonville General Plan was adopted by the City Council in January 2013, but was subsequently challenged in court and is on hold until resolution on the legal issues can be reached. Therefore, at this time, the 2005 General Plan remains in effect. The existing 2005 General Plan, adopted in 1994, includes the following goals, policies, and implementation measures to protect water quality and minimize risks from flood hazards:

Impl. 11.2.12                      *Point and Non-Point Pollutants. The City will control pollutants from point and non-point sources through a comprehensive NPDES Storm water program.*

Goal 11.3                      *Design Strategies for Storm water Quality and Infiltration. Encourage Best Management Practices in design of storm water facilities for effective and practical pollution and water flow control.*

Policy 11.3.1                      *All projects shall incorporate Storm water Best Management Practices that achieve the most effective control of pollutants and flow control practicable.*

Impl. 13.1.21                      *Risk Mitigation. The City shall identify and mitigate to an acceptable level of risk new development proposed in areas with geologic, seismic, flood, or other environmental constraints.*

Policy 13.3.1                      *Flood Hazard Reduction. The City shall pursue the protection of new and existing development from the impacts of flooding up to the 100-year event.*

Impl. 13.3.11                      *Flood Protection. The City shall require new development to conform to the Flood Damage Prevention Ordinance and the guidelines of the National Flood Insurance Program.*

*Monterey County.* Segment 20 of the proposed MBSST Network project, which is 0.74 miles long, would be located in Monterey County. The purpose of this segment is to provide a regional connection to the Monterey County section of the Monterey Bay Sanctuary Scenic Trail. Implementation of this section would require cooperation and coordination with the Transportation Agency for Monterey County (TAMC) and the County of Monterey. Monterey County General Plan goals and policies, as well as Monterey County Municipal Code regulations, would apply to this segment.

#### 4.9.2 Impact Analysis

**a. Methodology and Significance Thresholds.** The following thresholds are based on Appendix G of the *State CEQA Guidelines*. Impacts would be significant if the proposed MBSST Network would result in any of the following:

- 1) *Violate any water quality standards or waste discharge requirements;*
- 2) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;*
- 3) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;*
- 4) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;*
- 5) *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;*
- 6) *Otherwise substantially degrade water quality;*
- 7) *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;*
- 8) *Place within a 100-year flood hazard area structures which would impede or redirect flood flows;*
- 9) *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; and/or*
- 10) *Be subject to inundation by seiche, tsunami, or mudflow.*

It should be noted that the MBSST Network would not include the construction of houses and the two dams in Santa Cruz County do not show indications of failure or damage. As a result, the checklist items related to these conditions were excluded from the above list and further discussion can be found in the Initial Study (Appendix A of this document).

#### **b. Project Impacts and Mitigation Measures.**

**Impact H-1**     **Construction of the MBSST Network project would increase stormwater runoff due to the increase in impervious surface in the project area, which could also degrade water quality. The proposed Master Plan includes design standards to maintain historic run-off volumes. In addition, compliance with federal, state, and local regulations would ensure historic runoff volumes are maintained and water quality standards are met. Impacts related to surface runoff volumes and water quality would be Class III, less than significant.**

The proposed MBSST Network project would increase impervious surfaces within the MBSST Network by adding a paved multi-use trail and on-road pedestrian and bicycle improvements. Based on an average width of approximately 12 feet for the multi-use paved path and six feet for on-road improvements, the proposed MBSST Network project would add an estimated 53.1

acres of impervious surfaces. Such surfaces would increase the amount of runoff following storm events, and water quality could be degraded as a result. While water quality impacts would be minimized because the trail would not allow the use of motorized vehicles or include the use of industrial or hazardous materials, polluted runoff could still result from litter or animals on the trail. The MBSST Network would pass through 16 watersheds and cross over 52 streams, which include intermittent and perennial streams, as well as swales. Given the number of stream crossings throughout the trail, polluted runoff would remain a concern. In addition, construction activities would have the potential to result in discharges to nearby drainages.

The linear nature of the trail, and its relatively narrow width, would minimize a change in runoff potential at any given location. The Master Plan also includes design standards that would prevent an increase in historic runoff volumes, as described under *Mitigating Design Features*, below. Furthermore, each jurisdiction that the trail passes through has drainage standards that would prevent an increase in on-site runoff volumes for new development or re-development projects, as mentioned in Section 4.9.1(d) (Regulatory Setting). Each portion of the trail would be required to comply with the existing policies and standards in place for the local jurisdiction pertaining to stormwater runoff.

Regulations under the CWA would require that the proposed MBSST Network obtain CWA permits, including Section 401, Section 404, and NPDES permits. Permits would be required for each phase of construction of the MBSST Network and would be obtained by each implementing entity prior to construction. Construction activities associated with each segment would also require a General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ), even if the segment under construction would disturb less than one acre of soil (as it would be part of a larger plan of development that disturbs more than one acre). The Construction General Permit requires the development and implementation of a SWPPP. The SWPPP should identify stormwater collection and discharge points, drainage patterns across the project, and BMPs that the discharger will use to prevent pollution of stormwater runoff and the placement of those BMPs.

In addition to federal and state regulations regarding stormwater runoff and pollution prevention measures, each local jurisdiction has a SWMP in place to further guide runoff control measures during construction and operation of the MBSST Network. The SWMPs are supported by municipal code regulations in each jurisdiction, which provide the legal framework for stormwater runoff control. Adherence to existing federal, state, and local regulations regarding stormwater runoff would reduce impacts to a less than significant level.

*Mitigating Design Features.* Chapter 5 of the proposed MBSST Network Master Plan identifies drainage and erosion control methods that would be implemented during construction and operation of the MBSST Network project, including engineering to prevent an increase of historic runoff onto other properties, channelization, culverts, improved bridge crossings, and minimization of siltation. The implementation of drainage and erosion control strategies would reduce impacts to on- and off-site runoff during construction and operation of the trail.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

**Impact H-2 Construction and operation of the MBSST Network would be required to comply with existing federal, state, and local standards regarding water quality associated with the use of septic systems. Impacts associated with the degradation of water quality due to a septic system would be Class III, less than significant.**

One new public restroom facility would be constructed within the Watsonville reach. Although its precise location has not been determined, it is anticipated that this restroom would be in a predominantly rural location and utilize a septic disposal system. Because the location is unknown, the depth to groundwater cannot be determined and therefore the potential for groundwater contamination exists. However, the State and County have several regulations to prevent septic systems from causing pollution or presenting a serious public health hazard. The RWQCB has developed many standards for proper septic system installation, including: groundwater separation, stream and well setbacks, slope limitations, minimum system sizing requirements, and allowances for use of alternative technologies. These standards are contained in the Basin Plan. The RWQCB has conditionally delegated authority to oversee and regulate the installation of septic systems to the County Environmental Health Service through a memorandum of understanding. The County must comply with the minimum standards contained in the Basin Plan in order to keep the authority to permit septic systems. In addition, Section 7.38 of the Santa Cruz County Code (the Sewage Disposal Ordinance) specifies the standards for septic system installation in Santa Cruz County. Any installation, replacement, or significant repair of any part of a septic system requires a permit from Environmental Health. As part of the permit process, the proposed work is designed by a consultant, septic contractor, or the property owner, and described on the septic permit application form and a detailed plot plan. Environmental Health staff review the application and relevant information for the area on soils, groundwater depth, and site conditions in order to determine whether the proposal meets the standards as established by the State and the County. If inadequate information exists, additional soil or groundwater testing may also be needed prior to approval of the application. Once the application is approved, the Environmental Health Inspector conducts several progress inspections of the installation to ensure the work is done as indicated and that it is in compliance with standards. Minor changes to an approved permit may be allowed to accommodate actual field conditions encountered during the installation process. However, the discovery of soil conditions or high groundwater levels substantially different than those expected may require the work to stop until the project can be redesigned to meet standards. Compliance with existing state and local policies and standards would ensure that water quality impacts resulting from the installation of a septic disposal system would be less than significant.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

**Impact H-3 There are several streams within the MBSST Network vicinity that are designated as “impaired waterbodies.” The MBSST Network project would not increase pollutants of concern associated with impaired water bodies in the vicinity. Impacts**



**associated with the degradation of water quality would be Class III, less than significant.**

Several streams within the MBSST Network are considered “impaired waterbodies” through the CWA Section 303(d) Listing Policy, as described in Section 4.9.1(d) (Regulatory Setting). The pollutants of concern in each of the reaches are discussed below.

*Northern Reach.* The only stream on the Section 303(d) list in the northern reach is San Vicente Creek. The pollutant of concern is sedimentation/siltation and is being considered for removal from the Section 303(d) list. The proposed MBSST Network could contribute sedimentation into the system, primarily during construction activities. However, the Master Plan outlines drainage and erosion control methods that will be implemented during construction and operation of the MBSST Network, including engineering to prevent an increase of historic runoff onto other properties, channelization, culverts, improved bridge crossings, and minimization of siltation. These measures would ensure that the MBSST Network would not contribute to water quality impacts associated with sedimentation/siltation of this stream.

*Central Reach.* Impaired water bodies in the central reach include Moore Creek, San Lorenzo River Lagoon, Carbonera Creek, Branciforte Creek, Arana Gulch, Rodeo Creek Gulch, Soquel Creek, Nobel Gulch, Porter Gulch, and Aptos Creek. Pollutants of concern include nutrients, pathogens, escherichia coli (*E. coli*), sedimentation/siltation, chlorpyrifos, fecal coliform, enterococcus, low dissolved oxygen, pH, and turbidity. The sources of these pollutants come from the urban interface, such as septic systems, urban runoff, transient encampments, collection system failures, construction/land development, and non-point source discharges, as well as natural sources. This reach of the trail would not include the use of a septic disposal system, as no bathrooms are proposed in this reach. In addition, erosion control measures and stormwater runoff measures, as discussed under the *Northern Reach* discussion above, would ensure that the MBSST Network would not contribute to pollutants of concern associated with urban runoff, construction/land development, and non-point source discharges. As such, impacts to water quality along the central reach of the MBSST Network would be less than significant.

*Watsonville Reach.* Impaired water bodies in the Watsonville reach include Harkins Slough, Gallighan’s Slough, and Watsonville Slough. Pollutants of concern include pathogens, low dissolved oxygen, chlorophyll-a, pesticides, and turbidity. The sources of these pollutants come from agriculture, collection system failure, landfills, grazing-related sources, urban runoff, nonpoint source discharges, removal of riparian vegetation, as well as natural sources. Pollutants associated with septic disposal systems are not included on the Section 303(d) list for waterbodies in the Watsonville reach. In addition, the existing state and local policies in place to regulate septic disposal systems would prevent the discharge of pollutants. The proposed MBSST Network would not include agricultural or landfill related-uses and would therefore not contribute to pollutants associated with those activities. While some riparian vegetation removal would be required in areas of bridge construction, substantial vegetation removal would not be required. In addition, erosion control and stormwater runoff measures, as discussed under the *Northern Reach* discussion above, would ensure that the MBSST Network would not contribute to pollutants of concern associated with urban runoff and non-point

source discharges. As such, impacts to water quality along the Watsonville reach of the MBSST Network would be less than significant.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

**Impact H-4**    **The proposed MBSST Network project would introduce approximately 53.1 acres of impervious surfaces to Santa Cruz County, which is a region that derives 80 percent of its water supply from groundwater. However, the MBSST Network is not located in a PGR Zone. Impacts associated with groundwater recharge would be Class III, *less than significant*.**

A decrease in aquifer volume or groundwater levels could occur if the proposed MBSST Network project interfered with groundwater recharge. However, as mentioned above in Section 4.9.1 (Setting), no portion of the trail would fall within a primary groundwater recharge (PGR) zone. The PGR zones within Santa Cruz County are typically found at higher elevations along the Santa Cruz Mountains and foothills. The coastal location of the MBSST Network limits the potential for groundwater recharge due to the interface with the saltwater table. As such, impacts to groundwater recharge would be less than significant.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

**Impact H-5**    **Portions of the proposed MBSST Network project would be constructed within the 100-year flood plain and would be subject to periodic inundation during major storm events. Construction of the proposed MBSST Network bridge crossings could also alter the flow characteristics of the drainages it would cross, possibly resulting in greater upstream flooding during major flood events. This is a Class II, *significant but mitigable* impact.**

*Northern Reach.* There are several areas in the northern reach within the 100-year flood hazard zone, as shown in Figure 4.9-1a. These areas are located in the Waddell Creek and Scott Creek areas, as well as numerous areas between Davenport and Wilder Ranch. In these areas, the proposed trail features would be more likely to impede flows in the event of a substantial storm event. While many of the trail facilities in this portion of the MBSST Network are existing unpaved trails, the construction of bridge crossings could impede drainage and result in potential flooding upstream if the flow path of the waterway is constricted or obstructed by the trail bridges, or by debris caught behind these new bridges. Changes to flood flows in these portions of the northern reach would be potentially significant.

*Central Reach.* There are several areas in the central reach within the 100-year flood hazard zone, as depicted in Figure 4.9-1b. These areas are primarily limited to the river mouths of the San Lorenzo River, Arana Gulch, and Soquel Creek. These areas of the MBSST Network

would be exposed to flood damage, including washouts and scouring, in the event of a substantial storm event. These areas of the trail would include the construction of new trail features, including a multi-use paved path, bike and pedestrian bridges, as well as trail amenities, such as signs, trash cans, kiosks, benches, fences, and historical and educational exhibits. In addition, the construction of bridge crossings could impede drainage and result in potential flooding upstream if the flow path of the waterway is constricted or obstructed by the trail bridges, or by debris caught behind these new bridges. Changes to flood flows in these portions of the central reach would be potentially significant.

*Watsonville Reach.* A large portion of the MBSST Network falls within 100-year flood hazard zone surrounding the Pajaro River, between the Pajaro Dunes area and the City of Watsonville, as shown in Figure 4.9-1c. These areas of the trail would include the construction of new trail features, including bike and pedestrian bridges and a restroom facility. , the construction of bridge crossings or the restroom facility could impede drainage and result in potential flooding upstream if the flow path of the waterway is constricted or obstructed by the trail bridges, or by debris caught behind these new bridges. Changes to flood flows in these portions of the Watsonville reach would be potentially significant.

The CBC sets forth standards for construction of buildings and structures within flood hazard zones. The proposed MBSST Network project would also be required to comply with standards set forth by AASHTO LRFD Bridge Design Specifications, AASHTO Guide Specifications for the Design of Pedestrian Bridges, Caltrans LRFD, and Caltrans Highway Design Manual. In addition, each local jurisdiction has construction standards for buildings and structures within flood hazard zones set forth in their respective municipal codes. Compliance with existing building code standards would help reduce flood impacts along the MBSST Network. Mitigation would also be required to reduce impacts related to flood flows to a less than significant level. Because the trail would not include any structures that would be inhabited by people, and trail use during storm events would be limited, flood impacts associated with risk to humans would be less than significant.

Mitigation Measures. The following measures are required to reduce flood-related impacts.

**H-5(a) Bridge Design.** The plans for proposed creek bridges shall be submitted to the planning and/or building department of the jurisdiction in which the segment is located for review and approval. Bridges shall be designed to ensure that pre-project flood flows are maintained, such that upstream flooding does not occur. All recommendations in bridge design made by reviewing bodies shall be considered for implementation. These may include, but would not be limited to: structural anchoring, increase in base-flood elevation, and floodproofing techniques, such as the use of paints, membranes or mortars to reduce seepage, reinforcement to resist water pressure, addition of mass or weight to structure to resist flotation.

**H-5(b) Trail Inspection Program.** Within 10 calendar days following flooding events, the trail shall be inspected by the Trail Manager

or its designee to determine if damage has occurred or if debris has collected and constricted water flow around the bridges. If damage or debris is found, it shall be repaired or cleared immediately. If repair is required, temporary signage shall be posted to indicate the trail's closure until damage is repaired. Routine bridge inspections shall be conducted by the Trail Manager or its designee on an annual basis.

Significance After Mitigation. The measures above would reduce potential flooding impacts to a less than significant level.

**Impact H-6    Portions of the proposed MBSST Network project would be constructed within tsunami inundation and seiche hazard zones. Existing tsunami warning systems and compliance with state and local policies regarding construction in tsunami zones would reduce potential hazards. This is a Class III, less than significant impact.**

*Northern Reach.* There are two small areas in the northern reach that are in the tsunami run-up zone. These areas are located in the Waddell Creek and Scott Creek areas, as depicted in Figure 4.9-2a. In these areas, the proposed trail would be more likely to experience flood damage, including washouts and scouring, in the event of a tsunami. While many of the trail facilities in this portion of the MBSST Network are existing unpaved trails, there are some areas where construction of new trail features would occur, such as a multi-use paved path and bike/pedestrian bridge, as well as trail amenities, such as signs, trash cans, kiosks, benches, fences, and exhibits. A tsunami event could potentially cause damage to these trail features or loss of life to those using the trail during a tsunami event. This portion of the MBSST Network is not located adjacent to an enclosed or semi-enclosed body of water and is therefore not subject to flooding from seiche events.

*Central Reach.* There are several areas in the central reach that are in the tsunami run-up zone. These areas are located near the San Lorenzo River and the Arana and Rodeo Gulches, as depicted in Figure 4.9-2b. In these areas, the proposed trail would be more likely to experience flood damage, including washouts and scouring, in the event of a tsunami event. These areas of the MBSST Network would include the construction of new trail features, such as a multi-use paved path, bike and pedestrian bridges, and trail amenities, such as signs, trash cans, kiosks, benches, fences, and exhibits. A tsunami event could potentially cause damage to these trail features or loss of life to those using the trail during a tsunami event. In addition, most of this reach of the MBSST Network is located adjacent to the Monterey Bay, which has the potential for seiche events. While not all seiche events result in flooding, a large seiche event could cause damage similar to a tsunami event and the same areas would be at risk.

*Watsonville Reach.* There is only one small area in the Watsonville reach that would be near a tsunami run-up zone. This area is located near La Selva Beach, as shown in Figure 4.9-2c. In this area, the proposed trail would be more likely to experience flood damage, including washouts and scouring, in the event of a tsunami event. This area of the MBSST Network would include the construction of new trail features, such as a multi-use paved path, bike and pedestrian bridges, restroom facility, and trail amenities, such as signs, trash cans, kiosks,



benches, fences, and exhibits. A tsunami event could potentially cause damage to these trail features or loss of life to those using the trail during a tsunami event. In addition, the northern portion of this reach is located adjacent to Monterey Bay, which has the potential for seiche events. While not all seiche events result in flooding, a large seiche event could cause similar damage as a tsunami event and the same areas would be at risk.

Although nothing can ensure that structures do not fail under a large tsunami or seiche event, proper engineering can minimize the risk to life and property. The CBC sets forth standards for construction of buildings and structures within flood hazard zones. The proposed MBSST Network project would also comply with standards set forth by AASHTO LRFD Bridge Design Specifications, AASHTO Guide Specifications for the Design of Pedestrian Bridges, Caltrans LRFD, and Caltrans Highway Design Manual. In addition, each local jurisdiction has construction standards for buildings and structures within flood hazard zones set forth in their respective municipal codes. Compliance with existing building code standards would reduce seiche and tsunami impacts along the MBSST Network to the extent of industry standards and impacts would be less than significant. In addition, tsunami warning systems are in place to warn trail users of a potential tsunami threat. Existing warning and emergency evacuation systems would prevent loss of life for trail users during a tsunami event. Following a tsunami warning, the Trail Manager would coordinate with the appropriate agencies to close the trail and post any warning signs.

Mitigation Measures. No mitigation measures are required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

**c. Cumulative Impacts.** Additional development resulting from buildout of Santa Cruz County and the cities of Santa Cruz, Capitola, and Watsonville would create more impermeable surface and, therefore, more runoff within local waterways. This is anticipated to exacerbate flooding in stream channels of the area, and potentially contribute to flooding and damage of property downstream of new development.

The proposed MBSST Network project would incrementally contribute to this cumulative increase in surface water runoff, flood potential, and water quality degradation. The County and affected cities have policies, including maintaining historic runoff volumes, to mitigate flooding caused by cumulative development. Addressing flooding impacts from increased runoff on a regional basis for the watersheds in Santa Cruz County would be expected to reduce cumulative impacts to a less than significant level.

The increase in stormwater runoff resulting from the proposed MBSST Network project, in conjunction with cumulative development, would also contribute to a potential degradation of water quality within the watershed. However, NPDES requirements, as well as requirements imposed by local jurisdictions, when implemented on a project-by-project basis, would reduce potential water quality impacts to a less than significant level.

Development of cumulative projects in Santa Cruz County would adversely impact groundwater recharge of the underlying groundwater. The increase in development would increase the impermeable surfaces that otherwise could contribute to groundwater recharge.

However, due to its coastal location, the MBSST Network is not located within a groundwater recharge zone. Furthermore, the County of Santa Cruz has design standards in place to limit and regulate construction within groundwater recharge zones, which would be applicable to cumulative development within the region. Therefore, the proposed Master Plan would not substantially contribute to an overall adverse impact of cumulative development on groundwater recharge of the basin.

Cumulative development could incrementally increase exposure to flood hazards due to construction in flood hazard zones, tsunami run-up zones or seiche hazard zones. New buildings or structures could be subject to damage resulting from flooding and could potentially endanger human lives. However, all new development would be subject to federal, state, and local regulations regarding construction in flood hazard areas and would be addressed on a project-by-project basis. Existing regulatory policies and construction and design standards would ensure that cumulative impacts related to flood hazards would be less than significant.