

# SECTION C

## Objectives





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## Acronyms Appearing in this Section

ABAG	Association of Bay Area Governments
ACWD	Alameda County Water District
AF	acre-feet
AFY	acre-feet per year
BAWP	Bay Area Watershed Plan
Bay	San Francisco Bay
Bay-Delta	San Francisco Bay/Sacramento–San Joaquin Delta watershed
BMPs	best management practices
CCWD	Contra Costa Water District
Corps	U.S. Army Corps of Engineers
CVP	Central Valley Project
DBP	disinfection byproducts
EBMUD	East Bay Municipal Utility District
EDCs	endocrine disrupting compounds
FAD	functional area document
FADs	functional area documents
FP-SM	Flood Protection and Stormwater Management
IRWMP	Integrated Regional Water Management Plan
NPDES	National Pollutant Discharge Elimination System
PCBs	polychlorinated biphenyls
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SFPUC	San Francisco Public Utilities Commission
Sonoma CWA	Sonoma County Water Agency
SWP	State Water Project
TCC	Technical Coordinating Committee
TDS	total dissolved solids
TMDL	total maximum daily load
TMDLs	total maximum daily loads
TOC	total organic carbon
WM-HP&R	Watershed Management, Habitat Protection and Restoration
WS-WQ	Water Supply and Water Quality
WW-RW	Wastewater and Recycled Water

## Section C Objectives

### *IRWMP Appendix A Guidelines*

#### *Section C: Objectives*

- *Identify IRWMP Plan objectives and the manner in which they were determined. The Plan must address major water-related objectives and conflicts within the region, including water supply, groundwater management, ecosystem restoration, and water quality.*

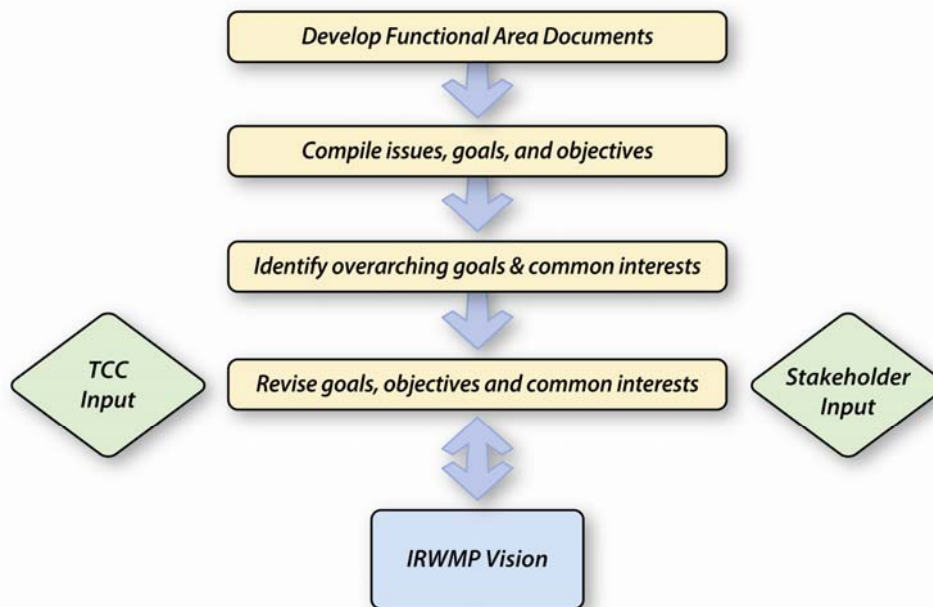
This section discusses the various conflicts and challenges facing the Bay Area water resources management entities and the goals and objectives identified to address those challenges.

### C.1 Development of IRWMP Vision, Goals and Objectives

The process for developing the vision, goals and objectives for the IRWMP is shown in Figure C-1. As shown in this Figure, the Bay Area IRWMP began with the development of Functional Area Documents (FADs) that focused on the following water resources management areas:

- Water Supply and Water Quality (WS-WQ)
- Wastewater and Recycled Water (WW-RW)
- Flood Protection and Stormwater Management (FP-SM)
- Watershed Management, Habitat Protection and Restoration (WM-HP&R)

Regional water resources management goals and objectives were developed for each functional area. As described in Section C.6, the process of identifying key goals and objectives was unique to each functional area. Each FAD outlines regional goals and objectives for that functional area based on geographic integration of established local agency plans, projects, and programs.



**Figure C-1: Development of Regional Goals, Objectives, Common Interests and IRWMP Vision**



The process of identifying and developing regional goals and common interests that transcend the functional areas involved the following steps:

- Compiling the issues, conflicts and challenges from each of the FADs and defining the common water resource management interests.
- Compiling the various goals and objectives identified in each of the FADs to address water management challenges and identifying overarching goals that transcend all function areas of water resource management.
- Revising overarching goals and objectives based on stakeholder input and feedback and developing a vision to guide implementation of the IRWMP.

Stakeholder outreach and involvement, discussed in Section N: *Stakeholder Involvement*, was critical to this process. Proposed goals and objectives for the Bay Area IRWMP were discussed at both Stakeholder Workshops 1 and 2. This open and transparent decision-making process was important to ensure that all perspectives within the region were considered in the IRWMP. Additionally, many of the local planning documents that serve as the basis for this IRWMP involved extensive stakeholder involvement programs as well.

Identification of overarching goals, objectives, and common interests for the Bay Area IRWMP assisted in focusing the vision for IRWMP implementation. Ongoing refinement of goals, objectives, and common interests helped to clarify desired physical contributions of the IRWMP to ongoing planning processes and programs, as well as individual agency missions. In contrast, the IRWMP vision statement assists in describing the collaborative IRWMP process itself. The vision to guide the development and implementation of the Bay Area IRWMP is:

***Working together to enhance sustainable water resources management to support a high quality of life in the Bay Area.***

The following sections present the water resources management challenges, common interests, and overarching goals and objectives of the IRWMP.

## **C.2 Bay Area Water Resources Management Conflicts and Challenges**

The *2005 California Water Plan Update* identified several water management challenges facing the Bay Area, including

- improving water supply reliability to sustain water supplies in drought periods and other emergency outages;
- maintaining and improving drinking water quality across the region by continuing to meet and exceed current and anticipated drinking water quality standards and protecting drinking water sources;
- improving the ecosystem health of San Francisco Bay;
- linking local land use planning with water system planning and improving water management planning on a regional level.

These issues, as well as other regional challenges identified by the four FADs are described in the following sections.



## C.2.1 Water Supply Challenges

Water agencies throughout the region face a variety of challenges threatening their ability to provide an adequate supply to meet the needs of their customers. Water supply challenges facing the region include threats to baseline supplies, increasing demands, hydrologic variations, and infrastructure vulnerability.

### Threats to Baseline Supplies

Protecting existing baseline supplies is of critical importance for ensuring reliable water supplies for the Bay Area. A variety of external constraints threaten to reduce or eliminate these supplies in the future.

- *Delta supplies* are threatened by regulatory constraints on Delta exports, risk of catastrophic failure, and local facilities operations (e.g., fish flows, temperature requirements, diversions, dam safety).
- *Surface water supplies* are threatened by reductions in local yield and/or carryover storage due to seismic concerns and sedimentation, as well as the use of water to meet regulatory requirements (i.e. environmental requirements).
- *Groundwater supplies* are threatened by potential pollution and overdraft.

Protecting existing water supplies continues to be a resource-intensive process, and Bay Area agencies have invested large amounts of time and funding simply to preserve their existing baseline supplies.

### Increasing Demands

The Bay Area continues to be a popular area to live and work, and ABAG predicts the population will increase from 7.0 million in 2004 to 8.2 million in 2020. Even though the Bay Area has made significant gains in reducing per capita water use through conservation measures, many agencies predict a shortfall in meeting future demands with their current supply portfolios, especially in dry years.

### Hydrologic Variations

Many sources of supply for the Bay Area are limited in dry years. If the Bay Area experiences another multi-year drought similar to that of the 1987-1992 drought, the following supply reductions are expected for the region:

- 60% reduction in SWP supplies
- 25% reduction in CVP supplies
- 30% reduction in Tuolumne supplies
- 40% reduction in Mokelumne supplies
- 50% +/- reduction in local supplies

### Infrastructure Vulnerability

Water resources infrastructure in the Bay Area is vulnerable to effects from seismic activity, levee failures, sedimentation, and system security breaches.

**Seismic Activity.** Since the Bay Area lies between several seismically active faults, Bay Area water agencies are continually faced with the challenge of retrofitting major aqueducts, storage facilities, pipelines and pump stations to enable the delivery of water supplies in the event of an earthquake. Many older dams require retrofit projects to restore original capacity, potentially at great cost to the owning agencies. For example,





the Calaveras Reservoir lies above an active fault zone. The California Division of Safety of Dams (DSOD) has directed the SFPUC to operate the reservoir at less than 30% of capacity to avoid potential breach of the dam in an earthquake. In order to make use of the full 97,000 AF of storage, the dam must be replaced. Similarly, an EBMUD-commissioned study of San Pablo Dam found that some of the soils and foundation of the dam are susceptible to liquefaction. In the event of a major earthquake on the Hayward Fault, the dam may lose height, resulting in downstream flooding. Until the dam is seismically upgraded, EBMUD has lowered the water level behind the dam to mitigate this risk.

**Levee Failures.** Many Bay Area agencies rely on the Delta as a major source of supply, and other Bay Area agencies' supplies are conveyed in pipes that cross the Delta. Vulnerability of Delta infrastructure presents a significant threat to the reliability and quality of these agencies' supplies. A recent example of the potential vulnerability of Delta infrastructure is the failure of the Upper Jones Tract Middle River levee on June 3, 2004, approximately two miles northeast of CCWD's Old River Pumping Station. This failure resulted in flooding of approximately 11,000 acres of farmland, threatening significant salt and organic matter contamination to Delta users, and requiring Tracy pumping to be reduced for a six day period. Many downstream users were forced to rely on groundwater, storage, and alternate supplies during this period.

**Sedimentation.** Many Bay Area water agencies are also faced with the dilemma of limited and/or reduced storage capacity due to sedimentation. For example, many Bay Area reservoirs are gradually decreasing in capacity because of the deposition of sediments. The decrease in storage equates to a decrease in available supplies and therefore poses a serious supply reliability problem for these agencies. Additional resources are necessary to ensure existing storage is maintained and safeguarded.

**System Security Threats.** In the current political climate, the vulnerability of water systems to physical and chemical threats cannot be ignored or allowed to go unmitigated. Minimizing potential system security breaches and threats to water supply infrastructure involves establishing comprehensive monitoring systems, preventing access to unauthorized individuals and creating an emergency plan in the event of a security threat.

## C.2.2 Water Quality Challenges

Many Bay Area water agencies rely on water supplies from the Bay-Delta estuary. According to the *2005 California Water Plan Update*, constituents in Delta water meet toxicity and chemical guidelines about 87 percent of the time, while only about 60 percent of the sediment samples meet chemical guidelines and pass toxicity tests, due in part to legacy pollutants (e.g., PCBs and mercury). Other regional water quality challenges issues include controlling storm water, urban, and construction site runoff into local streams, wetlands, and aquatic habitats.

These water quality issues, as well as other issues identified by the four FADs, are described below.

### Protecting Drinking Water Supplies

Protecting drinking water supplies includes proactive measures to protect against various parameter of concern, treatment modifications to ensure high quality supplies, and implementing system security measures to protect against acts of sabotage.

**Drinking Water Parameters of Concern.** Bay Area water supply agencies are tasked with managing concentrations of several parameters of concern on a daily basis. Total Dissolved





Solids (TDS), Disinfection Byproducts (DBPs), lead, and emerging contaminants are among these parameters of concern.

- *Total Dissolved Solids.* Many of the Bay Area's sources, particularly groundwater, Delta and CVP supplies, and recycled water, contain high levels of TDS. TDS is generally considered to reflect salinity of supplies. A secondary standard of 500 mg/L exists for TDS levels. Even at levels below this secondary standard, TDS can result in negative taste and odor impacts. Unless tailored to reduce TDS, treatment generally produces a TDS increase in treated water.
- *Disinfection Byproducts.* Many of the Bay Area's supplies, particularly Delta and CVP supplies, contain high levels of TOC and bromide, which are important precursors to formation of DBPs, which are potential carcinogens. The CALFED ROD has set target Delta source water concentrations for TOC and bromide of 3.0 mg/L and 50 ug/L, respectively, in an attempt to mitigate the potential formation of DBPs. The ROD also indicated that, should source water quality targets not be met, an equivalent level of public health protection (ELPH) should be achieved through treatment. This would involve use of treatment technologies specifically tailored to mitigate production of potentially harmful byproducts of disinfection and treatment. DBP production can be mitigated by innovative treatment strategies, but the process is difficult and expensive.
- *Lead.* Elevated levels of lead in drinking water are cause for concern, and may be present due to lead piping in the water distribution system. This issue is most common in older housing developments, often located in disadvantaged communities.
- *Emerging Contaminants.* Each day new contaminants are identified and public health risk assessments are conducted. Agencies are tasked with staying abreast of an ever-changing landscape of contaminants of varying concern. Currently, agencies are working to identify modes for detecting and removing emerging contaminants such as endocrine disruptors (EDCs), algal toxins, pharmaceuticals, and n-nitroso compounds from drinking water supplies.

**Source Water Quality Variations.** Some of the Bay Area's supplies, particularly Delta and CVP supplies, exhibit levels of certain source water quality parameters of concern that are high both in magnitude and in variability. This water quality variability can become so severe that treatment plants must shut down, switch to other supply sources, or blend with other supply sources in order to address the poor water quality.

**System Security Threats.** In the current political climate, the vulnerability of water systems to nuclear, biological, and chemical attacks cannot be ignored or allowed to go unmitigated. Protecting the quality of the Bay Area's water supplies involves comprehensive monitoring systems, preventing access to unauthorized individuals and creating an emergency plan in the event of a security threat.

### Protecting Receiving Waters

The Bay Area is part of the San Francisco Bay/Sacramento-San Joaquin Delta system, the largest estuary of the west coast of North and South America. As such, the Bay Area's water resources management entities are also faced with the challenge protecting the region's receiving waters.

**TMDLs.** The RWQCB has classified the San Francisco Bay and many of its tributaries as impaired for various water quality constituents. Impaired stream segments, or water quality limited segments, are included in the Clean Water Act 303(d) list for the San Francisco Bay region. The RWQCB is currently developing or planning to develop TMDLs to address many of these water quality limited segments. The TMDLs under development for the region include the following:



- *Guadeloupe River*: mercury
- *Lagunitas Creek*: sediment, pathogens
- *Napa River*: sediment, nutrients, pathogens
- *Pescadero/Butano Creeks*: sediment
- *Sonoma Creek*: sediment, nutrients, pathogens
- *Tomales Bay*: pathogens
- *Urban Creeks*: diazinon
- *Walker Creek*: mercury, sediment

TMDLs account for all pollutant sources, including discharges from wastewater treatment facilities; runoff from homes, agriculture, and streets or highways; “toxic hot spots”; and deposition from the air. The specific urban runoff BMPs and level of implementation that will be required in TMDLs will be determined through TMDL development. The scale of loading reductions anticipated suggests TMDLs will require significant increases in resources applied to urban runoff control and significant changes in scope and approach to urban runoff control programs.

**Wastewater Discharges.** Wastewater treatment is generally effective at removing harmful pollutants from discharges, and in many cases, no additional treatment will be required to meet TMDLs. However, in other cases, TMDLs may lead to new limitations on pollutant contributions from wastewater discharges.

**Urban Runoff.** Urban runoff is a significant source of toxic pollutants such as mercury, PCBs, copper, nickel, and pesticides. Communities across the Bay Area generate urban and roadway runoff laden with contaminants. In an effort to address this source of pollution, the RWQCB has developed more stringent regulations, known as C.3 Provisions, for storm water permits. Whereas previous permits had required stormwater treatment where practicable; the new provisions require that runoff from projects that create or replace an acre or more of impervious surface must incorporate source control, site design measures, and stormwater treatment of runoff before discharge from the site. Challenges associated with complying with these new requirements are discussed in the following section.



**Trash Control.** Many stormwater pollutants are not visually apparent in creeks. Trash—along with illegally dumped paint or oil—is an exception. Trash is transported into creeks through storm drains, by wind, and directly from adjacent roads and pedestrian areas. This can often be a problem in disadvantaged communities located near industrial areas, where trash can create a neighborhood eyesore. In 2001, the RWQCB considered adding trash to the list of pollutants impairing Bay area creeks. However, the listing was not made because of the lack of a consistent methodology to assess impairment from trash. Instead, all urban creeks, lakes, and shorelines were placed on a “monitoring” list. Municipalities are expected to assess trash impairments in their jurisdictions and to report their findings in their annual reports.

**Grazing and Agriculture.** Grazing and agricultural uses also degrade the quality of the region’s water bodies. Agricultural uses contribute fertilizers, pesticides, and other pollutants to surface water through



irrigation runoff. Trampling and direct consumption of stream and wetlands vegetation by cattle causes erosion and reduces biodiversity. Cattle also contribute nutrients and pathogens to surface runoff.

**Legacy of Mining Activities.** Legacy pollutants, such as mercury, are hazardous to both wildlife and humans during consumption of local fish species. Mercury contamination is of particular concern for the many minority communities practicing subsistence fishing in the region, as they are likely to face greater exposure to mercury and other contaminants found in Bay fish than the general population. Recent studies have sought to quantify transport of mercury-laden sediment in the region's historic mining streams. Additionally, current gravel mining activities alter sediment regimes and result in channel erosion.

### C.2.3 Flood Protection Challenges

Flood protection agencies throughout the region face challenges related to permitting, floodplain management, and stream ownership and maintenance responsibility.

#### Permitting

Permits from the Corps, San Francisco Bay RWQCB, and NMFS are typically required to construct a flood protection or stream restoration project and maintain existing facilities. State and Federal regulations require Bay Area flood protection agencies to obtain environmental permits before conducting routine maintenance of channels, including dredging, bank repair, and vegetation management. Flood protection agencies must also cooperate with efforts by Federal and state wildlife agencies and NGOs to maintain and restore critical habitat and assist species recovery. In each case, the local flood protection agency must evaluate and mitigate, if necessary, the effects of these projects on conveyance of flood flows. The time and cost associated with obtaining these permits are a considerable burden on the local agencies.

#### Floodplain Management

Development in upper elevations and steep hillside areas exacerbate problems of stream instability, erosion, and flooding. On lower elevations and flatter gradients, high land values are a disincentive to retaining riparian setbacks where natural geomorphic and ecologic processes such as flooding and minor erosion could occur without affecting structures. Key floodplain and riparian management concerns include the following:

- *Development in Stream Corridors.* During the 1940s through the 1970s, the “golden age of stream channelization” coincided with the most rapid urban development in the region. Stream restoration projects typically require reconfiguring channel planforms or cross-sections to accommodate increased flows and restore sediment equilibrium; development near streams constrains options for implementing these projects.
- *Accommodating Recreational Needs and Public Access.* As the Bay Area's population increases and urban development intensifies, there is increasing need for parks. Needs include active recreation areas such as playing fields and courts in addition to trails where residents can obtain access to nature. Many Bay Area riparian areas are used by homeless people for refuge and camping. This damages riparian areas and exacerbates problems with trash and potential water-borne pathogens.
- *Development in Areas Susceptible to Tidal Flooding.* Although many portions of the Bay shoreline are protected from development or are in the process of restoration, there is significant ongoing development on the Bay-ward side of the freeways ringing the Bay. Minority communities are often located in low-lying flood-prone areas. The Bay is subject to El Niño episodes, which bring about a dangerous combination of severe storms and heightened seas, and resulting tidal flooding impacts.



Many members of these flood-prone communities are renters whose flood losses may not be recompensed, or homeowners with little or no flood insurance.

### **Stream Ownership and Maintenance**

Ownership of Bay Area streams is a patchwork of public title, public easements, and private ownership. Flood protection agencies have adopted different policies with regard to jurisdiction over, or maintenance responsibility for, urban streams. Many Bay Area stream reaches have, in fact, no established public jurisdiction or established maintenance responsibility. As infrastructure ages and deteriorates, and as incised channels erode and evolve, resulting property damage and flooding threats often lead to claims and counterclaims among public agencies and private property owners.

## **C.2.4 Environmental and Watershed Challenges**

The Bay Area is composed of unique and varied ecosystems, from the tidal wetlands along the Bayshore to the wooded headlands that drain the Coastal Range. These ecosystems are home to important and endangered plants and animals and in some cases serve as the source of, or storage for, water supplies. Bay Area water agencies are tasked with balancing the water needs of sensitive environmental areas with the water needs of their customers, and ensuring that natural resources and habitats are shielded from potential adverse impacts associated with water resource management. Environmental and watershed challenges and conflicts faced by the region are provided below.

### **Environmental Water Demands.**

Diversions of water from streams can limit survival rates for aquatic and riparian species. Reservoir fluctuations can also have detrimental effects on wildlife habitats. Environmental water demands encompass the demands on quantity, timing, duration, and frequency of flows required by plants, wildlife, and fisheries. However, environmental water demands are frequently in conflict with water supply demands for agricultural irrigation and/or urban development. Opportunities exist for water managers to evaluate their delivery schedules, reservoir ramping rates, and other flow requirements and find ‘windows’ for providing flow for environmental and habitat support.

### **Barriers to Recovery of Special Status Fish**

Special status fish, including steelhead, coho salmon, and Chinook salmon, were historically abundant in Bay Area streams. Though the Bay Area historically served as an important estuary for anadromous fish, land use changes, channel alterations, and construction of dams, dikes, and weirs have severely limited modern fish populations. Fish passage barriers, as well as high water temperatures and increased sedimentation (resulting in reduced gravel permeability), negatively impact potential salmonid habitat. Opportunities exist for water resources managers to design fish passage structures to support migration around structural barriers.

### **Control of Invasive Species**

Bay Area riparian habitats are heavily impacted by invasion and spread of some non-native species of plants and animals. Invasion of aggressive foreign species reduces soil retention, consumes stream flows, reduces surface storage capacity, and eliminates biodiversity. For example, streamside areas can be dominated by periwinkle, English ivy, pampas grass, and other invasive species, which tend to crowd out native plants and reduce habitat value. Three invasive species are of particular concern to flood protection operations agencies: Giant reed, *Spartina*, and the Chinese Mitten Crab.





## Development in Floodplains and Riparian Areas

The Bay Area contains some of the most costly residential and commercial lands in the nation. High land values and ongoing pressure for urban expansion tends to encourage development in floodplain and riparian areas and in tidal areas along the Bayshore. Such development pressure is a disincentive to retaining riparian setbacks where natural geomorphic and ecologic processes such as flooding and minor erosion could occur without affecting structures. Additionally, the timing, frequency, and magnitude of runoff response to rainfall events changes due to increased impervious surfaces and this shift exacerbates localized flooding and economic impacts downstream.

Construction activities within floodplain and riparian areas also generally results in loss of biological resources due to habitat fragmentation. Urbanization across valley floors limit potential wildlife habitat opportunities and have separated lowland wetland habitats from upland watershed source areas. Construction of levees, bank protection, and landowner removal have resulted in gaps in streamside vegetation, which reduce potential wildlife migration corridors. Continuity of habitat corridors can be improved through designation and enforcement of stream buffers. However, high land costs limit the potential to purchase title or easements that would preserve these areas for stream functions or tidal wetlands. Land use planning agencies must consider future water resources management needs and set aside adequate land area prior to urbanization in order to implement such strategies as wetlands creation, flood management, and non-point source treatment.

## Channel Alterations and Maintenance

Channel alterations reduce structural complexity and habitat values, and disconnect flows from floodplains. Reduction of floodplain habitats is detrimental to amphibians and resident and migrating bird populations. In addition, increased streamflow volumes and velocities (due to urbanization, historic grazing, or other land use changes) have resulted in instream erosion, channel incision, and the loss of riparian vegetation. Many stream channels are deeply incised with steep banks as a result. Engineered bank stabilization techniques can eliminate vegetation canopy and habitat complexity. Underground culverts, storm drains, and engineered channels have been constructed in urban areas to optimize flood conveyance and provide flood protection. While largely effective in flood protection, such approaches have often resulted in reduced wildlife habitat. In addition, hardened or concrete channels prevent small mammals and birds from burrowing.

Naturalized channels typically require some level of maintenance through sediment and vegetation clearing or removal and bank stabilization. Riparian and aquatic habitats are often impacted through such routine maintenance activities. As a result, a conflict exists between providing adequate flood control capacity and protecting existing habitats. Flood control managers are considering new approaches to balance flood management and habitat needs.

## Sediment Management

Land development or intensive agricultural practices on hillslopes can result in erosion and downstream sediment transport. These eroded and transported sediments are then either deposited in reservoirs, thereby reducing water supply capacity; deposited in channels, thereby reducing flow conveyance capacity and blocking spawning gravels; or are deposited in other wetlands, thereby reducing flood detention capacity and limiting habitat values. Fire hazard reduction strategies can also affect erosion on hillsides; vegetation recovery after prescribed burns is slow.

## Recycled Water Quality

Known conflicts in use of recycled water for environmental management include high water temperatures, total dissolved solids, and endocrine disrupting compounds. Water resources engineers can



potentially address these conflicts during project design, planning, and monitoring for temperature, nutrients, dissolved oxygen, and heavy metals content of the recycled/imported water to minimize impacts to existing habitat and sensitive species.

### Stream Ownership and Maintenance

Ownership of Bay Area streams is a patchwork of public title, public easements, and private ownership. Many Bay Area stream reaches have, in fact, no established public jurisdiction or established maintenance responsibility. As infrastructure ages and deteriorates, and as incised channels erode and evolve, resulting property damage and flooding threats often lead to claims and counterclaims among public agencies and private property owners. In addition, discontinuous public lands and rights-of-way along urban streams prevent development of community trail networks.

## **C.2.5 Regulatory Compliance Challenges**

Water resources management entities throughout the region work hard to maintain compliance with applicable regulatory requirements. Achieving and maintaining regulatory compliance poses many challenges, some of which are described below.

### Compliance with Environmental Mandates

Federal and state environmental agencies address past and potential damage to stream and riparian habitat through environmental permitting processes, including public review. Projects must comply with the California Environmental Quality Act, and if a Federal interest exists, with the National Environmental Policy Act as well. Implementing capital projects and maintaining existing facilities (or habitats) often requires permits from the California Department of Fish and Game, U. S. Army Corps of Engineers, San Francisco Bay RWQCB, and/or San Francisco Bay Conservation and Development Commission. Because many Bay Area waterways provide habitat for threatened or endangered species, permits from the U.S. Fish and Wildlife Service and National Marine Fisheries Service may also be required.

Bay Area water resources management entities have observed problems imposed by severe funding and staffing limitations at the resource protection agencies, including long delays in permitting and the inability to commit sufficient resources to guiding and assisting applicants during the planning and decision-making phases of projects. Projects that can be formulated through collaborative discussions between local water resources management entities and resource protection agencies result in more effective projects that integrates protection of public health with environmental protection.

### Compliance with Stormwater Requirements

Stormwater compliance presents a variety of challenges to both municipalities and stormwater management agencies.

- *Stormwater Treatment Requirements for New and Redevelopment.* New “C.3 Provisions” require that runoff from projects that create or replace an acre or more of impervious surface must incorporate source control, site design measures, and stormwater treatment of runoff before discharge from the site. Local planning and plan review staff generally lacks expertise in NPDES permit compliance and in stormwater treatment. The state of the art for stormwater treatment design is very much in flux, and there is a dearth of design, installation, and operation and maintenance experience for stormwater treatment facilities in semi-arid climates. Despite the stormwater programs’ initial outreach efforts, the development community is not yet familiar with the requirements. Implementation of stormwater



treatment affects site layout and site grading and drainage, creating potential design conflicts and complicating the project review process.

- *Hydrograph Modification Management Requirements.* The “C.3 Provisions” also require projects to maintain pre-project runoff peak flows and flow durations where an increase in runoff could potentially accelerate stream erosion or otherwise harm beneficial uses of receiving streams. The requirement to detain or retain runoff so as not to increase runoff flows creates a particularly difficult challenge for developers and for municipalities. Most developable areas in the Bay Area are on low-permeability clay soils and/or have high groundwater, so infiltration to groundwater is generally not an option. Designs and design procedures for retention facilities have not been implemented and tested in a semi-arid climate, and many existing designs are generally not applicable for the smaller (<20 acres) sites typical of much of current Bay Area development.
- *Demonstrating Compliance.* The primary goal of municipal stormwater programs is regulatory compliance. Unlike other regulatory compliance programs, stormwater NPDES programs have responsibility for defining their standards as well as for meeting those standards. Beginning with issuance of the first municipal stormwater permits, RWQCB staff has pushed Bay Area stormwater programs to evaluate the effectiveness of their programs and to demonstrate they are achieving “maximum extent practicable” control of stormwater pollutants. Municipal-level stormwater programs also face pressures to limit the costs and impacts of stormwater requirements. Municipal stormwater program staff believe an inordinate proportion of their time and resources are spent preparing regulatory compliance reports.

### Compliance with Future Drinking Water Requirements

Drinking water regulations are continuously being updated and modified. In the near future, Bay Area water agencies will be facing the challenge of complying with the following regulations that were recently passed or are currently being developed by the EPA:

- Stage 2 Disinfectants and Disinfection Byproducts Rule
- Long Term 2 Enhanced Surface water Treatment Rule
- Groundwater Rule
- Revisions to the Total Coliform Rule
- Revisions to the Lead and Copper Rule
- Lowered Arsenic MCL
- Perchlorate MCL

### Compliance with Future Wastewater Regulations

Wastewater agencies are also facing the challenge of meeting increasing stringent regulations set forth by the State Implementation Plan (SIP), California Toxics Rule (CTR), TMDLs, Sanitary Sewer Overflow (SSO) regulations and many others.

## **C.2.6 Financial and Funding Challenges**

Water resources management entities in the Bay Area face several financial and funding challenges in daily operations. These challenges include competing costs and lack of funding to maintain aging infrastructure and comply with NPDES permit obligations. Each of these challenges is described below.



## Competing Costs

As the cost of doing business continues to rise, the need to balance economic interests while minimizing costs is becoming ever more important. The current trend has placed the responsibility of meeting many water supply and water quality challenges at the local and regional levels. The costs of implementing potential projects must be considered in the context of other competing costs faced by Bay Area water agencies, including imported water costs, energy costs required for conveyance, costs of treatment process upgrades required to meet increasingly strict standards, costs associated with infrastructure management, and costs of supplemental supplies to make up for imported supply uncertainties and shortages. In addition, projects considered in today's tough regulatory atmosphere undergo extensive scrutiny, and can take decades to proceed, due to process gridlock and court challenges. To further complicate this economic balancing act, agencies face increasing pressure from cities and counties to keep water rates down due to the current economic climate.

As a result of these competing interests, maximum benefit is not only desired from projects, but is expected. Projects should provide benefit not only to the participating agency or agencies, but to the environment and the general public as well. Where benefits accrue to parties beyond the agency customers themselves, some degree of external funding involvement should be provided. By combining the resources of the local, state and federal sources, the highest caliber of projects, yielding benefits to the largest possible populations, can be implemented. Though Bay Area water resources agencies are incorporating the latest cost efficiency measures into the implementation and management of projects, providing a benefit to the environment and general public as a whole will require securing new avenues of funding for water supply and water quality projects.

## Lack of Funding to Maintain or Replace Aging Infrastructure

In general, city, town, or county public works departments are responsible for water conveyance and storage, flood protection, and municipal storm drain infrastructure. Much of this infrastructure is several decades old and reaching the end of its useful life. Rehabilitating aging infrastructure can be as costly and complicated as providing new facilities.

## Lack of Funding to Comply with Stormwater Permit Obligations

In the early 1990s, Bay Area municipalities set up a variety of special assessments on property to finance compliance with the new stormwater NPDES requirements. Following voter approval of Proposition 218 in 1996, new assessments on property, or increases in existing assessments, now require a two-thirds supermajority of voters. In many Bay Area municipalities, existing assessments to finance stormwater pollution prevention are nearing the limit authorized prior to passage of Proposition 218. With permit requirements expanding, and TMDLs on the horizon, municipalities are facing increasing costs for stormwater NPDES compliance but have limited means to raise additional funds.

### **C.2.7 Interagency Coordination Challenges**

Effective management of water resources requires a collaborative approach to maximize resources while minimizing costs. Interjurisdictional coordination is a major challenge facing water resource management entities throughout the region.

Municipal boundaries, water supply service areas, and the boundaries of county flood protection agencies rarely coincide with watershed boundaries. In some cases, a river or creek, rather than being the focal point of a water resources management entity's jurisdiction, instead forms a boundary between two jurisdictions. In other cases, a jurisdictional boundary divides upstream from downstream areas of the same watershed. In these cases, one jurisdiction's runoff can become another jurisdiction's problem.



These jurisdictional boundaries can impede coordinated water resources management including floodplain management, watershed management, and implementation of water resources projects. As environmental protection initiatives—such as sediment TMDLs and habitat restoration—continue to adopt a watershed approach, the need for interagency coordination is increasing. However, regulatory guidance and permitting decisions are not made on a watershed basis, but on a project-by-project basis. Lack of a coordinated approach to watershed resource protection is as much a product of the regulatory agency approach as it is of local jurisdiction coordination.

Although the Bay Area IRWMP seeks to overcome regional conflicts and challenges toward integrated water resources planning and management, not all regional goals and objectives will be met exclusively through IRWMP implementation. Individual agencies and organizations within the Bay Area also contribute to these regional goals when addressing local challenges and implementing local programs. The Bay Area IRWMP provides a regional lens and opportunity for collaboration on activities that are already being pursued by individual agencies to meet their local mandates.

### C.3 Common Water Resources Management Interests

All Bay Area entities share many common interests related to water resources management, regardless of their role or responsibility in water resources management. These common interests are derived in response to the water resources management challenges described in the previous section and serve as the basis for the regional goals and objectives, as described in Section C.4.

**Protecting the Bay-Delta Watershed.** The Bay Area is part of the San Francisco Bay/Sacramento–San Joaquin Delta watershed (Bay-Delta), the largest estuary on the west coast of North and South America. An environmentally sensitive ecosystem, the Bay-Delta estuary supports over 750 plant and animal species and is a waterfowl migration and wintering area of international importance. In addition, this watershed provides drinking water supplies to over two-thirds of Californians and irrigates more than seven million acres of the world’s most productive farmland. Water resource management agencies throughout the region have a vested interest in protecting this watershed, regardless of their specific water resources management roles or responsibilities.

**Managing Impacts from an Increasing Population.** The Bay Area population has increased by 21 percent since 1986, and ABAG predicts the region’s population will increase from 7.0 million in 2004 to 8.7 million in 2030.<sup>1</sup> This poses several challenges for the region in terms of providing adequate drinking water supplies, preserving open space, developing and maintaining affordable housing, and protecting valuable environmental resources throughout the region.

**Addressing Aging Infrastructure Needs.** The “Report Card for Bay Area Infrastructure,” released by the American Society of Civil Engineers in 2005, noted failing infrastructure throughout the Bay Area, with water and urban stormwater and flood protection infrastructure receiving below-average scores. That study determined that significant investments would be needed to institute the recommended renewal and replacement, maintenance, security, and reliability needed by the Bay Area’s water infrastructure. Urban stormwater and flood protection infrastructure was determined to be in even worse condition than water infrastructure, with lack of funding cited as an important factor in the poor quality water that frequently drains from these systems into the region’s rivers and the San Francisco Bay.

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<sup>1</sup> Association of Bay Area Governments (ABAG) Population Projections. 2005.



**Maintaining a Vital Economy.** With an economy of almost \$300 billion, the Bay Area ranks as the 24th largest economy in the world, ahead of all national economies including the United States on a per capita basis. At the cutting edge of global technology, the Bay Area is a leader in many key indicators of regional, global, and national competitiveness. High-quality, reliable water supplies; protection from flood damage; ample recreation and public access; and a thriving ecosystem are critical underpinnings to the Bay Area's prosperity and continued leadership in economic development.

**Protecting Health, Safety, and Property.** The Bay Area's public agencies and organizations share a responsibility to protect the health, safety, and property of the public by continuing its long-standing commitment to delivering high quality and plentiful water supplies, providing protection from flooding, minimizing quantity and maximizing quality of stormwater and wastewater discharges, and promoting the overall health of the Bay Area's sensitive ecosystem.

**Increasing Efficiencies and Value Added through Coordination and Collaboration.** Taking a coordinated, collaborative approach will enable greater efficiency through knowledge transfer, shared resources, and increased support. Coordination and collaboration can also assist in identifying projects with multiple benefits. These projects may be more sustainable, with reduced maintenance costs over time.

**Protecting Water Resources and Infrastructure Internal and External to the Region.** Water is a public resource, one that can be in short supply in California. The Bay Area's public agencies and private citizens rely on, and are committed to, protecting water resources both internal and external to the region. The Bay Area's dependency on water resources external to the hydrologic region poses unique challenges to water resources management.

## C.4 IRWMP Goals and Objectives

Through the IRWMP process, regional goals were developed that characterize the common water resources management interests of entities across functional areas and geographic boundaries, both internal and external to IRWMP development. These regional goals, listed below, also reflect the specific objectives set forth in each of the FADs:

- ❖ Contribute to the promotion of economic, social, and environmental sustainability
- ❖ Contribute to improved supply reliability
- ❖ Contribute to the protection and improvement of hydrologic function
- ❖ Contribute to the protection and improvement of the quality of water resources
- ❖ Contribute to the protection of public health & safety; and property
- ❖ Contribute to the creation, protection, enhancement, and maintenance of environmental resources and habitats

The relationship of these regional goals and the common interests is outlined in Table C-1. The specific objectives associated with each of these goals and the source of each objective (e.g. FAD or public input) is presented in Table C-2. Section E: *Integration* describes the value of integrating water management strategies to achieve these regional goals.

**Table C-1: Relationship between Common Interests and Regional Goals**

Common Interest	Goals
Protecting the Bay-Delta Watershed	<ul style="list-style-type: none"> <li>▪ Protect and improve hydrologic function</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Managing Impacts from an Increasing Population	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect and improve hydrologic function</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Addressing Aging Infrastructure Needs	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Maintaining a Vital Economy	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Protecting Health, Safety, and Property	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Increasing Efficiencies and Value Added through Coordination and Collaboration	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect and improve hydrologic function</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>
Protecting Water Resources and Infrastructure Internal and External to the Region	<ul style="list-style-type: none"> <li>▪ Improve supply reliability</li> <li>▪ Protect and improve hydrologic function</li> <li>▪ Protect public health and property</li> <li>▪ Protect and enhance environmental resources and habitat</li> <li>▪ Protect and improve quality of water resources</li> <li>▪ Promote economic, social, and environmental sustainability</li> </ul>

**Table C-2: Source of Regional Goals and Associated Objectives**

Regional Goal	Objectives	SOURCE				
		WS-WQ FAD	WW-RW FAD	FP-SM FAD	WM-HP&R FAD	Modified/Added Based on TCC & Public Comments
Contribute to the promotion of economic, social, and environmental sustainability	Contribute to:					
	▪ Avoiding, minimizing, and mitigating net impacts to environment	◆				◆
	▪ Maintaining and promoting economic and environmental sustainability through sound water resources management practices		◆			◆
	▪ Maximizing external support and partnerships	◆				◆
	▪ Maximizing ability to get outside funding	◆				
	▪ Maximizing economies of scale and governmental efficiencies					◆
	▪ Providing trails and recreation opportunities			◆	◆	◆
	▪ Protecting cultural resources			◆	◆	
	▪ Increasing community outreach and education for watershed health				◆	
	▪ Maximizing community involvement and stewardship				◆	◆
	▪ Reducing energy use and/or use renewable resources where appropriate					◆
	▪ Minimizing solid waste generation/maximize reuse					◆
	▪ Engaging public agencies, businesses, and the public in stormwater pollution prevention and watershed management, including decision -making					◆
	▪ Achieving community awareness of local flood risks, including potential risks in areas protected by existing projects			◆		
	▪ Considering and addressing disproportionate community impacts					◆
	▪ Balancing needs for all beneficial uses of water					◆
▪ Securing funds to implement solutions					◆	



Regional Goal	Objectives	SOURCE				
		WS-WQ FAD	WW-RW FAD	FP-SM FAD	WM-HP&R FAD	Modified/Added Based on TCC & Public Comments
Contribute to improved supply reliability	Contribute to:					
	▪ Meeting future and dry year demands	◆				◆
	▪ Maximizing water use efficiency					◆
	▪ Minimizing vulnerability of infrastructure to catastrophes and security breaches	◆				◆
	▪ Maximizing control within the Bay Area region	◆				
	▪ Preserving highest quality supplies for highest use		◆			◆
	▪ Protecting against overdraft		◆			
	▪ Providing for groundwater recharge while maintaining groundwater resources				◆	◆
	▪ Increasing opportunities for recycled water use consistent with health and safety				◆	◆
Contribute to the protection and improvement of hydrologic function	Contribute to:					
	▪ Protecting, restoring, and rehabilitating natural watershed processes		◆			◆
	▪ Controlling excessive erosion and managing sedimentation			◆	◆	◆
	▪ Maintaining or improving in-stream flow conditions				◆	
	▪ Improving floodplain connectivity			◆	◆	
	▪ Preserving land perviousness and infiltration capacity			◆		◆
▪ Securing funds to implement solutions					◆	

Regional Goal	Objectives	SOURCE				
		WS-WQ FAD	WW-RW FAD	FP-SM FAD	WM-HP&R FAD	Modified/Added Based on TCC & Public Comments
Contribute to the protection and improvement of the quality of water resources	Contribute to:					
	▪ Minimizing point and nonpoint source pollution	◆				◆
	▪ Reducing salinity-related problems	◆	◆			
	▪ Reducing mass loading of pollutants to surface waters		◆			
	▪ Minimizing taste and odor problems	◆				
	▪ Preserving natural stream buffers and floodplains to improve filtration of point and non-point source pollutants			◆	◆	◆
	▪ Maintaining health of whole watershed, upland vegetation and land cover to reduce runoff quantity and improve runoff quality			◆	◆	◆
	▪ Protecting surface and groundwater resources from pollution and degradation					◆
	▪ Anticipating emerging contaminants					◆
	▪ Eliminating non-stormwater pollutant discharges to storm drains			◆		
	▪ Reducing pollutants in runoff to the maximum extent practicable			◆		
	▪ Periodically evaluating beneficial uses			◆		
	▪ Continuously improving stormwater pollution prevention methods			◆		
▪ Securing funds to implement solutions					◆	
Contribute to the protection of public health, safety, and property	Contribute to:					
	▪ Providing clean, safe, reliable drinking water					◆
	▪ Minimizing variability for treatment	◆				
	▪ Advancing technology through feasibility studies/demonstrations		◆			
	▪ Meeting promulgated and expected drinking water quality standards	◆				◆
▪ Managing floodplains to reduce flood damages to homes, businesses, schools, and transportation			◆		◆	

Regional Goal	Objectives	SOURCE				
		WS-WQ FAD	WW-RW FAD	FP-SM FAD	WM-HP&R FAD	Modified/Added Based on TCC & Public Comments
	<ul style="list-style-type: none"> <li>▪ Minimizing health impacts associated with polluted waterways</li> <li>▪ Achieving effective floodplain management by encouraging wise use and management of flood-prone areas</li> <li>▪ Maintaining performance of flood protection and stormwater facilities</li> <li>▪ Partnering with municipalities to prepare mitigation action plans that reduce flood risks to the community</li> <li>▪ Coordinating resources and mutual aid between agencies to enhance agency effectiveness</li> <li>▪ Securing funds to implement solutions</li> </ul>			◆		◆
			◆			
			◆			
			◆			
			◆		◆	
					◆	
Contribute to the creation, protection, enhancement, and maintenance of environmental resources and habitats	<b>Contribute to:</b>					
	<ul style="list-style-type: none"> <li>▪ Providing net benefits to environment</li> <li>▪ Conserving and restoring habitat for species protection</li> <li>▪ Acquiring, protecting and/or restoring wetlands, streams, and riparian areas</li> <li>▪ Enhancing wildlife populations and biodiversity (species richness)</li> <li>▪ Providing lifecycle support (shelter, reproduction, feeding)</li> <li>▪ Protecting and recovering fisheries (natural habitat and harvesting)</li> <li>▪ Protecting wildlife movement/wildlife corridors</li> <li>▪ Managing pests and invasive species</li> <li>▪ Recovering at-risk native and special status species</li> <li>▪ Improving structural complexity (riparian and channel)</li> <li>▪ Designing and constructing natural flood protection and stormwater facilities</li> <li>▪ Securing funds to implement solutions</li> </ul>	◆	◆			◆
				◆		
				◆	◆	
				◆	◆	
				◆	◆	◆
				◆	◆	
				◆	◆	◆
				◆	◆	◆
				◆	◆	◆
				◆	◆	◆
				◆	◆	◆



### C.4.1 Contribute to the Promotion of Economic, Social, and Environmental Sustainability

Contributing to the promotion of economic, social, and environmental sustainability was identified as a goal of all four functional areas. Objectives of this regional goal include the following:

- **Avoid, minimize, and mitigate net impacts to environment.** The Bay Area is composed of several unique ecosystems that are home to important and endangered plants and animals. Avoiding, minimizing, and mitigating environmental impacts are important to the maintenance and protection of these ecosystems.
- **Maintain and promote economic and environmental sustainability through sound water resources management practices.** Water availability is critical to sustaining economic and environmental processes. Projects that are not cost-effective are not economically sustainable. Costs must be considered in the context of anticipated benefits to promote economic and environmental sustainability.
- **Maximize external support and partnerships.** External support and public/private partnerships are critical to ensuring successful water resources management.
- **Maximize ability to get outside funding.** Obtaining necessary funding from state, federal, and other non-local institutions for effective water resources management is a great challenge facing the Bay Area. Overcoming this challenge is of the utmost importance to promoting economic sustainability for the region.
- **Maximize economies of scale and governmental efficiencies.** As the cost of doing business continues to rise, the need to identify opportunities to maximize the efficiency and benefits accrued from cost expenditures is becoming increasingly important. By maximizing governmental efficiency, redundancy can be minimized and resources can be optimized.
- **Provide trails and recreation opportunities.** Recreational trails and parks adjacent to streams, wetlands, and reservoirs allow multiple uses of the region's water resources for public benefit.
- **Protect cultural resources.** Cultural and archeological resources are often found adjacent to streams and wetlands areas. Protection of these resources is important for future generations.
- **Increase community outreach and education for watershed health.** Community outreach and education programs that introduce the public to water resources, watershed processes, habitats, and associated issues will improve public stewardship.
- **Maximize community involvement and stewardship.** Public awareness and stewardship of the region's water resources encourage local maintenance of hydrologic function and water quality, and support voter approval of future water bond measures.
- **Reduce energy use and/or use renewable resources where appropriate.** Renewable resources are increasingly becoming a more viable alternative. Where appropriate, use of renewable resources should be encouraged.
- **Minimize solid waste generation/maximize reuse.** Environmental sustainability can be advanced through efficient use and reuse of materials, where appropriate.
- **Engage public agencies, businesses, and the public in stormwater pollution prevention and watershed management, including decision-making.** Urban stormwater pollution prevention can be best achieved through collaboration within groups living and working in the region. Coordinated decision-making will lead to better stakeholder buy-in and implementation.
- **Achieve community awareness of local flood risks, including potential risks in areas protected by existing projects.** Community awareness of flood risks is essential for ensuring continued support of infrastructure bond measures.



- **Consider disproportionate community impacts.** Low-income neighborhoods and communities of color are often disproportionately impacted by flood hazards and lack of access to open space. The Bay Area is committed to equitable management of water resources and watershed health, and will consider and address disproportionate community impacts as feasible.
- **Balance needs for all beneficial uses of water.** Environmental and ecological water needs should be balanced with provision of water supplies for urban and agricultural use.
- **Securing funds to implement solutions.** The ability of water resources management entities to implement solutions that contribute to the promotion of economic, social, and environmental sustainability hinges on the ability of these entities to secure necessary funding through local, regional, state, and federal sources.

#### C.4.2 Contribute To Improved Supply Reliability

The goal of contributing to improved supply reliability was cited in the *Water Supply and Water Quality, Wastewater and Recycled Water, and Watershed Management, Habitat Protection and Restoration* FADs. Objectives of this regional goal include the following:

- **Meet future and dry year demands.** The Bay Area continues to be a popular area to live and work, and ABAG predicts the region's population will increase from 7.0 million in 2004 to 8.7 million in 2030.<sup>2</sup> Many Bay Area water suppliers are projecting future water supply shortfalls, particularly in dry years.
- **Maximize water use efficiency.** Efficient use of the Bay Area's water resources, including conservation practices and water recycling, will maximize the reliability of these finite supplies.
- **Minimize vulnerability of infrastructure to catastrophes and security breaches.** Water infrastructure in the Bay Area is vulnerable to effects from seismic activity, levee failures, sedimentation, and breaches of security.
- **Maximize control within the Bay Area region.** With many Bay Area water agencies importing supplies from remote watersheds, many water-related decisions are made outside of the region that affect water supply within the region. Increased local control over water supply infrastructure, projects, and programs will provide increased ability to reach the goal of maximizing supply reliability. In addition, maximizing local supplies can assist in achieving local control.
- **Preserve highest quality supplies for highest use.** Using non-potable supplies for irrigation and industrial demands will preserve the region's highest quality supplies for highest uses, such as drinking water.
- **Protect against overdraft.** Effective groundwater management programs should be implemented to optimize groundwater use while simultaneously protecting against overdraft and potential salt-water intrusion.
- **Provide for groundwater recharge while maintaining groundwater resources.** Effective groundwater recharge will protect groundwater basins from overdraft, ensuring that water supplies are available when needed. Further, groundwater basins provide valuable supplies to support aquatic and riparian resources during the summer season and dry water years.
- **Increase opportunities for recycled water use consistent with health and safety.** Increasing the quantity and availability of recycled water throughout the region will enable beneficial reuse of water supplies.
- **Maintain a diverse portfolio of water supplies to maximize flexibility.** Developing and maintaining a diverse portfolio of water supplies, including local and imported surface water and

<sup>2</sup> Association of Bay Area Governments (ABAG) Population Projections. 2005.



groundwater, recycled water, desalination, stormwater, wetlands, and others, will help the Bay Area to be prepared to meet demands now and in the future.

- **Securing funds to implement solutions.** Solutions that contribute to improved supply reliability cannot be implemented unless necessary funding can be secured from local, regional, state, and federal sources.

### C.4.3 Contribute to the Protection and Improvement of Hydrologic Function

The goal of contributing to the protection and improvement of hydrologic function was cited in the *Wastewater-Recycled Water, Flood Protection and Stormwater Management, and Watershed Management, Habitat Protection and Restoration FADs*. Objectives of this regional goal include the following:

- **Protect, restore, and rehabilitate natural watershed processes.** Protection, restoration, and rehabilitation of natural watershed processes are essential for healthy aquatic and riparian habitats. Important elements of hydrologic and geomorphic function include streamflow and conveyance, maintenance of channel and bed form, sediment transport and deposition, floodplain connection, and filtration of pollutants in the water column.
- **Control excessive erosion and manage sedimentation.** Excessive sedimentation threatens the storage capacity of Bay Area reservoirs and conveyance infrastructure. Controlling erosion and sedimentation will allow the region to optimize use of existing storage and conveyance infrastructure, decrease the turbidity of water supplies, and protect the region's instream and riparian habitats.
- **Maintain or improve in-stream flow conditions.** In-stream flows provide for riparian, aquatic and wildlife habitat and assist in maintenance of channel stability. Maintaining natural in-stream flow regimes will improve the healthy functioning of wetlands and stream systems in the region, as well as ensure continued recovery of listed fish and aquatic species.
- **Improve floodplain connectivity.** Disconnected floodplain areas reduce the effectiveness of pollutant filtration and eliminate potential for flood flow quantity and velocity reductions. Improving the connection between streams and their floodplains will restore floodplain functioning to reduce downstream peak flows, while allowing for diverse stages of floodplain vegetation.
- **Preserve land perviousness and infiltration capacity.** Maintaining infiltration capacity of porous soils, even within urban areas, can reduce surface runoff volumes, peak flood flows, and associated channel erosion. Preserving perviousness can also reduce pollutant delivery to Bay Area streams by filtering rainwater through soils and underground channels.
- **Securing funds to implement solutions.** In order to implement solutions that contribute to the protection and improvement of hydrologic function, required funding must be secured from local, regional, state, and federal sources.

### C.4.4 Contribute to the Protection and Improvement of the Quality of Water Resources

Contributing to the protection and improvement of the quality of water resources is another important regional goal that was cited by all four functional areas. Objectives of this goal include the following:

- **Minimize point-source and non-point-source pollution.** The goal of point source and non-point-source pollution control programs is to protect water resources by reducing pollutant loading from state or federally regulated, permitted discharges and non-permitted pollutant deliveries such as urban stormwater runoff and air deposition, respectively. These pollution control programs provide source water quality benefits, ecosystem and environmental habitat protection, and public



health and safety benefits. Minimizing point source and non-point-source pollution will also assist in reducing the mass loading of toxics and emerging contaminants, such as endocrine disruptors, to the region's waterbodies.

- **Reduce salinity-related problems.** Protecting existing supplies from salt impacts, including total dissolved solids, is an important element of the Bay Area's water resources management goals.
- **Reduce mass loading of pollutants to surface waters.** Loading of toxic pollutants to the Bay watersheds must be reduced to preserve water quality in the Bay and other surface waters. Increasing the level of wastewater treatment or reducing the quantity of discharge are important steps to protect water quality of Bay Area waterbodies.
- **Minimize taste and odor problems.** While not a direct threat to public health, taste and odor problems can reduce consumer confidence in otherwise safe drinking water supplies.
- **Preserve natural stream buffers and floodplains to improve filtration of point and nonpoint source pollutants.** Effective preservation of riparian vegetation in stream buffers, or retention in floodplains, can function to remove and retain point and nonpoint source pollutants from the water column, thus restricting downstream transport and deposition of pollutants and improving water quality.
- **Maintain health of whole watershed, upland vegetation and land cover to reduce runoff quantity and improve runoff quality.** Upland vegetation protects water resources by reducing the quantity and velocity of surface runoff, thus preventing excessive erosion and sedimentation. Additionally, vegetation provides pollution filtration functions. Protection of upland vegetation will further protect water quality and water resources in the region.
- **Protect surface and groundwater resources from pollution and degradation.** Protecting surface and groundwater resources from pollution and degradation is an important first step in improving water quality for the region.
- **Anticipate emerging contaminants.** The landscape of known water contaminants continues to expand and evolve, and new contaminants continue to be detected in source and treated waters. Agencies should take a proactive approach to addressing the presence of emerging contaminants.
- **Eliminate non-stormwater pollutant discharges to storm drains.** Non-stormwater pollution can be reduced through coordinated action with household hazardous waste disposal and other waste agencies. Eliminating non-stormwater pollutant discharges to storm drains will effectively reduce mass loading of pollutants to Bay Area water resources and habitats.
- **Reduce pollutants in runoff to the maximum extent practicable.** Reducing pollutants in runoff will similarly result in net reduction in pollutant loading to the Bay Area's water resources. Regional commitment to implementation of total maximum daily loads (TMDLs) will improve water quality in impaired streams, wetlands, and the Bay.
- **Periodically evaluate beneficial uses and continuously improve stormwater pollution prevention methods.** Periodic evaluation of beneficial uses will allow the region to more closely monitor water quality impairments that degrade water supply or recreational resources.
- **Securing funds to implement solutions.** Solutions contributing to the protection and improvement of the quality of water resources require funding to be secured from local, regional, state, and federal sources.



#### C.4.5 Contribute to the Protection of Public Health & Safety; and Property

The goal of contributing to the protection of public health & safety, and property was identified by the *Water Supply and Water Quality, Wastewater and Recycled Water, and Flood Protection and Stormwater Management* FADs. Objectives associated with this regional goal include the following:

- **Provide clean, safe, reliable drinking water.** An important objective for achieving the goal of protecting health, safety, and property is to provide clean, safe, and reliable drinking water. Providing clean, safe, reliable drinking water involves effectively preventing the introduction of or removing pollutants from drinking water, minimizing by-products of drinking water disinfection, and maximizing water supply reliability.
- **Minimize variability for treatment.** Minimizing variability of source water quality allows agencies to tailor water treatment to produce the greatest public health protection.
- **Advance technology through feasibility studies/demonstrations.** Feasibility studies and technology demonstrations contribute to development of new and innovative technologies, allowing more effective protection of public health and property.
- **Meet promulgated and expected drinking water quality standards.** Drinking water quality standards continue to evolve in response to new information on health effects of known contaminants. Ensuring that drinking water supplies meet or exceed promulgated and anticipated standards will ensure the health and safety of consumers is protected.
- **Minimize risks of water supply interruptions.** Water supply interruptions can cause significant risk to human health and safety and can compromise the ability to protect property from fire. Minimizing the risk of supply interruptions will assist in protecting public health, safety, and property.
- **Manage floodplains to reduce flood damages to homes, businesses, schools, and transportation.** Management of connected floodplains allows for delay of peak flood flows, and protection of downstream properties and infrastructure from flood damage.
- **Minimize health impacts associated with polluted waterways.** The Bay Area is committed to minimizing the potential health impacts associated with polluted waterways, including potential impacts from consumption of contaminated fish.
- **Achieve effective floodplain management that minimizes risks to health, safety and property by encouraging wise use and management of flood-prone areas.** Protection of undeveloped floodplains will allow natural floodplain processes, such as overbank flows and stream migration, to occur without damaging urban properties.
- **Maintain performance of flood protection and stormwater facilities.** Maintenance of flood protection and stormwater facilities requires periodic cleaning and sediment removal in order to ensure proper function.
- **Partner with municipalities to prepare mitigation action plans that reduce flood risks to the community.** Partnerships between flood protection agencies and municipalities will result in coordinated reduction of flood risks by ensuring both adoption and implementation of mitigation actions.
- **Enhance agency effectiveness by coordinating resources and mutual aid between agencies.** As with integrated regional planning, collaboration between agencies improves the likelihood of achieving mutual objectives. Coordinating resources will enable better protection from flood risks.
- **Securing funds to implement solutions.** The ability of water resources management entities to implement solutions contributing to the protection of public health & safety and property is contingent upon their ability to secure funding from local, regional, state, and federal sources.



#### C.4.6 Contribute to the Creation, Protection, Enhancement, and Maintenance of Environmental Resources and Habitat

Contributing to the creation, protection, enhancement, and maintenance of environmental resources and habitats was identified by all four functional areas as an important goal for regional water resources management. Objectives of this regional goal include the following:

- **Provide net benefits to environment.** Promoting projects that provide net benefits to the environment will minimize adverse environmental impacts and maximize environmental protection.
- **Conserve and restore habitat for species protection.** Bay Area goals focus on provision of habitat for state and federal threatened and endangered species. This goal works in conjunction with public and private efforts to improve environmental stewardship. Protecting and restoring functional habitats, including aquatic, upland and riparian, allow species to thrive.
- **Acquire, protect and/or restore wetlands, streams, and riparian areas.** Acquisition and protection of riparian and wetlands areas will ensure that valuable habitat, water quality, and flood control functions are protected throughout the region.
- **Enhance wildlife populations and biodiversity (species richness).** Restoration of wildlife populations in the region cannot be fully realized without fostering a variety of habitat environments and species richness. Enhancing biodiversity in riparian, wetland, upland, and aquatic populations will contribute to natural hydrologic function in the region's water resources.
- **Provide lifecycle support (shelter, reproduction, feeding).** Provision of diverse habitats will support wildlife populations throughout various lifecycle stages. Attention to such lifecycle stages is necessary to restore threatened and endangered species populations.
- **Protect and recover fisheries (natural habitat and harvesting).** Local fisheries are dependent on the quantity and quality of flows in the region's streams and wetlands. Recovery of threatened fisheries populations is an important benchmark for the Bay Area's hydrologic function, water quality, and overall environmental health.
- **Protect wildlife movement/wildlife corridors.** Riparian habitats serve as important wildlife movement corridors for wildlife populations. Protection of, and improved connections to, these habitat areas will support increased biodiversity in the region.
- **Manage pests and invasive species.** The success of both existing and newly restored habitat communities is often threatened by invasive species. To ensure the long-term protection of riparian and aquatic habitats, invasive species, and pests must be managed.
- **Recover at-risk native and special status species.** Native plant and wildlife species are essential to the healthy natural functioning of watershed systems, namely water filtration and flow conveyance.
- **Improve structural complexity (riparian and channel).** Diverse riparian habitats provide roosting, breeding, foraging, and refuge for wildlife. Similarly, diverse channel features, such as pools and overhanging branches, provide important habitat for riparian and aquatic species.
- **Design and construct new or improved flood protection and stormwater facilities to support these goals and objectives.** The Bay Area is committed to design and construction of flood protection and stormwater facilities that balance environmental resources and habitats with regional needs to convey and store flood flows.
- **Securing funds to implement solutions.** Solutions that contribute to the creation, protection, enhancement, and maintenance of environmental resources and habitat require funding to be secured from local, regional, state, and federal sources.

## C.5 IRWMP Goals and Proposition 50 Requirements

The Proposition 50 Integrated Regional Water Management Program Guidelines require IRWMP goals and objectives to address, at a minimum, the following water resources management areas: water supply, groundwater management, ecosystem restoration, and water quality. Table C-3 lists which the Bay Area regional objectives that address each of the required water management areas.

**Table C-3: Proposition 50 Water Management Areas Addressed by Bay Area IRWMP Goals**

Regional Goal	Water Supply	Groundwater Management	Ecosystem Restoration	Water Quality
Contribute to improved supply reliability	●	●		
Contribute to the protection and improvement of hydrologic function			●	●
Contribute to the protection and improvement of the quality of water resources	●	●	●	●
Contribute to the protection of public health, safety, and property			●	●
Contribute to the creation, protection, enhancement, and maintenance of environmental resources and habitats			●	
Contribute to the promotion of economic, social, and environmental sustainability	●	●	●	●

## C.6 Functional Area Objectives

As described earlier in this section, each functional area underwent a unique process for establishing goals and objectives specific to that aspect of water resources management. The processes for establishing goals and objectives, and the major goals and objectives identified by each functional area, are presented below.

### C.6.1 Water Supply and Water Quality Functional Area

The goals and objectives identified for the *Water Supply and Water Quality* FAD were originally developed as part of a collaborative effort between agencies participating in the *CALFED Bay Area Water Quality and Supply Reliability Project* – a project aimed at identifying regional solutions to water supply and water quality issues in the Bay Area.

Table C-4 summarizes the six primary water supply and water quality objectives identified for the Bay Area region.

**Table C-4: Water Supply and Water Quality Functional Area Objectives**

Goals	Objectives
Maximize supply reliability	<ul style="list-style-type: none"> <li>▪ Meet demands</li> <li>▪ Minimize vulnerability</li> <li>▪ Maximize control with the Bay Area region</li> </ul>
Maximize public health protection	<ul style="list-style-type: none"> <li>▪ Minimize disinfection byproducts</li> <li>▪ Minimize variability for treatment</li> </ul>
Minimize cost impacts	<ul style="list-style-type: none"> <li>▪ Minimize total cost</li> <li>▪ Allocation of costs</li> </ul>
Minimize environmental impacts	<ul style="list-style-type: none"> <li>▪ Net impacts to environment</li> <li>▪ Net benefits to environment</li> </ul>
Maximize implementation potential	<ul style="list-style-type: none"> <li>▪ Maximize external support</li> <li>▪ Maximize ability to get outside funding</li> <li>▪ Maximize internal consistency with agency plans and baselines</li> </ul>
Protect and improve water quality	<ul style="list-style-type: none"> <li>▪ Minimize nonpoint source pollution</li> <li>▪ Reduce salinity-related problems</li> <li>▪ Minimize taste and odor problems</li> <li>▪ Minimize total dissolved solids</li> </ul>

## C.6.2 Wastewater and Recycled Water Functional Area

In developing the *Wastewater and Recycled Water FAD*, the participating members of the Bay Area Clean Water Agencies developed a series of water resources management goals and objectives for wastewater and recycled water in the Bay Area. The goals and objectives developed through this process address various water resources management conflicts and challenges facing the region. Goals and objectives developed for the Wastewater and Recycled Water functional area are presented below.

**Table C-5: Wastewater and Recycled Water Functional Area Objectives**

Goals	Objectives
Maximize supply reliability	<ul style="list-style-type: none"> <li>▪ Preserve highest quality supplies for potable use</li> <li>▪ Maintain economic sustainability</li> <li>▪ Protection from groundwater overdraft</li> </ul>
Improve water quality	<ul style="list-style-type: none"> <li>▪ Salinity management</li> <li>▪ Reduction in mass loading of pollutants to surface waters</li> </ul>
Maximize environmental protection	<ul style="list-style-type: none"> <li>▪ Habitat restoration/species protection</li> <li>▪ Rehabilitate natural processes</li> <li>▪ Protect and restore functional habitats</li> </ul>
Support technological advancement	<ul style="list-style-type: none"> <li>▪ Advance technology through feasibility studies/demonstrations</li> </ul>



### C.6.3 Flood Protection and Stormwater Management Functional Area

The *Flood Protection and Stormwater Management* FAD was developed to address the major flood protection and stormwater management objectives and conflicts for the watersheds in the region, including identifying opportunities and efficiencies created by working collaboratively across the region towards a multi-benefit, multi-beneficiary management of resources.

The Flood Protection and Stormwater Management Functional Area developed the following vision, as presented in the *Flood Protection and Stormwater Management* FAD:

*Throughout Bay Area watersheds, site-appropriate flood protection is balanced with environmental quality, cost, and community benefit. Water quality is protected and enhanced.*

The major goals and objectives identified by the Flood Protection and Stormwater Management functional area are summarized in Table C-6.

**Table C-6: Flood Protection and Stormwater Management Functional Area Goals and Objectives**

Goals	Objectives
Protect public health and safety from flooding	<ul style="list-style-type: none"> <li>▪ Reduce risk of flood damages to homes, businesses, schools, and transportation</li> <li>▪ Achieve effective floodplain management that minimizes risks to health, safety and property by encouraging wise use and management of flood-prone areas</li> <li>▪ Maintain performance of flood protection and stormwater facilities</li> <li>▪ Achieve community awareness of local flood risks, including potential risks in areas protected by existing projects</li> <li>▪ Partner with municipalities to prepare mitigation action plans that reduce flood risks to the community</li> <li>▪ Design and construct new or improved flood protection and stormwater facilities to support these goals and objectives</li> </ul>
Protect homes, schools, businesses, and transportation from economic damages due to flooding and erosion	<ul style="list-style-type: none"> <li>▪ Reduce risk of flood damages to homes, businesses, schools, and transportation</li> <li>▪ Achieve effective floodplain management that minimizes risks to health, safety and property by encouraging wise use and management of flood-prone areas</li> <li>▪ Maintain performance of flood protection and stormwater facilities</li> <li>▪ Design and maintain flood protection and stormwater infrastructure to minimize lifecycle costs</li> <li>▪ Achieve community awareness of local flood risks, including potential risks in areas protected by existing projects</li> <li>▪ Partner with municipalities to prepare mitigation action plans that reduce flood risks to the community</li> <li>▪ Enhance agency effectiveness by coordinating resources and mutual aid between agencies</li> <li>▪ Manage increases in runoff peak flows and durations from new development where necessary to avoid accelerating stream erosion</li> <li>▪ Design and construct new or improved flood protection and stormwater facilities to support these goals and objectives</li> </ul>



Goals	Objectives
Protect and enhance water quality in creeks, wetlands, and the Bay	<ul style="list-style-type: none"> <li>▪ Protect and enhance wetlands, streams, and riparian areas by:               <ul style="list-style-type: none"> <li>▪ Improving natural filtration of point and nonpoint source pollutants</li> <li>▪ Preserving perviousness and maintaining the health of upland soil and vegetation to reduce runoff quantity and improve runoff quality</li> <li>▪ Eliminate non-stormwater pollutant discharges to storm drains</li> <li>▪ Reduce pollutants in runoff to the maximum extent practicable</li> <li>▪ Periodically evaluate beneficial uses and continuously improve stormwater pollution prevention methods</li> </ul> </li> <li>▪ Design and construct new or improved flood protection and stormwater facilities to support these goals and objectives</li> </ul>
Protect and enhance ecological and geomorphic stream functions and processes	<ul style="list-style-type: none"> <li>▪ Protect and enhance wetlands, streams, and riparian areas by:               <ul style="list-style-type: none"> <li>▪ Controlling bed and bank erosion and managing sedimentation</li> <li>▪ Protecting and recovering fish populations</li> <li>▪ Improving floodplain connectivity</li> <li>▪ Enhancing ecological structural complexity</li> <li>▪ Protecting wildlife corridors</li> <li>▪ Managing pests and invasive species</li> </ul> </li> <li>▪ Appropriately integrate multi-objective flood protection projects into watersheds in ways that protect and enhance stream corridor and wetland habitats, are aesthetically pleasing, provide trails and recreational opportunities, and protect cultural resources</li> <li>▪ Design and construct new or improved flood protection and stormwater facilities to support these goals and objectives</li> </ul>

#### C.6.4 Watershed Management, Habitat Protection, and Restoration Functional Area

The Watershed Management, Habitat Protection, and Restoration functional area team convened four workshops to assist in drafting the Bay Area Watershed Plan (BAWP), which serves as the *Watershed Management, Habitat Protection, and Restoration FAD*, through a public and transparent process. Public involvement guided the framing vision and objectives of the BAWP, drafting the project evaluation framework, and identifying participating watershed stakeholders, key watershed issues, and potential projects.

Members of the Watershed Plan Development Committee (WPDC) noted the importance of establishing a project vision and guiding principles for the Watershed Plan. The Watershed Plan included the following vision:

*To create a blueprint to improve watershed health throughout the San Francisco Bay watershed, that builds upon and is complementary with past and current regional planning efforts.*

*The Watershed Plan will be a stand-alone document to guide regional watershed management, habitat protection, and restoration planning efforts by multiple entities. It will fulfill the following purposes.*

- *Provide a basis for evaluating watershed and habitat restoration projects funded by the Conservancy and others, by providing relevant information for principal watershed*



*characteristics, key Bay Area watershed issues, and a framework for project evaluation, prioritization, and selection.*

- *Provide a web-based information and communications tool for Bay Area watersheds. The initial phase will consist of developing a regional database, providing a Bay Area-wide picture of priority efforts that promote protection and enhancement of watersheds and habitats.*

*The Watershed Plan will also serve as an integral component of the Bay Area Integrated Regional Water Management Plan (IRWMP). As such, it will recognize the importance of comprehensive water resource management (e.g., water supply and quality, storm water, flood protection, and waste water) in achieving ecological goals and objectives and will help decision-makers to identify projects with multiple benefits.*

Based on workshop discussions, as well as discussion of goals and objectives identified in the survey of regional planning documents, the WPDC developed the watershed management goals and objectives summarized in Table C-7.

**Table C-7: Watershed Management, Habitat Protection, and Restoration Functional Area Objectives**

Goals	Objectives
Provide, protect, and enhance watershed habitat for plants and wildlife	<ul style="list-style-type: none"> <li>▪ Acquire, protect, and/or restore habitat areas, including wetlands, streams, vernal pools, and open spaces.</li> <li>▪ Enhance wildlife populations and/or biodiversity (species richness).</li> <li>▪ Provide lifecycle support, including appropriate habitats for shelter, reproduction, and feeding.</li> <li>▪ Protect and recover fisheries through restoration of natural habitats.</li> <li>▪ Acquire and protect continuous wildlife corridors and connections between habitat patches.</li> <li>▪ Manage pests and invasive species.</li> <li>▪ Recover at-risk native and special status species.</li> <li>▪ Improve structural complexity in riparian canopy, channel form, aquatic and/or tidal habitats.</li> </ul>
Protect and improve hydrologic function and water quality of all water bodies	<ul style="list-style-type: none"> <li>▪ Control excessive erosion and sedimentation.</li> <li>▪ Reduce point and non-point source pollutants, and improve water filtration capacity.</li> <li>▪ Maintain or improve flow conditions to support natural flow/flushing regimes.</li> <li>▪ Enhance natural conveyance and storage, to support water supply and flood protection.</li> <li>▪ Improve floodplain connectivity.</li> <li>▪ Promote retention of pervious surfaces and opportunities for groundwater recharge.</li> <li>▪ Increase opportunities for recycled water use in aquatic and wetlands habitats.</li> <li>▪ Maintain health of upland vegetation to improve infiltration, reduce runoff quantity, and improve runoff quality.</li> </ul>
Improve the region's quality of life through restoration and enhancement of local watersheds	<ul style="list-style-type: none"> <li>▪ Provide trails and recreation opportunities, including water contact sports.</li> <li>▪ Protect cultural resources associated with Bay Area water bodies.</li> <li>▪ Increase community outreach and education for watershed health.</li> <li>▪ Maximize community involvement and stewardship.</li> </ul>