

Section E: Resource Management Strategies

E.1 RESOURCE MANAGEMENT STRATEGIES INCLUDED IN THE PLAN

The Integrated Regional Water Management (IRWM) Program requires Regional Water Management Groups (RWMGs) to consider certain resource management strategies for potential use in their regions and for possible inclusion in their IRWM Plans. The intention behind the “resource management strategy” standard in the Proposition 84/1E IRWM Plan Guidelines is to encourage regions to diversify their water management portfolios in order to become more resilient to, and to mitigate for, uncertain future circumstances (such as climate change). The operating assumption behind the standard is for RWMGs to intentionally find ways to diversify a water management portfolio. The RWMG is required to consider all of the resource management strategies listed in the *California Water Plan Update 2009* for possible inclusion in the plan, but other strategies may be considered as well.

The RWMG chose to include 37 resource management strategies in the Greater Monterey County IRWM Plan, including 28 resource management strategies from the *California Water Plan Update 2009* plus nine additional strategies. The process for selecting resource management strategies was based primarily on the region’s goals and objectives, i.e., the strategies needed to achieve the objectives of the Plan. The RWMG discussed the resource management strategies over the course of two RWMG meetings, and voted to approve the final list of resource management strategies at the March 2010 RWMG meeting.

The selected strategies “make sense” for this region, and many of the strategies are already included in Urban Water Management Plans, Stormwater Management Plans, Watershed Management Plans, Land Use Plans, and other local water resource plans developed by entities throughout the region. The IRWM Plan resource management strategies are outlined below, including a brief explanation as to why each strategy was chosen for inclusion in the Plan. Note that some of the descriptions of the resource management strategies have been quoted directly from the *California Water Plan Update 2009*.

Strategies chosen from the *California Water Plan Update 2009* include the following:

- **Agricultural Water Use Efficiency:** Water use efficiency and conservation measures serve to reduce water use, reduce energy consumption and therefore emissions of pollutants and greenhouse gasses, reduce wastewater and potentially polluted runoff, and reduce the economic and environmental costs associated with water use and water treatment. This strategy is already common practice throughout the region. Common water conservation best management practices (BMPs) implemented in the Salinas Valley include, for example, use of a time clock/pressure switch, water flowmeters, leakage reduction, sprinkler improvements, pre-irrigation reduction, reduced sprinkler spacing, micro irrigation systems, land leveling/grading, and soil moisture sensors. Since agriculture occupies more than 1.4 million acres of land and accounts for approximately 90 percent of groundwater use in the Salinas Valley, promoting agricultural water use efficiency is considered absolutely critical for helping the region meet its goal of improved water supply reliability.
- **Urban Water Use Efficiency:** Like agricultural water use efficiency, urban water use efficiency is considered an important strategy for the region. Urban water use efficiency measures are already widely practiced throughout the region, including, for example, plumbing retrofits, large landscape surveys and the development of water efficient landscape guidelines, washing machine rebates, public information campaigns, school programs, residential ultra low-flush toilet replacement programs, commercial, industrial, and institutional audits to identify water conservation opportunities, and internal water distribution system audits. Although urban use

accounts for significantly less water use than agriculture in the region, the potential benefits of urban water use efficiency and conservation are substantial. This strategy is considered an important means for helping the region meet its water supply objectives.

- **Conveyance – Regional/Local:** Conveyance includes both natural watercourses (including groundwater aquifers) and constructed facilities. The Monterey County Water Resources Agency (MCWRA) uses natural watercourses for conveyance to the extent possible and man-made structures where appropriate. The Salinas River channel is the primary means for conveyance of water in the region and to percolate water into the Salinas Valley Groundwater Basin. The MCWRA regulates water flows from the Nacimiento and San Antonio Reservoirs in order to maximize groundwater recharge, maintain in-stream flows for steelhead and other aquatic life, and manage floodwaters. The MCWRA also uses the Salinas River channel as a means to transfer water from the southern part of the Salinas Valley to the northern coastal portion of the groundwater basin in an effort to reduce seawater intrusion (as part of the Salinas Valley Water Project). Constructed components of the conveyance system include the reservoirs, pumping plants, pipelines, diversion structures, and a fish ladder. Improvements to this infrastructure are needed on a continual basis to ensure the optimal conveyance of water for urban/industrial, agricultural, and environmental uses. This strategy is considered a foundational part of the region’s water management portfolio.
- **System Re-operation:** System re-operation entails changing existing operation and management procedures for reservoirs and conveyance facilities in order to increase benefits from these facilities. An example of system re-operation in the Greater Monterey County region is the Salinas Valley Water Project, which involves re-operation of the Nacimiento and San Antonio Reservoirs along with modification of the Nacimiento spillway and construction of an inflatable dam diversion structure to allow the diversion of Salinas River water into the existing Castroville Seawater Intrusion Project (CSIP) distribution system. System re-operation enables the MCWRA to move more water through the Salinas Valley via the Salinas River. That additional water is percolated into the Salinas Valley Groundwater Basin and impounded at the new diversion facility, and then blended with recycled water for irrigation use on 12,000 acres of farmland in the Castroville area. The blended water replaces groundwater pumping in the northern coastal portion of the groundwater basin, thereby helping to reduce seawater intrusion. The MCWRA along with other water providers in the region continue to consider ways of re-operating the water supply systems in order to maximize water supplies, water quality, flood control, and benefits to environmental resources.
- **Water Transfers:** A water transfer is defined in the Water Code as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. Water transfers typically occur in five ways (though not all of these are practiced in this region): 1) transferring water from storage that would otherwise have been carried over to the following year; 2) pumping groundwater instead of using surface water delivery and transferring the surface water rights; 3) transferring previously banked groundwater either by directly pumping and transferring groundwater or by pumping groundwater for local use and transferring surface water rights; 4) making water available by reducing the existing consumptive use through crop idling or crop shifting or by implementing water use efficiency measures; or 5) making water available by reducing return flows or seepage from conveyance systems that would otherwise be irrecoverable. Water transfers are limited in the Greater Monterey County region because under current law, water supply from the Salinas Valley Groundwater Basin cannot be exported to customers in other basins; any connections made must be for emergency use only or of a “zero-balance type” (volume added must equal volume withdrawn). In 2006 the Marina Coast Water District (MCWD) investigated the possibility of

interconnecting with the Seaside Municipal Water System, with water from the Seaside Groundwater Basin, proposed as an emergency-only connection. Although not constructed at the time, the possibility of a future emergency connection still exists. Additional transfer opportunities exist within the Salinas Valley Groundwater Basin itself. For example, MCWD could purchase the rights to existing groundwater supplies currently used elsewhere in the Salinas Valley and transfer the water to the District service area. Such transfers would have to be performed on a willing-seller, willing-buyer basis and with the cooperation of the MCWRA. The use of water transfers as a resource management strategy is more evident in this region in the broad implementation of water use efficiency measures both in agricultural and urban systems, as well as in the transfer of water from surface storage to groundwater and from one end of the groundwater basin to another. This strategy has potential for expansion in the region.

- **Conjunctive Management and Groundwater Storage:** Conjunctive management and groundwater storage are part of standard practice in the Salinas Valley. Conjunctive management is the coordinated use of surface water and groundwater to maximize water use in order to meet various management objectives. The Nacimiento and San Antonio reservoirs capture and store water from winter rains, and that water is systematically released into the Salinas River according to protocols that aim to produce maximum percolation into the Salinas Valley Groundwater Basin. The water is stored in the groundwater basin and used throughout the year and over the course of many years, wet or dry, to provide a consistent source of water to virtually all water users in the Salinas Valley area.
- **Desalination:** Monterey County is a coastal county, and as such provides ample opportunity for the use of desalination as a viable resource management strategy. There is currently one desalination plant in the Greater Monterey County IRWM region. The plant is owned by the MCWD and has a capacity of 300 acre-feet/year (AFY). The facility has been idle for several years, but MCWD signed a developer agreement in 2006 that obligates the District to re-operate the desalination plant if needed. MCWD is also proposing a major new desalination facility to provide water for the Monterey Bay region (described in detail in various other sections of this plan). The proposed project consists of a 10 million-gallon/day (MGD) reverse osmosis desalination plant to treat brackish groundwater water extracted from the seawater-intruded Pressure 180-Foot Aquifer of the Salinas Valley Groundwater Basin.
- **Precipitation Enhancement:** Precipitation enhancement, commonly called “cloud seeding,” artificially stimulates clouds to produce more rainfall than they would naturally. Cloud seeding injects special substances, typically silver iodide, into the clouds to enable the raindrops to form more easily. Cloud seeding has been practiced in California since the 1950s. The MCWRA used precipitation enhancement as a resource management strategy from 1990-1995 and again in 2004. MCWRA retains this strategy in its portfolio as an option for future implementation. Precipitation enhancement remains a good option for the region to provide additional water on a cost-effective basis.
- **Recycled Municipal Water:** Recycled water is water that results from a level of wastewater treatment stringent enough to produce water suitable for re-use. The quality of the reclaimed water determines how it can be used, for example for agricultural or landscape irrigation, or even in some cases for potable water. Since recycled water typically replaces water that would otherwise come from a “new” supply (such as groundwater), it is considered a valuable resource. Two water reclamation plants currently exist in the Greater Monterey County IRWM region. The Monterey Regional Water Pollution Control Agency (MRWPCA) owns and operates a regional wastewater treatment plant at the northern end of the City of Marina. Wastewater from the Monterey Peninsula, Salinas, Marina, Moss Landing and the Ord Community is conveyed to the

plant for processing. The plant has the capacity to generate approximately 21,600 AFY of recycled water. Of that amount, 13,300 AFY of tertiary treated recycled water is delivered by the MCWRA to farmers in the Castroville region for irrigation during the irrigation season, and plans are currently underway to construct seasonal storage facilities that would enable the remaining 8,300 AFY of available capacity to be generated during the non-irrigation season. In addition, the City of Soledad has recently constructed a 5.5 MGD water reclamation facility at the City's wastewater treatment plant. The plant will provide tertiary treated water for agricultural and urban and landscape irrigation.

- **Surface Storage – Regional/Local:** Surface storage uses reservoirs to collect water for later release and use. The Nacimiento and San Antonio reservoirs, built in 1957 and 1965 respectively, are examples of surface storage in the Greater Monterey County IRWM region. The reservoirs play a central role in the region's water system. The MCWRA owns and operates both of these reservoirs and uses them for seasonal storage, flood control, hydropower generation, conjunctive use (i.e., coordinating surface water with groundwater storage and use), recreation, and operates the dams to meet environmental water needs (mainly for steelhead) in coordination with other water supply uses. No other surface storage facilities exist in the region, though the potential exists for surface storage facilities in the Big Sur region. !
- **Drinking Water Treatment and Distribution:** Providing a reliable supply of safe drinking water is the primary goal of public water systems in the region. Critical to achieving that goal is ensuring a safe raw water supply and well-maintained water treatment facilities. Beyond the treatment plant, a high level of water quality must be maintained as the water passes through the distribution system to customer taps. Contaminants can enter the distribution system, or water quality may deteriorate within the distribution system, for example, as a result of microbial growth and biofilm, nitrification, corrosion, water age, effects of treatment on nutrient availability (contributing to microbial growth and biofilm), and sediments and scale within the distribution system. Improvements to water treatment and distribution facilities are continually needed as infrastructure ages, populations grow, water quality stressors increase (such as seawater intrusion and chemical contaminants), and water quality standards become more stringent. This is considered an ongoing and critical resource management strategy for the region.
- **Groundwater Remediation/Aquifer Remediation:** Groundwater remediation removes contaminants that affect beneficial uses of groundwater. Passive groundwater remediation allows contaminants to biologically or chemically degrade or disperse in situ over time, while active groundwater remediation involves either treating contaminated groundwater in situ or extracting contaminated groundwater from the aquifer and treating it. Since groundwater is the primary water supply source for most of the region, and since the groundwater basin is stressed by both natural and human-caused contaminants, including nitrates, seawater, and arsenic, groundwater remediation is an important resource management strategy for the region.
- **Matching Water Quality to Use:** An example of matching water quality to use is a water supplier choosing to use a deeper, cleaner aquifer for municipal water, which requires less treatment before delivery, over a more shallow, more contaminated aquifer or over a surface supply. Benefits would include a reduced need for treatment and potentially fewer disinfection byproducts for the water user. Recycled water can also be treated to a wide range of purities that can be matched to different uses. In the Greater Monterey County IRWM region, water is currently reclaimed and treated for agricultural and landscape irrigation purposes. The potential exists to treat water to a drinking water standard if the need should arise in the future.

- **Pollution Prevention:** Pollution prevention protects water at its source and therefore reduces the need and cost for other water management and treatment options. An important pollution prevention strategy is implementation of proper land use management practices to prevent sediment and pollutants from entering the source water. Numerous pollution prevention programs exist in the Greater Monterey County IRWM region, including agricultural management measures, stormwater public education campaigns, construction best management practices, and vegetated treatment systems (including created wetlands). Pollution prevention is cost-effective and ultimately results in a cleaner, safer water supply and healthier environment. The potential always exists to improve and expand pollution prevention efforts in the region.

- **Salt and Salinity Management:** Salts are materials that originate from dissolution or weathering of the rocks and soil, including dissolution of lime, gypsum and other slowly dissolved soil minerals. “Salinity” describes a condition where dissolved minerals of either natural or anthropogenic origin and carrying an electrical charge (ions) are present. In February 2009, the State Water Resources Control Board (SWRCB) adopted a Recycled Water Policy which aims to promote and increase the use of recycled water. The policy requires local stakeholders, such as local water and wastewater entities and members of the public develop, to develop salt and nutrient management plans for groundwater basins. The purpose of the plans is to protect groundwater from accumulating concentrations of salt and nutrients that would degrade the quality of groundwater and limit its use. Historical strategies for mitigating the impacts of excess salinity include desalination as well as salt dilution and displacement. For example, agricultural operations typically displace soil salts by applying more irrigation water than the crop is able to take up to flush salts out of the root zone and relocate them in a lower part of the soil profile. The salt and nutrient management plans are intended to go beyond these historical strategies (which essentially address impacts) by evaluating the initial sources and loading of salts and nutrients in a groundwater basin, and working to manage excessive loading on a regional scale. Salt and salinity management has taken on greater prominence among the region’s resource management strategies by virtue of the fact that the Greater Monterey County IRWM region, like all regions in the state, will need to develop a salt and nutrient management plan as required by the SWRCB’s Recycled Water Policy.

- **Urban Runoff Management:** Urban runoff management, using a watershed approach, aims to emulate and preserve the natural hydrologic cycle that is altered by urbanization. The watershed approach consists of a series of best management practices (BMPs) designed to reduce the pollutant loading and reduce the volumes and velocities of urban runoff discharged to surface waters. These BMPs may include facilities to capture, treat, and recharge groundwater with urban runoff, conducting public education campaigns to inform the public about stormwater pollution and the proper use and disposal of household chemicals, and providing technical assistance and stormwater pollution prevention training. Urban runoff management is already common practice for most municipalities in the region, but there is great potential for improving and expanding urban runoff management strategies in the region.

- **Agricultural Lands Stewardship:** Agricultural lands stewardship broadly means the conservation of natural resources and protection of the environment on agricultural lands. Examples of agricultural lands stewardship include windbreaks, irrigation tailwater recovery, filter strips, grassed waterways, contour buffer strips, conservation tillage, noxious weed control, riparian buffers, streambank protection, and the use of cover crops and other soil-building and stabilization practices. Many farmers in the Greater Monterey County region actively pursue agricultural lands stewardship either on an individual basis or as part of collective groups. A group called the Agriculture Water Quality Alliance (AWQA) is a regional collaboration of agriculture industry groups, federal, state, and local agencies, technical experts, environmental

organizations and university researchers working together to help farmers and ranchers along the Central Coast attain technical assistance and funding, navigate the permitting process, and implement the management strategies outlined in the Monterey Bay National Marine Sanctuary's *Agriculture and Rural Lands Action Plan*. Since agriculture is such a dominant land use in Monterey County, agricultural lands stewardship is considered to be a vital resource management strategy for the region.

- **Economic Incentives (Loans, Grants, and Water Pricing):** Economic incentives include financial assistance, water pricing, and water market policies intended to influence water management. Examples of economic incentives include water rates and rate structures, free services, rebates, and the use of tax revenues to partially fund water services. As opposed to incentives, fines are a type of economic disincentive that can be used to discourage undesirable water user behavior. Economic incentives, such as plumbing retrofits, washing machine rebates, and residential ultra low-flush toilet replacement programs, have been used and continue to be used at different times by water suppliers in the region. This strategy is a particularly good option for encouraging urban water use efficiency and for assisting disadvantaged communities in attaining water services, facilities, and appurtenances.
- **Ecosystem Restoration:** This strategy focuses on restoration of aquatic, riparian and floodplain ecosystems because they are the natural systems most directly affected by water and flood management actions, and are likely to be affected by climate change. Future water and flood management projects that fail to protect and restore their ecosystems will face reduced effectiveness, sustainability, and public support. Restoration usually emphasizes recovery of at-risk species and natural communities. Successful restoration of aquatic, riparian, and floodplain species and communities ordinarily depends upon at least partial restoration of physical processes that are driven by water. These processes include the flooding of floodplains, the natural patterns of erosion and deposition of sediment, the balance between infiltrated water and runoff, and substantial seasonal variation in stream flow. Many organizations throughout the region, including nonprofit environmental organizations and watershed groups as well as many individual farmers, ranchers, and private landowners, are actively working to restore ecosystems in rivers, streams, and other waterways, riparian areas, floodplains, and wetlands in order to achieve both habitat and water quality benefits.
- **Forest Management:** The Greater Monterey County region contains vast tracts of forestlands, much of which is under the jurisdiction of the U.S. Forest Service (including the magnificent Los Padres National Forest), California State Parks, and the U.S. Army (including Fort Hunter Liggett and Camp Roberts). The national forests in California were established under the Organic Act of 1897, which states that a primary purpose of these lands is to “secure favorable conditions of water flow.” Forest management as a resource management strategy focuses on forest management activities that are designed to improve the availability and quality of water. Strategies include, among others, meadow restoration (for increased groundwater storage), riparian forest restoration, fuels/fire management, and road management. Urban forestry is also discussed as an important management strategy. Climate change is expected to directly affect forests through increased drought stress, making trees more vulnerable to insect attack; wildfires are also likely to increase in frequency, size, and severity as climate warms. These stresses on forests will affect their capacity to naturally regulate streamflow and buffer water quality. Many streams that are now perennial are likely to become intermittent with the resulting loss of riparian zones, aquatic habitats, and other beneficial uses of water that depend on perennial flows. For these reasons it is imperative that U.S. Forest Service and other forest managers participate in the IRWM discussions for the Greater Monterey County region, and the RWMG has been making efforts to include them in IRWM planning.

- **Land Use Planning and Management:** The way in which we use land directly affects our water supply and water quality, and conversely, our water supply and water quality should inform, if not dictate, our land use decisions. Integrating land use decisions with water and watershed management consists of sustainably planning for the housing and economic development needs of a growing population while keeping in mind the carrying capacity and other limits of the water system and watershed ecosystem. This strategy will naturally call for more sustainable land use practices, including intelligent site design, source control (e.g., low-impact development—a watershed management approach using design techniques that emphasize on-site water infiltration, whereby natural processes filter, store, evaporate, and detain runoff close to the source of rainfall in order to mimic a site’s pre-development hydrology), and land use decision-making that aims to both reduce and mitigate the potential impacts of climate change (i.e., learning how to reduce GHG emissions through energy efficient and more sustainable development practices). Land use planning and water management planning are treated largely as separate functions in the Greater Monterey County region, though integration does occur to some extent on both a county and municipal level. The RWMG intends to use the IRWM Plan process as a vehicle for bringing together land use planners and water managers into a collective conversation so as to better coordinate and integrate these inextricably linked aspects of planning.

- **Recharge Area Protection:** The goals of recharge area protection are to 1) ensure that areas suitable for recharge continue to be capable of adequate recharge rather than covered by urban infrastructure, such as buildings and roads; and, 2) prevent pollutants from entering groundwater in order to avoid expensive treatment that may be needed prior to potable, agricultural, or industrial beneficial uses. There are currently no areas within the Greater Monterey County IRWM region that are specifically designated as “recharge protection areas,” though most of the Salinas Valley, which sits atop the Salinas Valley Groundwater Basin, could be considered areas of natural recharge. Certain sub-basins of the Salinas Valley Groundwater Basin are more permeable than others, and the land areas that overlie those basins may be considered candidates in the future for recharge protection. In the meantime, many agencies, organizations, farmers and ranchers in the region employ non-point source pollution management practices that, in effect, help protect groundwater recharge areas by preventing or reducing pollutants and nutrients in urban and agricultural runoff from seeping into the groundwater basin. This is an important resource management strategy for the region that holds significant potential for greater consideration and expansion.

- **Water-Dependent Recreation:** Providing for water-dependent recreation in water projects is part of California law and also part of the Public Trust Doctrine (California State Lands Commission). Demand for water-dependent recreation opportunities in California is so great that it exceeds the capacity of the current infrastructure. As a result, many of these facilities are overused, jeopardizing natural and cultural resources and degrading the recreational experience. This is evident in Big Sur, where, for example, visitor use in some of the State Parks has resulted in litter and trampling in sensitive wilderness or riparian areas. By incorporating planning for water-dependent recreation activities in water projects, water managers play a critical role in ensuring that residents and visitors are able to enjoy water-dependent activities today and into the future. Water managers in the region do encourage water-related recreation, for example at Nacimiento and San Antonio reservoirs where thousands of local residents and visitors each year enjoy boating, fishing, camping, swimming, picnicking, and hiking. However, the MCWRA staff must balance water supply and water quality needs with recreational opportunities (for example, allowing recreational boating in the reservoirs while protecting the water supply against the non-native, highly invasive zebra and Quagga mussels), just as the State Parks staff must balance recreation in the forests and on the beaches with maintaining good water quality, healthy habitat, and natural stream functioning. Through implementation of the IRWM Plan, the RWMG intends

to actively encourage opportunities for recreation while protecting water supply, water quality, healthy ecosystems, and the property rights of landowners.

- **Watershed Management/Planning:** Watershed management is the process of creating and implementing plans, programs, projects and activities to restore, sustain and enhance watershed functions. Ensuring healthy ecosystems and properly functioning watersheds is important not only for wildlife and sensitive plant species, but for maintaining good water quality, a safe water supply, and flood management. Enhancing watershed function will also help mitigate and increase resiliency to future impacts of climate change. The watershed assessment and management plan process typically involves multiple stakeholders, including scientists, local agencies, non-profit organizations, and local landowners. Several watershed management plans and restoration plans have been developed within the Greater Monterey County region: the San Antonio and Nacimiento Rivers Watershed Management Plan (October 2008), the Garrapata Creek Watershed Assessment and Restoration Plan (July 2006), the Reclamation Ditch Watershed Assessment and Management Strategy (2005, this includes the watersheds of Tembladero Slough, Merritt Lake, Santa Rita Creek, Espinosa Lake, Gabilan Creek, Natividad Creek, Alisal Slough, and Alisal Creek), Moro Cojo Slough Management and Enhancement Plan (February 1996), Northern Salinas Valley Watershed Restoration Plan (January 1997), Elkhorn Slough Watershed Conservation Plan (August 1999), and the Elkhorn Slough Wetland Management Plan (December 1989). A watershed assessment and management plan for the Big Sur River watershed is currently underway, and proposals exist for additional watershed planning in the region, including the Gabilan Creek sub-watershed.

- **Flood Risk Management:** Flood risk management aims to maximize the benefits of floodplains, minimize the loss of life and damage to property from flooding, and recognize the benefits to ecosystems from periodic flood events. The MCWRA is the primary flood management agency in Monterey County. Monterey County participates in the National Flood Insurance Program (NFIP) and has been a voluntary participant in the Community Rating System (CRS) since 1991. The CRS recognizes and encourages community floodplain management activities that exceed NFIP standards, and allows for reduced flood insurance premium rates based on the implementation of activities “over and above” that reduce flood risk. Approximately 21,600 communities participate in NFIP. Of those communities, only about 1,100 exceed the minimum requirements of the NFIP through their participation in the CRS program; and of those 1,100 CRS communities, only six have a higher rating than Monterey County (based on August 2009 CRS statistics). Flood risk management includes both structural approaches and land use management approaches. Structural approaches in the Greater Monterey County region include the San Antonio and Nacimiento dams and reservoirs (constructed in 1957 and 1967, respectively) and a well-coordinated Emergency Action Plan, including an automated alert system. Land use management approaches include floodplain function restoration, floodplain regulation, development and redevelopment policies, and housing and building codes. Monterey County is highly proactive in flood risk management, though significant potential still exists to enhance natural floodplain function within the region, as noted during recent discussions involving potential improvements to the Salinas Reclamation Ditch.

- **Dewvaporation or Atmospheric Pressure Desalination:** Dewvaporation is a specific process of humidification-dehumidification desalination. Brackish water is evaporated by heated air, which deposits fresh water as dew on the opposite side of a heat transfer wall. The energy needed for evaporation is supplied by the energy released from dew formation. Heat sources can be combustible fuel, solar or waste heat. The technology of dewvaporation is still being developed, and thus far the basic laboratory test unit is capable of producing up to 150 gallons per day. The technology for dewvaporation is still too new to be of significant value for the Greater Monterey

County region, but the RWMG remains open to its potential use as a resource management tool in the future.

- **Fog Collection:** There has been some interest in fog collection for domestic water supply in some of the dry areas of the world near the ocean where fog is frequent. Some experimental projects have been built in Chile, including the El Tofo project which yielded about 10,600 liters per day from about 3,500 square meters of collection net (i.e., about 3 liters per day per square meter of net). Because of its relatively small production, fog collection is limited to producing domestic water where little other viable water sources are available. Monterey County's coastal location is ideally suited for fog collection; however, as long as other viable water sources exist, fog collection will be considered a low-priority strategy for the region. However, like dewvaporation, the RWMG remains open to its potential use as a resource management tool in the future.
- **Rainfed Agriculture:** Rainfed agriculture is when all crop consumptive water use is provided directly by rainfall on a real time basis. Rainfed agriculture has both water supply and water quality benefits. Land that is tilled and left fallow after harvest can cause the soil surface to seal with the first and second rainfall and increase runoff and erosion; planting more acreage for production of winter crops will reduce runoff flowing into the surface water systems and to ocean outflows. Improved tillage practices, no-till or minimum-till, may also improve water infiltration into soil root zone, thus increasing soil-water storage and could contribute to water supply by eliminating the first seasonal irrigation. Although the RWMG accepts this strategy as a viable, potential resource management tool, it is realistically of limited value to farmers and ranchers in the region, given rain patterns and the types of crops that are prevalent. However, the RWMG will continue to consider this strategy as a potential tool for the region.

The following additional resource management strategies, which were not included in the *California Water Plan Update 2009*, were also selected by the RWMG to help implement the objectives in the IRWM Plan:

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- **Environmental and Habitat Protection and Improvement:** The RWMG chose to add "environmental and habitat protection and improvement" as a complementary strategy to "ecosystem restoration," with the intention of not just restoring but also protecting and improving habitats and natural resources where possible. As noted earlier, this work is already being carried out by numerous organizations and agencies, as well as by many farmers, ranchers, and other private landowners in the region. The rationale for including it as a resource management strategy is to emphasize the RWMG's commitment to implementing projects through the IRWM Plan that not only improve water supply, water quality, and flood management, but that also protect, improve, and restore the region's environmental resources, as reflected in the region's goals and objectives.
- **Recreation and Public Access:** This strategy is a complement to the "water-dependent recreation" strategy noted above. It is included as a separate resource management strategy in order to emphasize the RWMG's commitment to providing opportunities for recreation and public access through the implementation of IRWM Plan projects, where appropriate and while respecting the rights of private property owners. This strategy is reflected in the region's goals and objectives as part of both the environmental and flood management objectives.
- **Stormwater Capture and Management:** Stormwater refers to all runoff produced by rainfall events. The vast amount of impermeable surfaces in urban areas not only prevents stormwater from seeping into the ground and replenishing the groundwater supply like it does in more natural landscapes, but it accelerates flow patterns, causing potential flooding downstream or overflows

at water treatment plants, and introduces harmful chemicals and pollutants that then get carried into the watershed environment and coastal waters. Keeping water “onsite” is one solution to urban runoff. Capturing that water for later reuse has the further advantage of providing water supply benefits. There is significant interest in stormwater capture and management by the Monterey Regional Water Pollution Control Agency and other water resource managers in the region, including the City of Salinas. Stormwater can be captured and allowed to filter into the ground or injected directly into the aquifers, either with or without treatment; or alternatively, it can be recycled along with wastewater and used for such purposes as agricultural or landscape irrigation. Stormwater is considered a largely untapped resource in the Greater Monterey County IRWM region. The major impediment to stormwater capture and reuse is lack of storage (storage and/or percolation ponds). Stormwater capture is an attractive resource management strategy for the region, and will be given further consideration for its potential use.

- **Wetlands Enhancement and Creation:** Wetlands enhancement refers to the rehabilitation or re-establishment of a degraded wetland, or modification of an existing wetland, including hydrologic enhancement (depth duration and season of inundation) and/or vegetative enhancement. Studies have reported loss rates of up to 90 percent of wetlands in California (Dahl and Johnson 1991), with some wetland types, including coastal wetlands, riparian areas, and vernal pools, experiencing a disproportionately higher rate of loss than others. In the Greater Monterey County IRWM region, the reclamation of wetlands for agricultural use over the past century has significantly reduced wetland cover. The Salinas Reclamation Ditch, completed in 1920, drained a series of seven shallow lakes in the northern Salinas River watershed, between Salinas and Castroville, in order to increase the acreage of productive agricultural lands. A proposal exists to convert one of those drained lakes, Carr Lake, into a regional multi-use flood control basin and park, which would include re-created wetland areas and enhanced riparian corridors. Benefits of the project would include water quality improvements, stormwater capture and detention, increased and enhanced wildlife habitat, flood control benefits for downstream agricultural and community lands, and open space and recreation. Another area with great potential for the creation of new wetlands in the Greater Monterey County region is in the lower Salinas River watershed, along the Monterey Bay from Elkhorn Slough to the Salinas River mouth, addressing the loss of coastal wetlands in the region.
- **Water and Wastewater Treatment:** Water and wastewater treatment as a resource management strategy potentially includes integration of agricultural and domestic wastewater into the water supply equation. Water/wastewater treatment has been a significant issue in the Monterey County region for several decades, and has ripened into a critical topic within the last several years. While this topic has received significant attention on the Monterey Peninsula, it also holds much promise for the Greater Monterey County IRWM planning area. For example, recent discussions are now focusing on integrating the Monterey Peninsula with the Salinas Valley wastewater treatment/recycling efforts. As Monterey Peninsula water supply planning has hit several snags, interest in integrating watersheds and infrastructure systems between watersheds has grown. Water/wastewater treatment as a supply option, through groundwater recharge and/or other means, is an important resource management strategy that holds much potential for the Greater Monterey County IRWM planning area.
- **Infrastructure Reliability:** The RWMG chose to include this as a resource management strategy in order to recognize the importance of maintaining and upgrading infrastructure for water supply, treatment, and distribution, wastewater collection, treatment, and disposal, and recycled water treatment and distribution. Infrastructure improvements are continually needed as facilities age, demands on their use increase (due to population growth, degraded water quality, or increased water quality standards), and new technologies are introduced.

- **Regional Cooperation:** Regional communication and cooperation is included as a goal category within the region’s goals and objectives, and is recognized as one of the “foundational” resource management strategies chosen for the region. Cooperation between water management entities and other stakeholders in the region is absolutely necessary if integrated regional water management is to be achieved. Cooperation forms the foundation for collaboration and allows for the possibility of true problem solving. The 18 entities that form the Greater Monterey County RWMG have developed a process and framework for IRWM planning that is meant to encourage cooperation, communication, and collaboration and to facilitate an open, region-wide conversation with all stakeholders about water resource management in the Greater Monterey County region as well as in the broader Central Coast region.
- **Education and Outreach:** Public education is considered such an important tool that it is included as an objective in six out of the seven goal categories in the region’s goals and objectives (“promoting public education” appears as an objective for water supply, water quality, flood protection and floodplain management, regional communication and cooperation, disadvantaged communities, and climate change). Many local agencies and organizations already sponsor public education and outreach programs to educate citizens about such issues as water conservation, nonpoint source pollution prevention, and the importance of healthy watersheds. Numerous programs have also been implemented to promote best management practices within specific occupational fields, such as agriculture, construction, and restaurants. Despite the extensive educational efforts that have occurred to date, there is always a need for more education and outreach, both in terms of promoting positive behavior and in terms of promoting public support for water supply, water quality, flood management, and natural resource enhancement programs. The need for public education and outreach will become all the more critical as new data and information become available regarding climate change. It is for these reasons that supporting public education and outreach is considered one of the higher priorities for the region.
- **Monitoring and Research:** Monitoring and research are recognized by the RWMG as crucial to ensuring effective water resource management in the region. Monitoring is considered so important that it is included as a “Guiding Principle” in the IRWM Plan. Support for research and monitoring is also included as specific objectives in the water supply, water quality, flood protection and floodplain management, environment, and climate change goal categories. Research enables us to understand the causes of problems and to develop and implement management measures to address those problems. Monitoring helps us gauge the effectiveness of those management measures and other projects implemented through the IRWM Plan. Monitoring and research provide the scientific foundation needed for objective decision-making and help guide the implementation of effective management practices throughout the region, and as such, are considered primary tools for integrated regional water management in the Greater Monterey County region.

The strategies listed below from the *California Water Plan Update 2009* were considered but were not chosen for inclusion in the Greater Monterey County IRWM Plan. The reason for omitting each of these strategies is as follows:

- **Conveyance–Delta:** Not applicable in the Greater Monterey County IRWM region.
- **Surface Storage–CALFED:** Not applicable in the Greater Monterey County IRWM region.
- **Crop Idling for Water Transfers:** There is no financial incentive for growers to employ this strategy in Monterey County (like there might be in the Central Valley).

- **Irrigation Land Retirement:** Like the preceding strategy, there is no financial incentive for growers to employ this strategy in Monterey County (like there might be in the Central Valley). Also, this strategy would meet with great resistance from the agricultural community.
- **Waterbag Transport/Storage Technology:** The RWMG did not consider this to be an appropriate option. Also, this strategy would meet with great resistance from stakeholders in the region.

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E.2 HOW RESOURCE MANAGEMENT STRATEGIES ARE IMPLEMENTED IN THE PLAN

Projects chosen for inclusion in the IRWM Plan represent a broad mix of the resource management strategies listed above. The RWMG encourages stakeholders to develop projects that employ a diverse mix of resource management strategies by offering additional points to projects that demonstrate such diversity as part of the project ranking process. In future IRWM Plan project solicitations, projects will continue to be proactively sought to ensure a diverse mix of resource management strategies for the region's water management portfolio. A strong diversification of resource management strategies will not only ensure robust solutions to current water management issues but will provide resiliency to help the region deal with uncertain future circumstances.

The table on the following pages demonstrates how projects included in the IRWM Plan (out of 38 projects total) will implement resource management strategies. The resource management strategies most widely used include:

- Watershed Management/Planning: 25 projects
- Environmental and Habitat Protection and Improvement: 25 projects
- Education and Outreach: 25 projects
- Regional Cooperation: 24 projects
- Monitoring and Research: 23 projects
- Pollution Prevention: 19 projects

The resource management strategies least often used by projects in the IRWM Plan include:

- Dewvaporation or Atmospheric Pressure Desalination: 0 projects
- Fog Collection: 0 projects
- Precipitation Enhancement: 0 projects
- Desalination: 1 project
- Rainfed Agriculture: 1 project
- Forest Management: 1 project
- Water Transfers: 3 projects
- Surface Storage – Regional/Local: 4 projects

For this region it makes sense that Dewvaporation, Fog Collection, Precipitation Enhancement, and Rainfed Agriculture are seldom-used strategies for water resource projects. However, Surface Storage and Forest Management are resource management strategies that the RWMG will actively seek for the resource management strategy “toolbox” in future project solicitations, and Desalination is in fact currently being considered for use in the region.

Table E-1: How IRWM Plan Projects Implement Resource Management Strategies

Resource Management Strategies / Projects	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance – Regional/Local	System Re-operation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – Regional/Local	Drinking Water Treatment and Distribution	Groundwater Remediation/Aquifer Remediation	Matching Water Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management/Planning	Flood Risk Management	Dewaporation or Atmospheric Pressure Desalination	Fog Collection	Rainfed Agriculture	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Stormwater Capture and Management	Wetlands Enhancement and Creation	Water and Wastewater Treatment	Infrastructure Reliability	Regional Cooperation	Education and Outreach	Monitoring and Research		
California State Parks: Big Sur River Steelhead Enhancement Project																			x				x	x											x				
Castroville Community Services District: Well 2B Treatment Project	x	x				x					x																									x			
Central Coast Wetlands Group: Coastal Wetland Erosion Control and Dune Restoration												x			x					x		x	x	x								x		x	x	x			
Central Coast Wetlands Group: Development and Evaluation of Climate Change Response Strategies in the Elkhorn Slough, Gabilan and Salinas River Watersheds				x	x	x									x						x	x		x	x									x	x	x	x		
Central Coast Wetlands Group: Ecosystem Condition Profile for the Lower Salinas River Watershed using Level 1-2-3 Framework																	x				x																x	x	x
Central Coast Wetlands Group, MBNMS, Monterey Bay Aquarium Research Institute, Elkhorn Slough Reserve: Expansion of a Coastal Confluence Water Monitoring System to support the Greater Monterey IRWMP										x		x			x	x	x	x	x		x			x	x										x	x	x		
Central Coast Wetlands Group: Northern Gabilan Mountain Watershed Management Project	x	x										x		x		x	x				x	x		x	x												x	x	x

Resource Management Strategies / Projects

	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance – Regional/Local	System Re-operation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – Regional/Local	Drinking Water Treatment and Distribution	Groundwater Remediation/Aquifer Remediation	Matching Water Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management/Planning	Flood Risk Management	Dewaporation or Atmospheric Pressure Desalination	Fog Collection	Rainfed Agriculture	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Stormwater Capture and Management	Wetlands Enhancement and Creation	Water and Wastewater Treatment	Infrastructure Reliability	Regional Cooperation	Education and Outreach	Monitoring and Research	
Central Coast Wetlands Group: Implementation of the Moro Cojo Slough Management and Enhancement Plan – Restoration of the Upper Slough											x	x							x		x		x						x	x	x	x		x	x	x		
Central Coast Wetlands Group: Study of Environmental Services from Nutrient Reducing BMPs												x	x				x	x		x		x	x						x						x	x	x	
Central Coast Wetlands Group: Water Quality Enhancement of the Tembladero Slough Phase II												x				x	x		x		x		x	x					x	x	x	x			x	x	x	
Central Coast Wetlands Group: Tembladero Restoration and Castroville Community Public Access		x										x	x		x				x				x	x	x				x	x	x	x	x		x	x	x	
City of Salinas: Integrated Industrial Wastewater Conveyance and Treatment Facility Improvements									x							x																						x
City of Salinas and MRWPCA: Dry Weather Runoff Diversion Program														x		x																x						x
City of Soledad: Soledad Recycled Water Project		x	x							x		x											x							x				x	x	x	x	x
Delicato Family Vineyards: San Bernabe Lining Project	x	x	x			x					x		x				x	x							x				x						x	x	x	x
Ecology Action: Monterey Bay Green Gardener Training & Certification Program		x										x	x			x			x						x				x							x	x	

Resource Management Strategies / Projects	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance – Regional/Local	System Re-operation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – Regional/Local	Drinking Water Treatment and Distribution	Groundwater Remediation/Aquifer Remediation	Matching Water Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management/Planning	Flood Risk Management	Dewaporation or Atmospheric Pressure Desalination	Fog Collection	Rainfed Agriculture	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Stormwater Capture and Management	Wetlands Enhancement and Creation	Water and Wastewater Treatment	Infrastructure Reliability	Regional Cooperation	Education and Outreach	Monitoring and Research		
Elkhorn Slough Foundation: Integrated Restoration – Beneficial Reuse of Sediment to Restore Tidal Marsh and Agricultural Stormwater Treatment by a Native Grassland Buffer														x		x		x					x	x	x										x	x	x		
Elkhorn Slough Foundation: Ridgeline to Tideline – Water Resource Conservation in Elkhorn Slough	x					x								x	x		x		x	x		x	x	x												x	x		
Marina Coast Water District: Recycled Water Element of the Regional Urban Water Augmentation Project (RUWAP)		x	x						x			x																											
Monterey Bay Sanctuary Foundation: Making Monitoring Count												x	x				x		x		x																		
Monterey Bay Sanctuary Foundation: Watershed Approach to Water Solutions	x													x			x		x																				
Monterey County Public Works: Las Lomas Drive Storm Drain Improvements Project																	x																						
Monterey County Redevelopment & Housing Office: Well Replacement and Pipeline – San Lucas Water District				x							x	x	x				x				x	x																	
Monterey County Water Resources Agency: Aquatic Invasive Species Inspection Project																							x	x															
Monterey County Water Resources Agency: Coastal Dedicated Monitoring Well Drilling	x	x										x	x	x	x								x	x															

Resource Management Strategies / Projects	Agricultural Water Use Efficiency	Urban Water Use Efficiency	Conveyance – Regional/Local	System Re-operation	Water Transfers	Conjunctive Management and Groundwater Storage	Desalination	Precipitation Enhancement	Recycled Municipal Water	Surface Storage – Regional/Local	Drinking Water Treatment and Distribution	Groundwater Remediation/Aquifer Remediation	Matching Water Quality to Use	Pollution Prevention	Salt and Salinity Management	Urban Runoff Management	Agricultural Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Planning and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management/Planning	Flood Risk Management	Dewaporation or Atmospheric Pressure Desalination	Fog Collection	Rainfed Agriculture	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Stormwater Capture and Management	Wetlands Enhancement and Creation	Water and Wastewater Treatment	Infrastructure Reliability	Regional Cooperation	Education and Outreach	Monitoring and Research
Resource Conservation District of Monterey County: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program			x			x								x			x		x			x		x				x			x				x	x	x
Rural Community Assistance Corporation: Greater Monterey Bay Disadvantaged Community Wastewater Management Pilot Program	x										x		x		x	x	x				x		x					x		x		x	x	x	x	x	x
San Jerardo Cooperative: San Jerardo Wastewater Project	x								x		x		x																				x	x			
Save Our Shores: Watershed Protection Program – Annual Coastal Cleanup Day in Monterey County														x					x									x									x
UC Davis Marine Pollution Studies Lab: Evaluation of Potential for Stormwater Toxicity Reduction by Low Impact Development (LID) Treatment Systems														x		x					x		x					x				x					x
Number of Projects that Implement Resource Management Strategies	6	11	12	5	3	7	1	0	4	4	5	9	13	19	10	11	16	7	15	1	13	10	9	25	12	0	0	1	25	9	14	10	8	11	24	25	23

Projects highlighted in green: These projects have been funded and are currently being implemented through Proposition 84 Implementation IRWM Grant funds (Round 1).

E.3 RESOURCE MANAGEMENT STRATEGIES AND CLIMATE CHANGE

As noted above, the RWMG selected resource management strategies based primarily on IRWM Plan goals and objectives. Climate change adaptation and mitigation is one of the seven goals of the Plan, and as such, was explicitly factored in to the RWMG's selection of resource management strategies.

The RWMG supports and encourages the implementation of so-called "no regret" adaptations to general effects of climate change. Such adaptations are those that make sense in light of the current water management context for the region and also help in terms of effects of climate change. Examples of "no regret" strategies include increasing water use efficiency, practicing integrated flood management, and enhancing natural ecosystems. Several of the resource management strategies chosen by the RWMG may be considered "no regret" strategies. These include strategies that:

Increase water supply through water use efficiency:

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Increase water supply by developing "new" sources of water:

- Recycled Municipal Water
- Desalination
- Dewvaporation or Atmospheric Pressure Desalination
- Fog Collection
- Rainfed Agriculture

Increase (or maintain) water supply by protecting and replenishing groundwater:

- Stormwater Capture and Management
- Pollution Prevention
- Salt and Salinity Management
- Recharge Area Protection
- Groundwater Remediation/Aquifer Remediation
- Agricultural Lands Stewardship

Encourage integrated flood management:

- Flood Risk Management

Encourage the protection and enhancement of natural systems:

- Ecosystem Restoration
- Forest Management
- Watershed Management/Planning
- Environmental and Habitat Protection and Improvement
- Wetlands Enhancement and Creation

Encourage collaboration in order to understand and address the impacts of climate change:

- Land Use Planning and Management
- Regional Cooperation
- Monitoring and Research
- Education and Outreach

Section R of this IRWM Plan presents an in-depth overview of climate change and its expected consequences for the Greater Monterey County region. The section includes a preliminary adaptation strategy based on the results of climate change risk assessments conducted by the RWMG and a Climate

Task Force, comprised of regional scientists, water resource managers, and policy experts (see Table R-10, “Adaptation and Response Strategies Based on Risk Assessment”). The recommended adaptation and response strategies address, among other things, impacts of sea level rise on coastal resources and coastal groundwater basins, impacts to water supply due to changes in rainfall, and the potential for increased flooding due to higher storm flow events. Adaptation and response strategies include, for example:

- Prepare a regional sea level rise adaptation strategy
- Manage watersheds, habitat, and vulnerable species
- Implement adaptation strategies to conserve California's biodiversity
- Habitat/ecosystem monitoring and adaptive management
- Implement water conservation and supply management efforts
- Integrate land use and climate adaptation planning
- Support essential data collection and information sharing
- State recommendations suggest no new critical facilities be built within the 200-year flood plain
- Provide guidance on protecting critical coastal ecosystems and development
- Promote community resilience to reduce vulnerabilities
- Educate, empower, and engage citizens regarding risks and adaptation

The resource management strategies selected by the RWMG for this Plan, in particular the “no regret” strategies listed above, are consistent with and will help carry out these adaptation and response recommendations for addressing climate change impacts.

In addition to addressing climate change impacts, the IRWM Plan supports GHG emissions reduction and climate change mitigation activities, as reflected in the following IRWM Plan objectives:

- Support efforts to research alternative energy and to diversify energy sources appropriate for the region.
- Seek long-term solutions to reduce greenhouse gas producing energy use.
- Support research and/or implementation of land-based efforts such as carbon-sequestration on working lands and wildlands in the Greater Monterey County region.

The “Land Use Planning and Management” resource management strategy addresses these objectives. The strategy calls for more sustainable land use practices, including land use decision-making that aims to both reduce and mitigate the potential impacts of climate change, e.g., learning how to reduce GHG emissions through energy efficient and more sustainable development practices.

Section R in this IRWM Plan provides a more in-depth discussion regarding climate change mitigation and GHG emissions reduction. A full GHG emissions reduction strategy for the region is expected to be created by Monterey County in the near future to meet State mandates (AB 32, CEQA). However in the meantime, several key strategies and actions are recommended in Section R.6.1, “GHG Reduction Strategies,” for project proponents, water resource managers, land use managers, and other stakeholders in the region based on strategies listed in the *Climate Change Handbook for Regional Water Planning* (US EPA Region 9 and DWR 2011). The recommended GHG reduction and climate mitigation actions will be further evaluated by the RWMG, with substantial input from the Climate Task Force, to define possible next steps, responsible entities, and funding resources.