

# Section 6

## Prioritization Results

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This section presents the results of the action screening and prioritization process described in Sections 2 and 5.

As described in Section 5, the Stakeholder Group and planning team screened potential actions into the IRWMP. These actions included continuing efforts of the Solano agencies that do not require much time and resources and mandated actions required by law. The planning team then rated the remaining potential actions according to each prioritization criterion and compiled results in a prioritization matrix (Figure 5-6). The matrix shows the actions that performed the best at the top of the list. Based on the screening and prioritization results, the planning team separated the potential actions into three tiers:

- Tier 1 – Highest priority for implementation;
- Tier 2 – Moderate priority; and
- Tier 3 – Lower priority - longer term implementation actions.

The following sections describe the three tiers and the actions included within each tier.

### 6.1 TIER 1 – HIGHEST PRIORITY FOR IMPLEMENTATION

Tier 1 actions are the highest priority for implementation. The Solano agencies should focus on implementing these actions first to achieve the most regional benefits and maximize use of resources. Tier 1 includes all the actions that were “screened-in” to the evaluation as described Section 6.1.1 below. These actions continue ongoing water resource efforts. In addition, Tier 1 includes the top 16 actions evaluated after the initial screening that performed the best according to the prioritization criteria. The actions are not listed in a specific order in which they should be implemented. More detailed explanations of the Tier 1 actions are included at the end of Section 7.

#### 6.1.1 Continue Ongoing Water Resource Efforts (Screened-in Actions)

Solano agencies have been working for many years to more effectively manage and protect the region’s water resources. Many of these ongoing actions are mandatory; therefore, they must continue. Other actions are not mandatory, but require few resources (both money and staff time) to continue. This potential action would continue ongoing efforts that are either mandatory or require few resources. These existing efforts should continue:

- Participate in regional water resources planning
- Monitor land use activities with potential for encroachment or impacts on surface water supplies
- Monitor Delta water resource issues
- Implement flood management public awareness program

- Implement SCWA Flood Control Project Small Grant Program
- Improve efficiencies of SCWA maintenance activities
- Monitor Sacramento Area Flood Control Agency's (SAFCA) plans for the Yolo Bypass
- Participate in CALFED's efforts for Delta levee integrity
- Monitor statewide flood control programs for applicability to Solano County
- Track Reclamation's emergency dam failure response plan for Putah Creek and Vallejo's plans for its dams
- Evaluate flood management issues on Putah Creek
- Monitor DWR safety and security studies and actions for NBA
- Implement identified recommendations by Reclamation to improve safety and security of Monticello Dam
- Investigate seismic concerns and potential solutions at Terminal Reservoir
- Implement Phase I/Phase II nonpoint National Pollutant Discharge Elimination System (NPDES) runoff programs

### **6.1.2 Administer Solano Project Contract and Defend Water Rights**

To implement this potential action, SCWA would continue its activities to administer the Solano Project contract and defend the water rights. Administering Solano Project water supply contract entails basic duties, including submitting schedules, payments and water use reports to Reclamation. SCWA and the participating agencies (cities, districts, and agencies contracting with SCWA for water from the Solano Project) need to coordinate schedules, payments, and water use reports. The contract also requires SCWA and its participating agencies to meet federal water conservation standards and to submit plans on meeting the standards.

Defense of Solano Project water rights encompasses a wide variety of implementation steps, some of which may not be foreseeable at this time. Prior to the signing of the Putah Creek Accord that settled instream flow issues in Lower Putah Creek, significant SCWA resources were dedicated to protecting the Solano Project water supply and water rights. Some concerns and obligations still remain from both the upstream and downstream settlements.

### **6.1.3 Administer State Water Project Contract**

Administering the SWP water supply contract would require continued coordination between SCWA and member units (cities contracting with SCWA for water from the NBA). SCWA and member units consistently interact regarding schedules, payments, and water use reports. SCWA must then submit these forms and reports to DWR. Other activities under this action include SCWA coordination with the other user of the NBA, the Napa County Flood Control and Water Conservation District, and with water users who utilize the NBA to convey non-SWP water.

Administering the SWP supply is much more complex and time consuming compared to the Solano Project. Fluctuating water supply allocations and changing DWR costs require close interaction between DWR and contractors using SWP water, such as SCWA. The water supply of the SWP suffers from dry year deficiencies and SWP operational constraints. Many of these operational constraints are because of environmental regulations to protect water quality, fish, and wildlife. SCWA and the member units must understand these constraints to be able to advocate regional issues; understanding these constraints involves a high degree of technical and legal expertise.

#### **6.1.4 Work with SWP, State Water Contractors, and CALFED to Explore Water Supply and Storage Opportunities Outside of the Region**

Increased water supply or water storage could increase the reliability of Solano's water supplies, particularly those from the NBA. Increasing the yield of the SWP through SWP or CALFED projects would increase the reliability of the NBA. Storing water in wet years for later use in drier years would help Solano water agencies maintain reliable water supplies in more hydrologic year types. Several options exist for Solano agencies to acquire from or store water outside the region. Solano agencies could participate in groundwater banking projects similar to the Mojave Exchange Agreement. Other potential agencies include Semitropic Water Storage District, Berrenda Mesa Irrigation District, or Arvin Edison Water Storage District. In addition to groundwater storage, new surface storage could increase SWP water supply reliability or could increase storage for the region. The CALFED program is studying five potential surface storage projects and potential groundwater storage projects throughout the state. Most of these storage facilities have the potential to increase SWP supplies, which would increase the reliability of the NBA supplies. Other potential opportunities include long-term transfers to increase SWP water supplies and purchase of additional permanent supplies. This proposed action does not envision participation in surface storage opportunities outside of the CALFED collaborative process, and any surface storage project would have to be part of a balanced CALFED implementation package.

#### **6.1.5 Improve Water Treatment Technology for Water Supplies**

High organics and turbidity in the water supply, particularly in the winter season, cause cities to have difficulty treating NBA water supply to meet ever more stringent drinking water standards. This action would provide research opportunities and facilities to develop solutions to effectively treat NBA water. Solano agencies are considering a wide variety of projects and programs to address the water quality concerns, including an alternate intake on the Sacramento River and installation of Best Management Land Use Practices. Because cities treat the drinking water, they will make final decisions on treatment technologies. The cities in Napa and Solano Counties use a common source; therefore, collective efforts on treatment technology are most efficient.

Other agencies are also studying treatment of drinking water from the Delta. Although the NBA water is different for other Delta sources in some respects, there are some commonalities that make regional cooperation important. Solano agencies should continue to work with other agencies who are studying treatment of Delta water.

#### **6.1.6 Increase NBA Capacity and Utilization**

The NBA is a major water supply facility conveying SWP water and other non-SWP water supplies to the major cities in Solano County and to Napa County. Although designed to convey 154 cfs,

recent tests have shown its actual capacity at 142 cfs due to the growth of a biofilm on the pipe's interior.

Even with an increase to DWR's contracted capacity of 175 cfs, the NBA will fall short of conveying all potential permitted and contracted water originating from the Delta. To convey all potential permitted water, the NBA will need to be expanded; an initial estimate by DWR placed the expansion at a capacity of 248 cfs. Given growth and demand for water in Solano and Napa Counties, the NBA's capacity will require expansion to meet future demand. This action includes evaluating those steps necessary to expand the NBA to meet future demand capacity.

### **6.1.7 Quantify Countywide Demand and Supply**

This action would initiate studies to quantify existing and future agricultural, urban, and environmental water demands and water supplies (including surface water and groundwater). Understanding countywide demand and supply would facilitate better management of resources and assist in the determination of long term regional planning actions. SCWA has completed Phase 1 of the IRWMP, which documents water supplies for SCWA member agencies (all entities that receive water from SCWA, either from the Solano Project or the SWP). Each member agency characterized water supply reliability differently. This action would standardize those measurements to provide an overall estimate of countywide supply.

This action would quantify current countywide water demand and initiate studies to project future water demands. Water demand consists of agricultural, urban, and environmental water uses. The Phase 1 report includes individual city and district estimates for water demand; however, they often derive the estimates by different methods using various units, especially for urban water use. This action would standardize individual city and district demand estimates to determine an overall countywide water demand.

### **6.1.8 Transfer Water Within the County**

This potential action would involve multiple water agencies within the region engaging in transfers to help meet water needs throughout the region. Solano water agencies engage in transfers to move water from areas with adequate supplies to areas that require additional supplies. Many agencies share use of facilities (such as the NBA and Putah South Canal), which helps them move water easily.

The Solano water agencies have demonstrated a willingness to work together to solve local supply issues; however, local supply reliability concerns persist in some areas. Increasing intra-county transfers would provide water to agencies that may have shortages in some years, and would provide financial incentives to the selling agencies. This action includes intra-county transfers that use existing facilities to move water throughout the region.

### **6.1.9 Optimize Delivery of Water to End Users Based on Quantity and Quality**

Two fundamental sources of surface water serve Solano County – water originating from the Delta, primarily via the NBA, and Solano Project water stored in Lake Berryessa. The NBA is a primary water source for the cities of Benicia, Fairfield, Vacaville and Vallejo. NBA water originates from Barker Slough. NBA water is high in organics and turbidity and consequently is difficult and costly to treat for municipal use. The NBA is a part of the SWP, which is an unreliable supply to Solano

County in dry years as DWR strives to meet demand throughout the State system. Lake Berryessa water is of high quality (low organics and turbidity) and is conservatively operated to provide reliable water even in dry years. Approximately three quarters of water from the Solano Project is used in SID and MPWD for agriculture. The NBA and the Solano Project can have different dry year cycles so there is opportunity for conjunctive use (trading these water supplies) of these two surface water supplies to meet county demand.

This action would explore measures that could lead to greater use of the Solano Project water by the cities and NBA water by agriculture. Additionally, this action would evaluate measures to optimize the quantity of water delivered to the end user based upon existing infrastructure.

### **6.1.10 Purchase Contingency Supplies at the Wholesale Level**

Contingency supplies augment existing supplies and are necessary to prepare for drought conditions or an unforeseeable increased demand. As part of this potential action, SCWA would pursue contingency supplies at the wholesale level for use by retailers during dry years. Contingency supplies could be either on a short-term basis, where SCWA negotiates additional water for a year when supply is needed, or for a longer-term period. Contingency supplies could come from a variety of sources, including water storage projects, conjunctive use projects, and water transfers. The most likely option would be a transfer from an out-of-county agency. SCWA could also initiate participation in an external contingency supply agreement, such as DWR's or State Water Project Contractor's Dry Year Purchase Program.

### **6.1.11 Improve Conveyance at Putah Diversion Dam**

This action would continue studies and possibly construct improvements to improve water conveyance in Putah Creek near the dam. The Putah Diversion Dam is a small structure that backs water up to allow water to flow into the Putah South Canal. Water spills over the dam into Putah Creek. Recently it was discovered that water flows in Putah Creek are constrained by thick vegetation in the creek. Because the water cannot flow freely during high flows, it backs up and potentially could cause water to rise over the dam. Increased water levels could compromise the safety of the dam and affect flows into Putah South Canal. The conveyance improvements need additional study, and should be completed in a way that improves both water supply reliability and environmental factors.

### **6.1.12 Increase Opportunities for Conjunctive Use**

This action focuses on increasing opportunities for conjunctive groundwater use as a means of increasing water supply and reliability. Conjunctive use projects integrate the use of groundwater and surface water to allow use of surface water when available and groundwater at other times. The surface water provides supplies to local users and recharges the groundwater basin in normal or wet years. Stored groundwater then provides supply during drier years. The groundwater recharge part of conjunctive use in Solano County would occur as in-lieu recharge, meaning that rather than direct recharge (through percolations ponds), recharge occurs by reduced groundwater pumping by districts during wet years. This allows the groundwater basin to recharge naturally during wet years.

Several agencies in the County are or could explore conjunctive use opportunities for additional water supply. In the Solano Subbasin there may be opportunities to partner with Yolo County for the

collection of data or conjunctive use management as the Tehama formation extends beneath both counties. A significant emphasis has been placed on the groundwater conjunctive use as a source of supply. DWR, CALFED, and the SWRCB are assisting with the financing of conjunctive use programs that increase water supply reliability.

### **6.1.13 Increase Use of Groundwater**

This action focuses on increasing the use of groundwater as a means of increasing water supplies and reliability. Several entities in the region, including SID and the cities of Vacaville, Rio Vista, Dixon, rely on groundwater either for all or a portion of their supply. Before development of the Solano Project, districts and cities relied more heavily upon groundwater for supply. Historic groundwater pumping has had significant effects on groundwater levels, but groundwater levels are relatively stable at present. Groundwater levels tend to decline because of increased pumping in dry years and rebound in wet years. Increased use of groundwater can occur in two forms: increased reliance on groundwater alone or increased use of groundwater as part of a conjunctive use program. This action focuses on increased groundwater withdrawals because conjunctive use is included in a separate action. More information will be necessary to understand the safe quantity of water that can be withdrawn in Solano County. Any program to increase use of groundwater will need to be coupled with further research, monitoring and collaborative management by groundwater users.

### **6.1.14 Increase Participation in the Mojave Exchange Agreement**

Increasing participation in the Mojave Exchange Agreement would store more water from the region for use during dry years. SCWA's agreement with Mojave Water Agency, a contractor to the SWP, allows SCWA member units to exchange wet year SWP water for dry year SWP water. In years when Solano water agencies have adequate supplies, they can send water to Mojave for storage. Mojave stores this water in its groundwater basin. In dry years, Mojave returns water by reducing its use of SWP water and instead using groundwater. A portion of Mojave's SWP supplies are directed to SCWA for use during dry years.

Benicia is the only water agency that has taken advantage of this exchange agreement. As of 2004, Benicia had stored enough water to have up to 5,500 AF returned during dry years. Increasing participation in the Mojave Exchange Agreement would allow member units to store excess water in wet/normal years and rely upon this water as a supply during dry years. DWR currently requires the return to occur within 10 years of the initial exchange, but this policy may be modified to extend the return period.

### **6.1.15 Develop Final SCWA Flood Control Funding/Construction/Maintenance Policy from Existing "Interim Principles"**

SCWA approved Interim Principles to be followed for SCWA-Funded Flood Control Projects (Principles) in 2003. SCWA labeled the principles as "Interim" because the Solano agencies' IRWMP was under development and SCWA expected this document to provide information for the SCWA Board of Directors as to the appropriate level of resources to dedicate to the flood control program.

These principles apply to flood management projects and programs where SCWA does not have a contractual responsibility for operations and maintenance. The principles call for a proposed project to have benefits greater than costs. Non-SCWA partners shall provide at least 10% of capital costs; partners could include benefiting landowners or other public agencies. Project beneficiaries must cooperate with SCWA in planning and implementing the project by funding operations and maintenance and providing necessary right-of-way easements.

Under this action, SCWA and member agencies would revisit the principles and modify them based on the priority of these types of flood control projects compared to other activities.

### **6.1.16 Implement Water Use Efficiency Efforts**

Water use efficiency occurs at both the larger wholesale water supplier level and the individual retail customer level. As a wholesale supplier, SCWA is limited to actions at the wholesale level that generally include big-picture region-wide actions, coordinating member agency actions, and providing incentives for water use efficiency. SCWA has formed urban and agricultural water conservation committees to address countywide water conservation issues. Under this action, SCWA would continue to support the efforts of these committees and promote coordination between them.

Solano water agencies would continue to implement water use efficiency measures at the retail level. Both SCWA and member agencies are involved in the California Urban Water Conservation Council (CUWCC) and the Agricultural Water Management Council (AWMC), statewide organizations that promote water conservation. The CUWCC and AWMC require development of water management plans that evaluate implementation of water use efficiency measures at the district level, including urban Best Management Practices (BMPs) and agricultural Efficient Water Management Practices (EWMPs). Under this action, retail water agencies would update water management plans and continue to implement EWMPs and BMPs. SCWA could provide incentive programs for member agencies to implement BMPs and EWMPs that are not locally cost effective.

A potential project to improve agricultural water use efficiency is a runoff and diversion facility in RD2068. This facility would redirect agricultural drainage for reuse on irrigated fields and reduce agricultural drainage into Delta channels. This type of project benefits county water supply and water quality in Delta channels.

### **6.1.17 Clarify Regulations in Developing Areas to Minimize Runoff**

When developing new areas, builders must follow regulations to mitigate any stormwater impacts. This requirement is managed by the cities within city limits and by Solano County in unincorporated areas. While the regulations are similar in all areas, the public perceives that the regulations are interpreted and applied differently under different circumstances.

The cities and Solano County have worked to uphold their regulations and make sure that all development mitigates stormwater impacts. The public, however, still expresses skepticism. As part of this action, Solano water agencies would work together and with the County to try to improve coordination and public awareness. This action would inform the public of the actions that the cities and the County are taking to mitigate stormwater impacts, and would stimulate dialogue regarding these policies and actions.

A related issue of particular importance in some populated unincorporated areas is the lack of accurate data on where flooding might occur. FEMA flood hazard maps do not always depict flooding potential (their purpose is for insurance) and the FEMA maps may be outdated. Land use decisions are not always based on accurate information regarding flooding; therefore, programs to upgrade flood hazard mapping are needed. Flood hazard mapping should depict reasonably foreseeable flooding and include impacts of “build out” of communities.

## **6.2 TIER 2 – MODERATE PRIORITY**

Tier 2 includes actions the Solano agencies do not need to implement immediately. These actions, however, should be considered if Tier 1 actions do not achieve the expected benefits, or if additional resources become available, or if circumstances change affecting the Tier 2 priorities. The actions are not listed in a specific order in which they should be implemented.

### **6.2.1 Cooperatively Monitor Agricultural Runoff Quality**

This potential action would continue programs to encourage local agencies and agricultural users to work together to monitor agricultural runoff. California Water Code requires dischargers to submit a report of waste discharge to the Regional Water Quality Control Boards (RWQCBs). The RWQCBs use this report to determine if the dischargers should submit waste discharge requirements (WDRs) or a National Pollutant Discharge Elimination System permit order. In July 2003, the Central Valley RWQCB adopted a conditional waiver of WDRs for discharges from irrigated lands that waives permitting for agricultural tailwater, operational spills, subsurface drainage, and stormwater runoff, subject to certain conditions. The RWQCB’s order allows conditional waivers for individual dischargers and for Coalition Groups that respond on behalf of a group of individuals (Central Valley RWQCB 2004).

The objective of the conditional waiver is to create programs that manage discharges from irrigated lands to prevent violations of any water quality standards. As a result of the conditional waivers, Coalition Groups or individuals will review watershed information, develop monitoring plans, and identify ways to address pollutants within the watershed (Central Valley RWQCB 2004).

Only about half of the region falls within the area governed by conditional waivers, but water quality monitoring can provide benefits even apart from these requirements. Information about water quality could benefit multiple agencies within the region, and working with agricultural users could help them meet the requirements of the Central Valley RWQCB’s conditional waiver. SCWA is working with RD 2068, MPWD, and Dixon Resource Conservation District to implement a coordinated monitoring program, and is coordinating these results with SID. Implementing regional monitoring is more cost effective than individual monitoring and beneficial in a larger area.

### **6.2.2 Construct an Alternate NBA Intake**

This potential action would construct a new NBA intake at a different location closer to the Sacramento River to improve reliability and quality of NBA water. The NBA intake in Barker Slough is in an area where the threatened delta smelt spawn. In the past, the presence of larval delta smelt has caused pumping restrictions. An alternative intake would allow water deliveries from another location when larval delta smelt are present in Barker Slough.

Barker Slough water quality is high in organics and turbidity because of local runoff and the limited flushing that occurs in the slough. Locating the intake closer to or on the Sacramento River would provide a cleaner source of water and lower water treatment costs.

SCWA completed a feasibility study of a new NBA intake on the Sacramento River away from Delta smelt habitat and at a location with higher water quality (less organics). The cost of a new intake should be compared to the cost of enhanced treatment of existing intake water, source control in the Barker Slough watershed, and value of other benefits in order to evaluate the cost feasibility of an alternate intake.

### **6.2.3 Continue State Lobbying Effort**

Through the year 2007, the state will spend several hundred million dollars to improve water supply reliability statewide from Proposition 50, future new bond measures, and other sources. As the population increases in California, bond funding will likely continue as alternative means are sought to improve water supply, storage, and conveyance. This action would continue SCWA's state lobbying effort to communicate the importance of water supply reliability in Solano County and increase the likelihood of grant funding. The state lobbying effort will advocate grants for the region, work to have the region's projects included in future bond measures, and protect SCWA funds.

### **6.2.4 Administer Solano Project Rehabilitation and Betterment Program**

SCWA has a Solano Project Rehabilitation and Betterment Plan (R&B Plan). The R&B Plan provides for implementation of major maintenance projects and capital improvements for Monticello Dam, the Putah Diversion Dam, Putah South Canal and Terminal Reservoir. Typical projects are: control gate repairs, upgrading flow measuring device upgrades, gate automation, drainage improvements, security fencing and flood damage repairs. The R&B Plan prioritizes projects and establishes a timetable for implementation. SCWA and its member units evaluate the R&B Plan each year and update it as necessary. SCWA includes the cost for projects in the R&B Plan in the SCWA annual budget and in the SCWA Capital Facilities Funding Plan.

### **6.2.5 Promote Land Use Practices that could Improve or Protect Water Quality**

Land use patterns and practices within a watershed can affect the water quality of surface water and groundwater bodies. Some land use practices (e.g., BMPs) can reduce adverse water quality impacts. Some examples include restoring riparian zones, protecting riparian zones from farming/grazing, restricting development in the watershed, and limiting lot sizes and density. These BMPs focus on improving water quality for a drinking water supply and the environment.

Instead of making these changes through a more rigid regulatory framework, this option would work to promote land use BMPs. SCWA and participating agencies could adopt several strategies to promote BMPs:

- **Build relationships with landowners.** Building relationships with landowners, particularly those who are adjacent to stream and river corridors, could help educate landowners on the mutual benefits of water quality BMPs. Development of these relationships and understanding of landowners' local area knowledge will also help create the best and most applicable BMPs to specific areas.

- **Approval process.** Integrate BMPs into the land use approval process.
- **Create a grant program.** Granting funds to willing participants to implement BMPs, which reduces the burden on local landowners.

Implementing BMPs throughout the watershed could improve water quality in surface water and groundwater to meet both drinking water and ecosystem needs.

### **6.2.6 Model Water Quality Effects on NBA Intake from a Levee Failure and Other Delta Water Quality Impacts**

This potential action would model effects of flooding various islands in the Delta and Delta water quality changes to determine the potential effects on the NBA. The NBA takes water from Barker Slough, a tributary to the Delta. Because of tidal fluctuations, Delta water quality changes may affect the supplies diverted from Barker Slough. Delta islands are typically protected by levees that keep water from entering the subsided portions of the islands. Levee failure is a concern both to local residents and statewide water users; a levee failure has the potential to flood local residents, affect the environment, and reduce water quality of Delta export supplies (CALFED 2000). There is approximately a two in three chance of an abrupt change in the Delta in 50 years due to a large earthquake or flood (Jeffrey Mount, personal communication).

If a levee failed, water would rush in to fill the interior island space. This water would come from both Delta tributary rivers and from San Francisco Bay. The water quality of water from the Bay would be more saline than typical Delta water, which could affect exports. However, effects of levee failure on the NBA water quality are unclear because of the northeast location of Barker Slough within the Delta. The water quality effects may focus on areas closer to the Bay, and the NBA may not see an effect on water quality.

### **6.2.7 Improve Putah South Canal Conveyance Efficiency**

The Putah South Canal delivers water from Lake Solano to water users (Participating Agencies). SCWA measures flows at the diversion point from Lake Solano and at each turnout from the Putah South Canal. Calculated losses from the Putah South Canal are relatively high. The cause of these losses is unknown, and could be from leakage, measurement errors, accounting errors, or a combination. SCWA has started a program to conduct a systematic review of Putah South Canal water use and measurement to determine the source of the high loss calculation. Steps in the program include review of each water measuring device, installation of new measuring devices, and possible repairs to the Putah South Canal if leaks are found.

### **6.2.8 Identify Funding from Federal and State Sources**

This action would be to more aggressively identify those sources of funds available at the state and federal level for water resource issues in Solano County. The region has had success in the past obtaining state grants, and would likely have greater success with increased efforts. State funds are available through the DWR and the RWQCB for integrated water resource and environmental planning, groundwater conjunctive use, and water use efficiency. The federal government has funding mechanisms through Reclamation's Energy and Water Appropriations and the USACE Water Resources Development Act where there is a federal interest. This action would catalog available funding and identify the implementing agency and the process to secure the funds.

### **6.2.9 Implement Solano Project Watershed Water Quality Protection Activities**

Water quality from the Solano Project is excellent for municipal, industrial, and agricultural uses. The primary sources of contamination are body contact recreation and wastewater discharges; however, Putah South Canal users are somewhat protected because of the size of Lake Berryessa and the retention time of water (SCWA and Napa County Department of Public Works 2001). SCWA works with organizations and public agencies in the Lake Berryessa watershed to promote activities that protect water quality, such as the Lake Berryessa Watershed Partnership. SCWA leads the partnership to monitor and improve water quality by supporting projects like household hazardous waste collection sites, signs to prevent water pollution, and water quality data sharing.

SCWA and Napa County Department of Public Works (DPW) have developed a sanitary survey covering Putah Creek, Putah South Canal, and the Lake Berryessa watershed to analyze potential contamination sources and recommend water quality protection measures. The sanitary survey's primary recommendations focus on creating a watershed management plan, reducing recreational use near drinking water intakes, coordinating monitoring efforts, and implementing BMPs related to agriculture and sewer/septic systems within the watershed (SCWA and Napa County DPW 2001). Implementation steps for this action include completing recommendations from the Solano Project sanitary survey, supporting the Lake Berryessa Watershed Partnership, monitoring land use activities with potential for encroachment or impacts on surface water supply, monitoring recreation activities through the watershed to encourage responsible practices, and considering property acquisitions in the Solano Project watershed above Putah Diversion Dam.

### **6.2.10 Manage Land Use Practices in Barker Slough Watershed that could Affect Water Quality**

Land use practices in the Barker Slough watershed affect the quality of water entering the NBA. NBA water typically has poor water quality as a drinking water source because of elevated levels of turbidity, organic carbon, and pathogens (SCWA 2002). These factors can create carcinogenic disinfection byproducts during the water treatment process and can also increase costs of treatment.

Managing land use practices in and around the watershed may reduce turbidity levels and increase water quality levels. SCWA has considered implementation of traditional BMPs such as settling ponds and vegetative buffers. However, these methods will not be successful because of unique soil conditions in the watershed. Approximately 93 percent of the sediments causing increased turbidity come from erosion within the channel system (Noonan Main Drain and Barker Creek downstream to Campbell Lake) and agricultural lands (Hydro Science 2002). Studies show that new BMPs such as limiting livestock to particular grazing areas and away from channels, as well as performing erosion control, such as seeding embankments, are land use practices that can improve water quality. SCWA has secured two grants to implement BMPs, and will completely fence the waterways to prevent livestock from entering channels by 2005. Additional implementation steps for this potential action include:

- Implement special urban BMPs (where Vacaville is extending into the watershed);
- Encourage agricultural practices that benefit water quality; and

- Consider property acquisitions necessary to protect water quality.

### **6.2.11 Protect Water Quality in the Putah South Canal**

After a rain storm, turbidity in Lake Solano and the Putah South Canal noticeably increases on a temporary basis. The effects of this seasonal increase in turbidity are unclear; local agencies have not yet compiled data to indicate if the water quality is an issue for agricultural or urban use. SCWA has been investigating the potential to bypass drainage that currently flows into the Putah South Canal, but SCWA does not have a method to reduce turbidity entering Lake Solano. This action would work to investigate sources of turbidity, understand the effects on drinking water and agricultural supplies, and identify measures that would reduce the effects.

### **6.2.12 Complete and Implement an HCP**

SCWA, in cooperation with several irrigation districts, cities, and other public agencies, has begun development of an HCP, which is required as part of the renewal of the Solano Project water supply contract. Additionally, to comply with the California Endangered Species Act, the HCP is contemplated as a combined HCP and Natural Communities Conservation Plan (NCCP). The document authorizes federal and state agencies to issue incidental take permits that allow local agencies to negatively affect federal and state listed species. The HCP/NCCP identifies listed species that could be affected and provides conservation and mitigation measures.

SCWA expects to complete the HCP/NCCP in 2006. The document can be used to obtain grants and other funding to implement projects that could benefit the covered species. SCWA's role in implementation of the HCP/NCCP includes monitoring, adaptive management, and reporting.

### **6.2.13 Construct Infrastructure and Treatment for NBA Water in Rio Vista, Dixon, and Suisun City**

This action would investigate the best means to convey and treat NBA water for Rio Vista, Dixon, and Suisun City; determine when they will need these facilities to be complete to meet projected demand increases; and construct the facilities. Rio Vista, Dixon, and Suisun City have current or future allocations of NBA water, but do not have the facilities to convey or treat this water. Suisun City has an allocation of 750 acre-feet/year, with an ultimate future allocation of 1,300 acre-feet/year. Rio Vista and Dixon each have an ultimate future allocation of 1,500 acre-feet/year.

Some means to convey and treat water may not be as straight-forward as building pipes from the NBA and treatment plants at each city. Suisun City could potentially create an agreement with Fairfield to treat and deliver water within Suisun City limits. Rio Vista is investigating the potential to divert SWP water directly from the Sacramento River and treat that water locally.

### **6.2.14 Expand Opportunities for Recycled Water**

Recycled water is wastewater that has been highly treated and disinfected to meet stringent and protective standards set by the California Department of Health Services. Solano County cities and districts could use recycled water for landscape and agricultural irrigation, industrial processes, and environmental restoration. Recycled water requires its own distribution system completely separate from drinking water.

The Fairfield-Suisun Sewer District currently operates a wastewater recycling plant that provides recycled water for agricultural irrigation and as a freshwater supply for Suisun Marsh. The City of Vacaville discharges treated wastewater into Alamo Creek to be used for agricultural irrigation. This action would modify wastewater treatment plants to be capable (or increase capacity) of tertiary treatment and expand recycled water distribution systems in cities, including Fairfield, Suisun City, Benicia, Vacaville, and Vallejo. Recycled water could be used for urban purposes and to reduce domestic water demand. Implementation steps for this potential action include:

- Investigate wastewater quality issues, study potential for recycling and implement projects, including those in recycled water Master Plans;
- Investigate limiting use of water softeners;
- Increase distribution system for recycled water; and
- Evaluate desalination of recycled water and regional brine disposal options.

### **6.2.15 Update SCWA Flood Control Master Plan**

The SCWA Board of Directors approved the SCWA Flood Control Master Plan in 1994. The plan addresses all of SCWA's flood management activities, but focuses on flooding issues in watersheds where flood management infrastructure is lacking. The plan recommended conducting watershed-wide studies to identify solutions to flooding problems that do not adversely impact others in the watershed. The plan prioritized watersheds to perform studies. SCWA has been implementing the plan since 1994, has conducted seven watershed studies, and is working on implementation of several flood management projects recommended in the watershed studies. A plan update would be beneficial because the plan is 10 years old and SCWA has gained much experience in dealing with flood management projects. An update could include more information on floodplain management based on recent State reports. This recommendation could be done after completing the Tier 1 potential action to "Develop a final SCWA flood control funding/construction/ maintenance policy."

### **6.2.16 Investigate Use of Non-potable Water for Non-potable Uses**

Non-potable water is water that is not treated to drinking water standards and is not meant for human consumption. Non-potable water sources include untreated water from reservoirs or low quality groundwater. This action would increase the opportunities to use non-potable water for industrial and irrigation needs, including landscape irrigation, car washes, and decorative water fountains. A city implementing this action would need to build a distribution system to deliver non-potable water to customers. This could include a new piping system, separate from those that deliver treated water.

### **6.2.17 Assume a More Proactive/Aggressive Role in Control of Invasive Species**

The working draft of the Solano HCP/NCCP identifies invasive species as a factor that has had "profound effects on the structure, composition, and functionality of ecosystems" (SCWA 2004). Two primary invasive species affecting the region's ecosystems are the New Zealand Mudsnail (NZMS) and *Arundo donax* (Arundo). Arundo is a giant reed that is highly invasive, promotes

streambank erosion, reduces channel capacity, and has no natural local predators (UC Davis undated). In Solano County, Arundo affects the biological environment and increases risks for flood damages. NZMS is an introduced aquatic snail; the effects of NZMS are not fully documented but it has been shown to alter primary production in streams (Montana State University undated). This action would pursue grant funding to research and monitor NZMS, develop a biological control strategy for NZMS, and invest in Arundo eradication on a stream-wide approach. This action would also fund eradication and control efforts for other existing invasive species in Solano County (e.g., Tree of Heaven, blackberries) and monitor and protect against new invasive species (e.g., Zebra mussel).

### **6.3 TIER 3 – LOWER PRIORITY - LONGER TERM IMPLEMENTATION ACTIONS**

Tier 3 includes lower priority actions or longer term actions that the Solano agencies should consider implementing as appropriate. These actions did not receive as high ratings compared to Tier 1 and 2 actions, and consequently have less priority for implementation. The Solano agencies should monitor the strategic issues associated with these actions to determine if these actions are necessary to implement in the future. The actions are not listed in a specific order in which they should be implemented.

#### **6.3.1 Develop and Implement a Federal Lobbying and Funding Strategy**

Federal funds are available through the Water Resource Development Act, Energy and Water Appropriations and the new CALFED Bay Delta Authorization Act. The federal government can commit money to water resources and flood control where a federal interest is identified. This action would involve identifying projects that the county is interested in developing with federal funds and hiring a federal lobbyist to promote the projects in Washington DC. Actions involving the Solano Project could receive funding from Reclamation as could ecosystem restoration in the Bay-Delta from CALFED or the USACE. The USACE can also fund flood control projects. As an example of a federal funding effort, Sonoma County Water Agency is engaged in a multi-year congressional appropriations request to develop a regional wastewater reuse program for agriculture in Sonoma and Napa counties. Pursuing federal funds for water resource development takes time (2- 5 years or more) and a monetary investment. This process is most effective with the support of local congressional representative to promote the project.

#### **6.3.2 Study Feasibility of In-county Surface Water Storage Options**

Surface water storage could help meet future demands by storing water during normal-to-wet years when water is available until regional agencies need additional supplies during drier years. Past studies have investigated the potential for in-county surface water storage. This potential action would revisit these studies, update the analyses to current conditions, and determine if these facilities are feasible.

#### **6.3.3 Desalinate Carquinez Strait Water**

Desalinating Carquinez Strait water to supplement water supplies could be a long-term solution to develop new permanent supplies. SCWA is a member of the Northern California Salinity Coalition that helps seek funding for studies and projects involving desalting water for beneficial uses. SCWA could work with the Coalition to seek funding for feasibility studies for a desalination plant. Potential

locations include offshore of Benicia and Vallejo. A major obstacle would be disposal of brine from the treated water. Solano agencies would need to investigate alternatives for discharging brine into San Francisco Bay that would not have substantial environmental effects. A potential alternative is constructing infrastructure for deeper discharges of brine.

#### **6.3.4 Improve Security and Safety of Putah South Canal Near Development**

The Putah South Canal runs from Lake Solano to Terminal Reservoir in Cordelia. The canal runs through urban areas of Vacaville and Fairfield. While the canal right-of-way is fenced in all these developed areas, the canal is still vulnerable to intentional or accidental contamination. While this has not been a problem to date, SCWA and SID, the operators of the canal, should continue to implement measures to maximize the security and safety of the canal.

#### **6.3.5 Increase Flood Management Coordination between Agencies**

Flood management is dispersed between many public agencies. Cities and Solano County, through their land use approval authority, approve development that can affect flood management. Other agencies, like SCWA and other special districts that are involved in flood management, sometimes maintain flood management facilities that are affected by actions of other agencies. Informal coordination exists between most public agencies through the public review process for development. Agencies can communicate their concerns and recommendations for projects that could affect flood management under their jurisdictions. A common standard does not exist for mitigating impacts from development nor is there a process for resolving disputes. Most potential problems are worked out in advance of becoming real problems through the current process, but some problems still need to be addressed (such as use of outdated flood maps to determine building requirements). SCWA could act as a facilitator to improve communications between agencies involved in flood management and land use.

#### **6.3.6 Assess Risk and Uncertainties Associated with Potential Effects of Climate Change**

Climate change in the future could change water supply and demand within Solano County. A recent study in the Proceedings of the National Academy of Sciences examined the types of potential effects, including a reduction in Sierra snowpack, an increased incidence of heatwaves, and a reduction in alpine and sub-alpine forests. These effects would create changes in water supply by storing less water in the Sierras and changing groundwater tables. It could also affect demand because temperature changes could have impacts on agricultural production (Hopkins 2004).

The study of climate change and its impacts is at a very preliminary stage. The types of effects of climate change are uncertain. This potential action would follow scientific efforts to further the study of climate change, and apply this information to local supplies and facilities. Solano water agencies would identify facilities and services potentially affected by climate change, and develop a long-term strategy and plan for addressing potential consequences of climate change.

#### **6.3.7 Reduce Water Quality Problems from Newly Emerging Contaminants**

Recent studies have started to identify potential contaminants that are not yet regulated. These contaminants originate from a variety of standard household products and common

pharmaceuticals. The effects of these contaminants are unclear, including fate and transport in the environment and in the human body. This potential action would investigate potential emerging contaminants and follow state and federal research projects that could identify the types of potential effects. After identifying the types and intensity of effects, the Solano water agencies would implement projects to address these contaminants.

### **6.3.8 Manage Perched Groundwater to Reduce the Effects to Urban and Agricultural Areas**

Perched groundwater is groundwater that is separated from the groundwater table by an unsaturated zone. Perched groundwater may occur when geologic materials having low permeability (e.g., clay or silt) restrict the downward percolation of groundwater. Where perched groundwater is close to the ground surface, soggy or swampy conditions can result. Perched groundwater should be mapped for its occurrence and severity in the county. Geologic investigations could be conducted to better understand the local occurrence of perched conditions. Adequate drainage design can mitigate most problems associated with perched groundwater.

### **6.3.9 Study Feasibility of Treating Poor Quality Groundwater, Including Abandoned City Wells, as a New Water Supply**

Poorer quality groundwater is known to exist in the Suisun-Fairfield groundwater basin. The City of Fairfield have shut down wells due to poor quality groundwater. Contaminants include high total dissolved solids and nitrates. This action would evaluate treating or blending this water for domestic consumption. This action would be most cost effective if the existing water well and conveyance infrastructure is operable. This type of supply could be used as either new water or emergency supply.

### **6.3.10 Reduce Drought Effects to Groundwater Pumpers**

In times of drought, independent pumpers are more likely to experience impacts to wells than agencies or cities because independent pumpers tend to operate shallower, lower yielding wells. As greater reliance on groundwater occurs during drought, particularly an extended drought, the local groundwater table will drop making shallow wells vulnerable to dewatering. This action would evaluate means to understand and reduce these effects. Steps would include mapping shallow low yield wells, identifying wells affected during the last drought in the early 1990s, and developing contingent supplies for the pumpers. Contingent supplies could include well networks, inter-connections, or deepening shallow wells below the vulnerable groundwater fluctuation zone. Understanding drought effects on wells is an important step in mitigating the effects of groundwater conjunctive use projects.

### **6.3.11 Implement Watershed Planning Studies**

Implementation of the SCWA Flood Control Master Plan has resulted in seven watershed planning studies addressing flood problems and potential solutions. Once the planning studies are completed, recommended projects are considered for implementation. SCWA staff works with local residents and other agencies to gain support for a project including developing a funding plan, acquiring easements for maintenance, and permitting. Funding and easement acquisition have been major impediments to implementing these projects. The current policy of the SCWA Board is that others must pay for permanent maintenance of the constructed project and permanent

easements must be granted for SCWA to maintain the project. At least 10 percent of the project capital costs must come from non-SCWA sources. SCWA staff is working on implementation of projects resulting from the following watershed studies: Sweeney Creek, Gibson Canyon Creek, Dixon Area and McCune Creek.

### **6.3.12 Update Flood Hazard Maps**

Many existing Federal Emergency Management Agency (FEMA) flood hazard maps of Solano County are outdated and do not account for current population levels and new urban developments, particularly in unincorporated areas. FEMA updates these maps, but the cycle between updates can be very long. This action would collect data and facilitate an update of the County's flood hazard maps. These updated maps would then be submitted to FEMA for approval.

### **6.3.13 Assume a Proactive Role in Stewardship of Water-related Environmental Resources**

The region is home to multiple environmental resources. The Solano water agencies typically focus on securing and delivering water, but more environmental actions could be in their purview. As part of this potential action, the Solano water agencies would begin to be more proactive related to protecting and restoring environmental resources in the region as part of a multi objective approach to water management. Implementation steps could include protecting, restoring, and/or enhancing local creeks, initiating habitat restoration/enhancement projects, and investigating involvement in wetland preservation issues in Solano County.

### **6.3.14 Maintain Quality of Suisun Marsh**

This potential action would monitor and control runoff to maintain the quality of Suisun Marsh. Suisun Marsh is the brackish water marsh between the Delta and the San Francisco Bay. It encompasses 116,000 acres, and is the largest contiguous brackish marsh in the United States (Interagency Ecological Program undated). The marsh serves as valuable habitat for many species of wetland species and waterfowl. Some surface water runoff from Solano County eventually flows to Suisun Marsh; poor quality runoff could affect the quality of the habitat.

### **6.3.15 Perform Risk Assessment of Flood Management Facilities**

Several dams that impound water could affect Solano County if they failed, including dams impounding the following waters: Lake Berryessa, Lake Curry, Lake Frey, Lake Madigan, and Terminal Reservoir (Putah South Canal). Some are under state and federal dam safety programs. These structures have no known immediate risks. Additionally, many man-made and natural channels convey flood flows. Most of these channels are not capable of passing a large storm, such as a 100-year storm. Most of these channels have not had a risk analysis to determine how they would function in a 100-year storm. Delta levees in the eastern part of Solano County are also susceptible to failure or damage during large storm events and natural disasters such as earthquakes. A risk assessment of these facilities could provide additional information on how to manage risks associated with these facilities.