5.0 GROUNDWATER MANAGEMENT PLAN COMPONENTS

Note to Reviewers: We have not made changes or updated the Section 1 Stakeholder Involvement and Section 2 Monitoring Program & Modeling since your last review, and have not attached figures and tables from those sections. We will have a draft matrix of how the Management Components Address the BMOs at the TAC meeting next week.

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Tables and Figures (Attached – to be incorporated in final draft version)

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5.0 GROUNDWATER MANAGEMENT PLAN COMPONENTS

The Plan includes a variety of components that are required by Water Code § 10753.7, recommended in DWR Bulletin 118 California's Groundwater (DWR 2003), and identified as optional programs under Water Code § 10753.8. It also includes groundwater management elements already in place. These components are grouped into five general categories:

5.1 Stakeholder involvement
5.2 Monitoring program & modeling
5.3 Groundwater protection
5.4 Increase conservation & efficiency
5.5 Increase groundwater recharge
5.6 Increase water reuse
5.7 Integrated groundwater management

These components or programs are presented in this section and summarized in Table 5-1 for reference. The table correlates the activities that are related to one or more BMO. Each component includes discussion, proposed actions, and identification of the objectives toward which the component is directed. Proposed actions can fall under the categories of projects, which are implementations actions to address a particular BMOs, and studies, which are efforts to gather data in order to implement an eventual project. Note that many actions will require funding and their implementation is thus dependent on obtaining such funding. Panel approval is not required prior to implementing any project/study unless the Agency is directly funding it, although coordination is encouraged.

5.1 COMPONENT 1 – STAKEHOLDER INVOLVEMENT

Stakeholder involvement forms the foundation for a continued, collaborative process of decision-making and action during Plan implementation. The Plan calls for active participation of a broad group of stakeholders as a key component to sustaining a successful, collaborative process during Plan implementation, as outlined in the SRPGMP Communication and Outreach Plan (CCP 2012) (Section 6.1).

Several methods to achieve broad stakeholder participation will be employed during the implementation of the Plan, including: 1) involving the public, 2) using advisory groups, 3) informing public agencies, stakeholders, and public schools, and 4) facilitating relationships. Each of these methods is discussed further below

5.1.1 Involving the Public

The Water Agency and Panel will involve the public in Plan implementation. Involving the public includes regular communications about the Plan implementation, conducting outreach and education, and notifying the public on key issues and milestones. The Plan supports engaging the public in groundwater management and providing opportunities for individuals and groups for access to information and involvement at regular meetings to weigh in on implementation issues. The Water Agency and Panel will implement a public outreach plan with strategies for managing a web site and carrying out these activities with the aim of communicating with urban, rural, agricultural, business and environmental stakeholder audiences both within and outside the Santa Rosa Plain Watershed.

In 2010, the Agency created a website for the project: http://www.scwa.ca.gov/srgroundwater/. The Water Agency will use its website to distribute information on Plan implementation activities to the public, and to ensure program information is readily accessible through the Internet.

(Note to Reviewer: Recommended Actions in Section 5.0 will all be listed and prioritized in the final chapter (6.0) on Implementation. Only a portion of the Recommended Actions will be implemented in the initial Groundwater Management Program, pending funding availability.)

Recommended Actions:

1) Circulate copies and publish the adopted Plan and subsequent periodic reports on website.
2) Develop an informational flyer on the Plan to accompany mailings from water agencies and companies, as well as mailings to private well owners.
3) Develop and execute a Public Outreach Plan for Plan implementation, which will help maximize outreach on implementation activities, and will encourage public attendance at key advisory meetings and workshops for input.
4) Develop outreach information that is comprehensible by public members with different levels of education and technical knowledge.
5) Conduct public forums at key milestones to encourage public participation.
6) Maintain email and postal mail lists to announce meetings and keep interested parties informed about Plan implementation.
7) Invite interested parties to participate in Panel meetings.
8) Meet with representatives from interested organizations as appropriate and get feedback.
9) Coordinate meetings and conduct briefings with stakeholders within the SRPW to provide information and solicit feedback on the management responsibilities and activities relative to this Plan.

5.1.2 Advisory Groups

The Water Agency will seek and follow recommendations of the Panel in the implementation of the Plan as described in Section 6.1. Additionally, the Water Agency will continue to convene a TAC on an as-needed basis for regular input on technical aspects of Plan implementation.

Recommended Actions:

1) Following Plan adoption, the current Panel will discuss and recommend the composition of the Panel and the Technical Advisory Committee for Plan implementation.
2) Conduct quarterly meetings with the Panel to inform and seek guidance on implementation.
3) Conduct monthly TAC meetings, as needed, to obtain technical input on the various aspects of Plan implementation.

5.1.3 Informing Stakeholders & Public Agencies

The Water Agency and Panel will maintain good communication and foster further involvement with public agencies and stakeholders. Once implementation of the Plan begins, the Water Agency and Panel will be responsible for ensuring relevant public agencies and elected officials are informed on the activities conducted under the Plan.

Recommended Actions:

1) Continue to maintain and further develop relationships with local, state and federal agencies and organizations to benefit Plan implementation while maintaining local control.
2) Coordinate and inform land use planning with surface water and groundwater management activities by providing periodic water and groundwater management activities to local land use planning agencies.
3) Conduct briefings with the elected officials who have adopted the Plan in conjunction with implementation milestones and annual reporting.
4) Provide information to increase public awareness of current and future water supplies, demands, and trends in reliability related to a changing climate.

5.1.4 Partnerships & Coordination

The Panel will facilitate partnerships and develop relationships at the local, state, and federal levels. Over the past decade, the SRPW area water users and other local leaders have made great strides in regional planning and collaboration on water issues. Several important partnerships have facilitated project implementation providing benefits to water agencies, their customers, and other groundwater users. For example, the Water Agency, City of Cotati, City of Sebastopol, City of Santa Rosa, Town of Windsor, County of Sonoma, and the California American Water District formed a cooperative partnership to fund the development of this Plan; and the

same local agencies and the USGS conducted an assessment of SRPW groundwater resources (USGS, 2013) through a cooperative agreement.

Facilities necessary to implement and expand conjunctive use programs in the SRPW could help to achieve broader regional and statewide benefits. These facilities, however, would require substantial resources, and might best be pursued through partnerships with potential beneficiaries, and through seeking grant funding. Potential partners include California Department of Water Resources, State Water Resources Control Board, California Department of Public Health, and US Army Corps of Engineers.

Recommended Actions:
1) Continue to promote partnerships that achieve goal and objectives of the Plan
2) Coordinate implementation activities and work to the extent practicable with watershed groups, local stewardship groups, water interest groups, and state and federal regulatory agencies that have jurisdiction in areas related to Plan activities.
3) Seek grant funding for Plan actions and coordinate grant funding efforts in the Plan area.

5.2 COMPONENT 2 – MONITORING PROGRAM & MODELING

Monitoring and modeling have been identified by the Panel as a key component of the Plan to be able to measure and assess the water resources in the Plan Area and to simulate and plan for various climate and proposed project scenarios.

5.2.1 Monitoring Program

An important component of the Plan is to establish a comprehensive, long-term monitoring program, which is a systematic effort to identify and gather essential data for evaluating changes in the resource over time. Groundwater management cannot be accomplished without the monitoring and measurement of basic hydrologic parameters in the basin, because:

- Groundwater systems are dynamic and adjust continually to short-term and long-term changes in climate, groundwater withdrawal and recharge, and land use.
- Monitoring provides information on the status of the resource.
- Monitoring is the principal source of information about the hydrologic stresses on aquifers and the way these stresses affect groundwater recharge, storage and discharge.

A monitoring program is also a required component in the Water Code (Reference Section 1.0).

The Plan monitoring program contains the following elements (Table 5-1):
Note to Reviewers: Table 5-1 will be developed once the Basin Management Objectives are approved.

1) Groundwater-Level Elevation Monitoring
2) Groundwater Quality Monitoring
3) Inelastic Land Surface Subsidence Monitoring
4) Surface Water-Groundwater Interaction Monitoring
5) Hydro-Meteorological Monitoring
6) Monitoring Protocols
7) Data Management
8) Prioritize Data Needs

The monitoring data will be used on an annual or bi-annual basis to comprehensively evaluate the state of groundwater resources within the Plan area, to periodically update and improve the monitoring program, and to help make decisions on water management strategies.

Goals of the Plan Monitoring Program include:

- Develop and maintain sufficient data of adequate quality to assess the status and trends of groundwater-levels, groundwater quality and surface water/groundwater interaction within the basin and responses to future management actions.
- Establish monitoring protocols to ensure the adequacy, quality and consistency of data collected, and a framework and format for data collection and maintenance.
- Provide data to support future updates and improvements to the surface water-groundwater flow model.
- All available monitoring data should be screened, qualified, and either incorporated in the database or of archived.
- Make non-confidential data available to all stakeholders in the Plan area.

Statutory Groundwater Management Plans require that the local agency shall adopt monitoring protocols designed to detect changes in groundwater levels, groundwater quality, and also to investigate inelastic surface subsidence for basins in which subsidence has been identified as a potential problem. The monitoring protocols should also be able to detect changes in the flow and quality of surface water that directly affect groundwater levels or quality, or that are caused by groundwater pumping in the Plan Area. The monitoring protocols shall be designed to generate information that achieves these standards and promotes efficient, effective groundwater management.

5.2.1.1 Groundwater-Level Monitoring

Table 5-2 and Figure 5-1 show current groundwater level monitoring programs (CASGEM, DWR, water suppliers and other volunteer efforts) in the Plan Area. Additional details on the existing groundwater-level monitoring wells, including the well depth range (where known) and the type of well and associated program are in Table 5-3.

DWR has measured groundwater levels in a network of wells within the Santa Rosa Plain Groundwater Subbasin. Most of these wells were incorporated into DWR's monitoring network between the mid-1950's and 1981. Measurements are generally collected from these wells semiannually in the spring and fall, although a subset of wells are monitored on a monthly basis. DWR currently monitors a total of 23 private wells in the Santa Rosa Plain Groundwater Subbasin.

Since 2004, PRMD also administers the Use Permit Groundwater Monitoring Program, which requires the measurement and reporting of groundwater-levels on a quarterly or monthly basis for commercial and industrial projects requiring a use permit and using over 0.5 afy of water. Ten water wells are currently monitored and reported to PRMD under this program within the Santa Rosa Plain Groundwater Subbasin.

Groundwater-level measurements are also collected by the Water Agency, Cities of Santa Rosa, Rohnert Park, Cotati, Sebastopol, Town of Windsor, California American Water Company, Sonoma State University and many operators of small mutual water systems from a combination of dedicated monitoring wells and inactive and active public water supply wells.

The current network of groundwater-level monitoring under the DWR, CASGEM and PRMD programs within the Plan area are comprised of the following:

- 27 private water supply wells currently monitored by DWR;
- 6 private wells, 24 dedicated monitoring wells, and 6 inactive municipal supply wells monitored by various entities, including the Cities of Rohnert Park, Santa Rosa, and Sebastopol, the Water Agency, California American Water Company, Gold Ridge Resource Conservation District, and the Sebastopol Water Information Group, which are reported through the CASGEM program; and
- 10 public supply wells monitored through the PRMD program.

There is still inadequate groundwater level monitoring to assess the trends and status of some parts of the Plan Area. The following general areas have been preliminarily identified as potential data gaps in the proposed monitoring program:

- Northern portions of the Plan area (vicinity of the Town of Windsor);
- Eastern central portions of the Plan area (vicinity of the City of Santa Rosa);
- Southwestern portions of the Plan area; and
- Upland areas underlain by the Sonoma Volcanics and bedrock.

Based on evaluation of spatial well distribution, well-screened intervals and hydrogeology, an expanded groundwater level monitoring program is envisioned as

summarized in Table 5-2 *(Note to Reviewers: This will be Developed by the Monitoring Work Group.)*. A minimum of __ additional groundwater level monitoring wells are planned to be added to the current Plan Area monitoring effort in areas shown in Figure 5-1. As part of the process for establishing the groundwater-level monitoring network, criteria will be developed for selecting suitable wells to be used for monitoring, such as known well construction details, age and condition of the well, and access for monitoring instrumentation.

A long-term groundwater level monitoring program for the Plan Area is planned to be established that incorporates:

a) Existing monitoring wells – CASGEM, DWR, water suppliers, others.
b) Wells historically monitored by DWR with long-term records that might be reactivated.
c) Selected wells of small water distribution systems (wineries, restaurants, schools and parks), mutual water companies (non-urban residential subdivisions).
d) Additional wells that improve the spatial density and depth distribution of the well-monitoring network by recruiting new volunteers in locations where additional data is needed to understand groundwater elevation trends in the Plan Area.
e) Additional multi-depth monitoring wells to better understand the distribution of groundwater hydraulic heads, flow and water quality with depth.
f) Groundwater level data from wells along and in adjacent basins, where underflow is considered a factor in the water budget.
g) Coordinating the collection of groundwater elevations on a minimum semiannual basis (spring and fall), and prioritize specific areas where more frequent groundwater elevation monitoring, for example quarterly or monthly in recharge areas, may be desirable.
h) Linkages between groundwater level data to surface water quality and flow information.

Data Objectives:

- Provide estimate of amount of groundwater in storage in the basin
- Provide essential information to evaluate groundwater level trends over time
- Develop information for groundwater models, water budget, and to forecast trends
- Design, implement and monitor effectiveness of groundwater management program

Recommended Actions:

1) Assess groundwater elevations on an annual basis for trends, conditions and adequacy of the groundwater level monitoring network.

2) Develop an outreach program to obtain groundwater level data from volunteer private well owners, private producers, and mutual water companies in the Plan Area.
3) Coordinate with local, state and federal agencies to investigate opportunities to develop better information on groundwater level monitoring, including projects such as groundwater recharge to incorporate project-specific monitoring.
4) Project – Conduct systematic, coordinated groundwater elevation monitoring: Establish and fund a Plan Area-wide, standardized, long-term monitoring well network. Select an appropriate group of wells (both public supply and volunteer private wells) to begin monitoring groundwater elevations through cooperative and volunteer efforts.
5) Project – Install new multi-depth groundwater monitoring wells project: Obtain funding and install new multi-depth monitoring wells in the Plan Area for long-term depth-specific monitoring of groundwater levels and groundwater quality.

5.2.1.2 Groundwater Quality Monitoring

Groundwater quality information is available from records of public water supply wells being monitored by municipal water suppliers (e.g., Water Agency, Cotati, Rohnert Park, Santa Rosa, Sebastopol, Windsor), small water distribution systems, mutual water companies, historic long-term water quality monitoring by DWR, and USGS sampling (Figure 5-2). *Note to Reviewers: Figure for groundwater quality monitoring wells is under development.* These state-mandated monitoring efforts, which help ensure that the public is provided with a safe, reliable drinking water supply, include the following existing programs:

- Water Agency, Cotati, Rohnert Park, Santa Rosa, Sebastopol, Windsor, small water distribution systems, and mutual water companies public supply wells are monitored as required by the California Department of Public Health (DPH) under California Code of Regulations (CCR) Title 22 (which includes organic compounds, inorganics, metals, microbial, and radiological analytes).
- DWR monitors __ (number) private volunteer wells for water quality parameters including major ions (including calcium, magnesium, potassium, sodium, carbonate, bicarbonate, chloride and sulfate), iron, manganese, boron, nitrate, total dissolved solids, total alkalinity, specific conductance (referred to as either specific conductance [USGS] or electrical conductivity [DWR]), pH, and water temperature.
- USGS collected groundwater quality samples from __(number) wells as part of the SRP Study and the GAMA study.
- Extensive water quality monitoring is conducted at numerous contaminant release sites within the Plan area and reported to regulatory agencies, including the North Coast RWQCB, County of Sonoma Environmental Health Department, and the California Department of Toxic Substances Control.

Data Objectives:

- Track status and trends of groundwater quality within basin

- Protect the health of basin users
- Assess effect of human and natural factors on groundwater and surface water
- Understand groundwater flowpaths within the basin

Recommended Actions:

1) Assess water quality on an annual or biennial basis for trends, conditions and adequacy of the groundwater quality monitoring network. This will include preparing tables of analytical results, and developing water quality plots and figures, in conjunction with well hydrographs, groundwater level contour maps, for the Periodic Plan Implementation Report, described in Section 6.3.
2) Identify opportunities to capture and integrate existing water quality data for areas where current data is insufficient, including contributions from the DPH, small water distribution system operators (wineries, restaurants, schools and parks), mutual water companies (non-urban residential subdivisions), and other entities.
3) Integrate other monitoring programs established through efforts such as the NCRWQCB Dairy Program, local recycled water projects and the Salt and Nutrient Management Plan for the Santa Rosa Plain.
4) Project – Conduct groundwater quality monitoring: Establish and fund a basin-wide, standardized, coordinated, long-term groundwater quality monitoring network in conjunction with groundwater level monitoring. Consider selecting an appropriate sampling of wells (both public supply and volunteer private wells) to monitor for groundwater quality through cooperative and volunteer efforts.

5.2.1.3 Inelastic Land Surface Subsidence Monitoring

Land subsidence monitoring will be conducted periodically to monitor for the potential lowering of the land surface related to groundwater extractions.
The monitoring program would aim to measure and document any changes in land surface elevation that could be associated with elastic or inelastic subsidence due to groundwater extraction.

Data Objectives:

- Assess the potential for inelastic land subsidence due to groundwater extraction in the Plan Area
- Ensure adequate spatial coverage, precision and accuracy of land surface monitoring measurements.

Recommended Actions:

1. Identify the available data related to potential inelastic land subsidence due to groundwater extraction in the Plan Area:
   a) Existing survey data
   b) Plate Boundary Observatory (PBO) GPS Stations (Figure 5-3)

2. Evaluate potential benchmark locations for periodic monitoring of land subsidence related to groundwater extraction in the Plan Area: Discuss and coordinate among the Agency, Cotati, Rohnert Park, Santa Rosa, Sebastopol, and Windsor to determine suitable benchmark locations and/or supply wells in the Plan Area, to aid the analysis of potential land subsidence.
3. Develop monitoring program and network for assessing the potential for inelastic land subsidence due to groundwater extraction; long-term land surface elevation changes to determine whether such changes are elastic and/or inelastic. Potential components could include:
   a) Semiannual surveying of a network of benchmarks and other survey points in areas where previous data and (or) groundwater-level declines within confined aquifer zones suggest the potential for subsidence
   b) Continued monitoring of sites recorded and reported through the existing PBO GPS stations.

5.2.1.4 Surface Water-Groundwater Interaction Monitoring

Surface water-groundwater interaction monitoring is a key area of interest to many on the advisory groups and is also an area of opportunity particularly with the groundwater flow model. It is also an important area of focus due to the relationship with wetlands and ecosystem values.

An appreciable number of streamflow gages are located within the Plan area, but the interaction between surface water and groundwater is not being systematically monitored. Additional information on shallow groundwater levels close to stream courses, and tributary inflows between existing gages, will be needed to define and assess the surface water/groundwater relationship. Figure 5-4 shows the nine currently active and two inactive USGS streamflow gages, and three active stream gages, monitored by the Center for Ecosystem Management and Restoration (CEMAR) within the Plan area. Table 5-4 summarizes the locations and parameters that the gages record, along with the periods of recording.

Most of the streamflow records in the Plan Area are relatively recent (2 to 5 years), but four have 11 to 12 year records. Consequently, the Plan area lacks a good, long-term estimate of the amount of water moving through water courses and discharging to the Russian River, and the effects of surface water and groundwater are on the quality and quantity of each are not well understood. Preliminary results of USGS surface water-groundwater model flow simulations suggest that watercourses in the Plan Area vary in time and space, seasonally and annually, in terms of losing or gaining streamflow.

Data Objectives:

- Develop a better understanding of the relationship between surface water and groundwater flow and quality, and provide information for determining water budget
- Provide information on locations of groundwater recharge and discharge areas
- Evaluate seasonal and long-term changes in groundwater recharge and discharge
- Design, implement and monitor effectiveness of groundwater management program

***Recommended Actions**:*

1) Continue to compile available stream gauge data and information on tributary flows in the Plan Area.
2) Collect and analyze stream gauge data to evaluate potential stormwater capture projects.
3) Determine current surface water quality sampling being conducted in the Plan Area.
4) Incorporate water quality sampling of high flow surface water and storm water flows on project specific basis for recharge.
5) Project – Conduct seepage runs along major watercourses: Conduct seepage runs to further assess surface water and groundwater interactions. Correlate groundwater level data from wells in the vicinity of stream gauges to further establish connectivity of the creek water and groundwater.
6) Project – Analyze and as Necessary Re-Activate Existing Stream Gauges and Install New Gauges in the Plan Area: Three stream gauging stations that measure discharge and stage in the Plan Area would be analyzed for priority and need of evaluating water budget and surface water-groundwater interaction evaluation purposes Stream gauges would be re-activated or added based on need and usability.
7) Project – Stable Isotope Study to Understand Surface Water-Groundwater Flow: Analyze existing and collect new surface water and groundwater samples for isotopic and other natural or anthropogenic tracers to evaluate surface water and groundwater interactions.
8) Project – Install new wells along major watercourses: Install new wells along major watercourses to further assess surface water and groundwater interactions.

5.2.1.5 Hydrometeorological Monitoring

Hydrometeorological monitoring, which provides part of the information necessary for forecasting weather conditions, flood preparedness, drought preparedness, water supply planning, and for determining the Plan Area water budget, takes place in varying levels of degree at 15 weather stations in the Plan Area (Figure 5-5 and Table 5-5). Hydrometeorological monitoring stations may include sensors to collect data on rainfall, air temperature, relative humidity, wind speed and direction, solar radiation, soil temperature and moisture. Additional hydrometeorological data may

be collected by other stakeholders in the Plan area. Additional rainfall data in Sonoma County is collected under the Community Collaborative Rain, Hail & Snow Network (CoCoRAS).

The Water Agency is working collaboratively with National Oceanic and Atmospheric Administration and the US Geological Survey to develop better information on weather conditions, weather and river forecasting and climate change. Additional hydrometeorological stations and data will collected through this effort and will be incorporated into the GIS database and benefit stakeholders in the Plan areas, and the future Plan project planning and activities.

Data Objectives:

- Provide estimates and database of Plan Area values of rainfall, air temperature, relative humidity, wind speed and direction, solar radiation, soil temperature and moisture.
- Produce information such as ET that can used by stakeholders to improve water use efficiency and conservation
- Provide estimate of amount of annual rainfall and distribution in the Plan Area
- Produce essential information to evaluate changes over time and for climate change
- Develop hydrometeorological data that can be used to for weather forecasting, flood preparedness, drought preparedness, water supply planning, for determining the Plan Area water budget, and to educate and prepare public on climate and hazard preparedness
- Develop information for surface water-groundwater models, water budget, and to forecast trends

Recommended Actions:

1) Develop inventory of existing hydrometeorological stations including sensors, data collection and management protocols and plans for future expansion
2) Identify and develop strategy to collect hydrometeorological data needs for surface water-groundwater flow model
3) Develop a protocol and work plan for compiling rainfall data on a water year basis to develop isohyetal maps as warranted, compare with groundwater level trends, periodic GMP reports and update the model.
4) Evaluate rainfall data distribution and determine the need for additional data; consider CoCoRAS and automated systems for possible rainfall monitoring station expansion, and develop plans for future efforts.

5.2.1.6 Monitoring and Reporting Protocols

Comparing groundwater data for both elevations and quality on a basin-wide basis in the Plan Area requires a set of consistent data collection techniques, sampling

intervals, documentation methodologies, and good quality assurance practices to maintain the accuracy and precision of monitoring data.

Recommended Actions:

1) Develop a schedule to coordinate the time of sampling and the sampling interval (time between samples) to ensure data collection frequency.
2) Coordinate the various existing and planned monitoring efforts including the Russian River data management framework to ensure uniform, standard water quality data collection protocols are followed.
3) Use a Standard Operating Procedure (SOP) for the collection of groundwater level data for wells (Appendix __).
4) Provide DPH guidelines on the collection, pretreatment, storage, and transportation of water samples intended for water quality analyses (Appendix __).
5) Develop field and office quality assurance practices for the program. For individual future studies in the Plan Area, review project-specific quality assurance/quality control procedures for collecting groundwater quality samples.
6) At the onset of the GMP monitoring program, prepare and distribute a stand-alone Sampling and Analysis Plan incorporating the management program component elements for use by monitoring organizations.
7) Provide training on water level sampling to volunteer well owners as needed.

5.2.1.7 Data Management

A comprehensive, central GIS data management system for monitoring data in the Plan Area will be required for organizing, managing, and storing the monitoring data, and for accessing data for periodic evaluations and studies. In cooperation with the Agency, the USGS, undertook a study to evaluate the surface water and groundwater resources of the Plan Area, which included developing a GIS data management system. The GIS system includes topography, hydrology, geology, land and water use layers, and data on surface water quality, groundwater level and quality, groundwater extraction, land-cover correlated with water use, well location and construction details, and other necessary information for future studies and modeling.

Recommended Actions:

1) Maintain and update the central GIS data management system including GIS layers and other data formats related to groundwater, hydrology, geology, land use, and relevant imagery.
2) Maintain well log data confidentiality, per requirement of Water Code, Division 7, Chapter 10, Article 3, Section 13752.
3) Work with cooperating agencies, including DWR, Cotati, Rohnert Park, Santa Rosa, Sebastopol, Windsor, PRMD, and any other non-governmental entity, to provide data for updating the database periodically.

4) Adopt flexible, standard formats for data collection, transfer protocols, reporting, and quality assurance-quality control checks to facilitate regularly scheduled data updates.
5) Use the GIS data management system to assist in periodic data evaluations and prepare the Periodic Plan report summarizing groundwater conditions within the Plan Area and documenting groundwater management activities conducted in the previous year.
6) Make the GIS data management system data publically available to Plan area stakeholders, while protecting any confidential information.
7) Project- Aquifer and Well Data Compilation - Compile, screen and review State Department of Public Health, DWR Well Logs and PRMD records as an additional data source, especially for aquifer test data and parameters, for improved aquifer parameterization and maps.
8) Project - Additional GIS Layers and Analysis: Develop and coordinate related data including GIS layers and other data formats on topics including low flow conditions, recharge and discharge areas, impervious areas, land cover, drainage networks, historical hydrology and land cover, seasonal springs and areas of seepage, and wetlands distribution.

5.2.1.8 Data Needs Prioritization

Note to Reviewers: to be discussed during the next two meetings.
See Table 5-6 Planned Actions and Monitoring Program Priorities

5.2.2 Modeling

To be completed with model report.

5.3 COMPONENT 3 – GROUNDWATER PROTECTION

Protection of groundwater resources is a key component of importance to the Panel. Ground protection comes in many forms, from developing actions to maintain quantity and quality, to improving the management of wells and protecting recharge areas, and better informing the public on ways to improve groundwater protection.

5.3.1 Maintain Groundwater Levels

Maintaining groundwater levels over the long-term is a fundamental objective of the Plan and Panel. Non-regulatory, voluntary strategies and actions to achieve this objective are considered and will require the collaborative development of solutions to reduce demands and augment supplies.

Recommended Actions

1) Evaluate Plan Area historical groundwater level trends and identify subareas and scenarios that are more vulnerable to groundwater level declines.
2) Should monitoring data indicate persistent groundwater level declines in a particular subarea of the Plan Area, provide notifications to groundwater users

regarding declining trends to promote awareness of the issue and foster increased conservation efforts and reduced groundwater demands.

3) Support and enhance water conservation goals, to reduce groundwater demands, with local and region wide incentive programs.
4) Promote and support small- and large-scale groundwater recharge, water conservation and increased recycled water use to help maintain groundwater levels and reduce groundwater demands.
5) Provide information to the public on the importance of groundwater monitoring maintaining groundwater levels and promote voluntary groundwater level monitoring Plan Area wide.

5.3.2 Prevent Adverse Interactions Between Groundwater and Surface Water

In areas where surface water and groundwater are directly connected, changes in one can affect the other. For example, declining groundwater levels within a shallow aquifer can lead to decreases in streamflow. Conversely, degraded surface water quality can affect shallow groundwater quality in areas where surface water recharges groundwater. Surface water-groundwater interaction monitoring can help identify areas of concern, vulnerability, and assist in the development of possible actions to address potential adverse outcomes.

Recommended Actions

1) Support surface water-groundwater interaction monitoring program to better understand potential for adverse interactions and identify vulnerable areas.
2) Should reductions in streamflow related to shallow groundwater level declines be identified, inform local stakeholders and encourage activities to adjust the amount, location and/or timing of groundwater pumping to reduce potential impacts. Such activities may include additional conservation measures, adjusting pumping scenarios spatially and in time, and use of alternative water sources if available.
3) Encourage activities that protect surface water quality with a particular focus on areas where surface water recharges groundwater.

5.3.3 Well Construction, Maintenance, Protection, Abandonment and Destruction

PRMD administers the well permitting program for Sonoma County. The standards for permitting, construction, abandonment, and destruction are contained in Chapter 25B of the Sonoma County Code. The well standards are consistent with those recommended in State Water Code Section 13801 and incorporate standards included in *California Well Standards, Bulletin 74-81*. PRMD also has adopted policies and procedures for:

- Monitoring guidelines for large capacity water wells and industrial projects (No. 8-1-3).
- Well pump testing in water scarce areas (No. 9-2-28).

- Disinfecting wells (WLS-011).

The County's General Plan 2020 has a provision within the Water Resource Element, 3.2 Groundwater, policy WR-2c, #4 "in areas where a groundwater management plan has been approved and has been accepted by the County, require the issuance of well permits and any limitations imposed on well permits to be consistent with the adopted plan" (PRMD, 2008).

Improperly abandoned wells can be conduits for contamination of groundwater resources. Because permitting of well construction, abandonment, and destruction practices did not start until the late 1960s or early 1970s, there are likely a number of abandoned wells in the Plan Area that have not been properly destroyed.

Identification of wellhead protection areas is a component of the Drinking Water Source Assessment and Protection (DWSAP) Program administered by the DPH, formerly DHS. DPH set a goal for all licensed water distribution systems statewide to complete Drinking Water Source Assessments by mid-2003. Assessments are completed by performing the three major components required for public water supply wells by DPH:

- Delineation of capture zones around extraction sources (wells);
- Inventory of Potential Contaminating Activities (PCAs) within protection areas; and
- Vulnerability analysis to identify the PCAs to which the source is most vulnerable.

While these assessments are only required for public water supply wells, they represent good practices for private well owners.
The actions listed below will provide improved protection of groundwater resources within the Plan Area.

Recommended Actions

1) Review Chapter 25B and provide suggestions to PRMD on the well permit application requirements to improve the collection of hydrogeologic information through working with drillers, well owners, and other parties familiar with groundwater conditions in the Plan Area.
2) Provide guidance, as appropriate, on well construction and destruction to well owners, operators, and licensed well drillers and service providers.
3) Review the USGS report on the Santa Rosa Plain (USGS, 2013) and update Sonoma County information and maps on groundwater conditions.
4) Identify management approaches that can be used to protect the water supply from potentially contaminating activities including voluntary control measures, public education, zoning restrictions or ordinances, development of contamination contingency plans, and minimizing pollution around wellhead protection zones.

5) Study – Obtain Better Information During Well Installations: Develop a program to obtain better hydrogeologic information on new well completions in the Plan Area. Such information can be obtained by requesting, on a voluntary basis, the well permittee to allow for collection of additional geologic information during drilling.
6) Study – Conduct Well/Abandoned Well Survey: Conduct an inventory and survey of active and inactive wells in the Plan Area to identify potential abandoned wells, and develop an approach for possible grant funding to provide incentives to properly destroy abandoned wells. Prioritize efforts in areas where improperly abandoned wells are known to present water quality concerns.
7) Project – Distribute Guide for Well Owners: Distribute the Wellness Guide to local well owners within the Plan Area which includes , the County's well construction, abandonment and destruction requirements, well head protection information, and tips for ensuring that wells are properly maintained, and monitoring.

5.3.4 Mapping and Protecting Groundwater Recharge Areas

One of the objectives of the plan includes the identification and protection of groundwater recharge areas and the enhancement of groundwater recharge where appropriate. Groundwater recharge is recognized as one of the most difficult components of the hydrologic budget to quantify. The extent to which water recharges an aquifer depends on a number of factors. Some of these factors are land use, soil permeability, slope, precipitation patterns, type of surficial deposits, thickness of surficial deposits, vegetation, and connection of surficial deposits with underlying aquifers. A wide variety of techniques can be applied to investigate groundwater recharge. Scanlon et al. (2002a) classified these recharge estimation techniques into physical (lysimeter, zero flux plan, and Darcy's Law), tracer (chemical, heat, and isotope), and numerical modeling approaches and recommended using multiple adaptive techniques to provide the most reliable estimates. Techniques employed to map recharge areas within the Plan Area to date include numerical modeling (USGS, 2013) and GIS-based approaches (Todd, 2012).

The Plan recognizes that improved understanding and delineation of groundwater recharge are critically important for effectively managing groundwater resources and includes the following actions to continue refining the potential groundwater recharge area map and encourage activities that retain the function of natural recharge areas.

Recommended Actions:

1) At milestones of additional study completion and periodically, review and update the Plan groundwater recharge area map (to be developed and inserted into Water Resources section from previous work and the model).

2) Provide the groundwater recharge area map to PRMD, the County and local planning agencies for consideration in local land use planning decisions.
3) Periodically update the recharge area map as new information becomes available through future studies and monitoring programs.
4) Provide recommendations on what areas are most vulnerable to loss of recharge capacity and for water quality impacts from land use activities.
5) Collaborate with local organizations (e.g., the Sonoma County Agricultural Preservation and Open Space District, Land Trust, etc.) to encourage protection and preservation of recharge areas.
6) Encourage new developments in primary recharge zones to maintain or increase a site's pre-development absorption of runoff.
7) Discourage land use activities in recharge areas that have higher potential to contaminate groundwater resources.

5.3.5 Evaluate Distribution and Remediation of Contaminated Groundwater

There are a number of groundwater contaminant sites present in the Plan Area. These sites are generally located along major thoroughfares and industrial areas of the urbanized portions of the Plan Area and typically involve localized contamination of shallow groundwater by industrial point sources such as dry cleaning facilities and fuel stations, street runoff and agricultural runoff.

While the Lead Agency and the Panel do not have authority or the responsibility for the oversight, control and remediation of contamination, it will coordinate with state and local water quality regulatory agencies to keep Plan Area stakeholders informed on the status of potential contamination issues relevant to implementation of the Plan. The actions listed below will provide improved protection of groundwater quality from contamination within the Plan Area.

Recommended Actions:
1) Coordinate periodically with the RWQCB and Sonoma County Environmental Health Department regarding any new occurrences of contaminant sites that are believed to be a threat to groundwater.
2) Incorporate GIS layers on mapped contaminant plumes and contaminant sites from the Regional Water Quality Control Board (RWQCB) and Sonoma County Environmental Health Department into the GIS data management system.
3) Share available information to Plan Area licensed water system operators and private well owners on impacted wells, mapped contaminant plumes and contaminant sites.
4) Provide rural well owners with Sonoma County Department of Health Services guide, *What You Need to Know About Water Quality in Your Well*.

5.3.6 Identify and Provide Information to the Public on Groundwater Protection

Protecting groundwater involves not only water suppliers, businesses, and agricultural users, but also the general public, many of whom own a private well and septic system in a rural setting. Given the importance of groundwater as a source of drinking water for so many communities and individuals and the cost and difficulty of cleaning it up, the best way to ensure continued supplies of clean groundwater is to protect groundwater resources and prevent contamination. The Plan objective is to provide a number of resources to the public, including guides on well and septic system maintenance to prevent groundwater contamination, safe practices for household hazardous substances disposal (also pharmaceuticals and personal care products) both via the web and periodic meetings and forums, and on the Plan project website.

Recommended Actions:

1) Review and as necessary and appropriate, update the ***WELLness – A Guide to You Water Well*** document, prepared by the Sonoma County Department of Environmental Health Services, to address the Plan objective for this management component. Post the updated guide on the Plan Project website for easy access, and distribute information to the public on the availability of this resource.
2) Conduct a periodic forum on groundwater in the Plan Area and develop educational materials in hard copy, electronic for web-based and YouTube posting easily accessible on the Plan Project website.

5.4 COMPONENT 4 – INCREASE CONSERVATION & EFFICIENCY

Water conservation lessens development impacts by reducing the demand for potable water resources (both surface and groundwater supplies), and decreases the amount of wastewater to be treated. Through fostering water supply sustainability and lessening water demand and withdrawals, water conservation approaches reduce environmental impacts by protecting groundwater levels, water quality conditions, base level streamflow, and the riparian vegetation and wildlife supported by water resources.

5.4.1 Continue and Increase BMPs for Urban Water Conservation

The Water Agency and its Contractors are undertaking several water conservation programs. They are signatories to the CUWCC MOU. Signatories agree to implement BMPs for water conservation (see Section 3.2). Besides the implementation of BMPs for urban water areas, there is a 100 percent meter and billing using a conservation rate structure. The Plan intends to continue and increase BMPs for urban water conservation.

Recommended Actions:

1) Continue Implementing BMPs and Report Annually: Continue implementing, maintaining and updating CUWCC BMPs, as appropriate, for urban areas. Annually report estimated savings for ongoing water conservation programs.
2) Assess current successes and develop potential options to increase BMPS for urban water conservation.
3) Landscape Irrigation Efficiency: Increase efficiency of water use and demand reduction by shifting landscape irrigation to evenings to reduce evapotranspiration. Include development of educational materials and public outreach component

5.4.2 Voluntary Water Conservation BMPS for Unincorporated Areas

The majority of grape growers already employ water conservation practices that contribute to sound water management. These practices include adopting a water management strategy, using water conserving irrigation systems, and using water budgets and deficit irrigation techniques. Sound water management contributes to sustainability through increasing fruit quality (economic), reducing the need for water and fertilizers (environmental, social and economic), and preventing pollution from soil erosion and off-site movement of nutrients.

Rural dwellings in the unincorporated areas are not eligible for the rebates and incentives for increasing water conservation as is provided in urban areas. The Plan intends to develop options and incentives for voluntary water conservation BMPs and incentives in unincorporated areas in the Plan Area.

Recommended Actions:

1) Develop water conservation BMPs for voluntary non-viticulture agricultural and agricultural-residential water users. Explore additional water conservation measures for agricultural operations.
2) Encourage viticulture agriculture water users to increase conservation by using the Code of Sustainable Winegrowing Practices Workbook (Wine Institute and California Association of Winegrape Growers, 2013) and Vineyard Manual (Southern Sonoma County Resource Conservation District, 2012?) to address soil erosion and surface water runoff.
3) Develop program, incentives and funding for voluntary implementation of CUWCC water conservation BMPs in the unincorporated County areas not served by Contractors
4) Develop incentives for conservation BMP retrofits during real property transactions in unincorporated County areas not served by Contractors.

5.5 COMPONENT 5 – INCREASE GROUNDWATER RECHARGE

To ensure a long-term, viable, sustainable supply of groundwater, the Plan seeks to increase the amount of groundwater recharge ("managed aquifer recharge") in the Plan Area over the long term. Managed aquifer recharge can be accomplished through diverting stormwater captured into spreading basins over areas that have

high permeability soils, and allowing the ponded water to percolate into the subsurface. Understanding the distribution of soil permeabilities, how groundwater recharges the Plan Area, identifying and maintaining viable recharge areas will all be important to successfully increase groundwater recharge and storage. Another option is aquifer storage and recovery (ASR) and groundwater banking with wells to recharge water directly into the aquifer. The source water for groundwater banking would be Russian River contract water. The source water for spreading basins would be captured stormwater runoff, however this option could include future consideration of recycled water.

Increasing groundwater recharge by optimizing the use of surface water during wet years and during the wet season, and using more groundwater during the dry years, is called conjunctive use. Conjunctive use comes in many forms, but always involves the optimization of surface water and groundwater supplies to increase water supply reliability and availability.

Implementing groundwater recharge options would entail site-specific studies building on the previously completed Groundwater Banking Feasibility Study (2013), and Stormwater Management/Groundwater Recharge Scoping Study (2012). Site studies would include, but not limited to, evaluation of the proposed site-specific hydrogeology, source water and receiving water chemistry, water availability, and would involve the use of the model to consider optimal, integrated design of combined water management options.

5.5.1 Stormwater Recharge by Infiltration

Stormwater recharge is one of the key water management options for groundwater sustainability in the Plan Area. Storm water runoff from our cities, highways, industrial facilities and construction sites can carry pollutants that harm water quality and may impair the beneficial uses of our waters. As a result, stormwater is regulated with the goal to use storm water as a resource and to reduce harmful pollutants, fertilizers, debris and other materials carried into storm drains, drainage systems and ultimately our rivers, lakes, and ocean. Storm water regulatory programs fall into three main areas:

- Construction - Projects that disturb one or more acres of soil or that disturb less than one acre but are part of a larger common plan of development, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity.
- Industrial: Specific industrial activities must use the best technology available to reduce pollutants in their discharges.
- Municipal: Large and small municipal sewer system operator s must comply with permits that regulate storm water entering their systems under a two phase system.

Each permit and re-permit may present an opportunity for increasing stormwater recharge.

A number of stormwater management initiatives have been conducted in the Plan Area (Section 3.4) upon which to build plan actions, including reduce potential water quality impacts to local waterways, while also enhancing or preserving groundwater recharge. The actions listed below include studies to identify areas with suitable soil permeabilities and geology, alternatives for preserving these recharge areas for the future, feasibility studies to capture rainfall and stormwater, and recharge projects incorporating stormwater capture and the use of spreading basins or dispersed recharge areas.

Recommended Actions:

1) Study/Pilot - Feasibility Analysis and Pilot Stormwater Capture and Groundwater Recharge: Conduct feasibility level analysis and pilot scale testing of stormwater capture and groundwater recharge to assess volumes, timing, best locations, estimate costs and potential benefits of implementation.
2) Project - Stormwater Capture and Groundwater Recharge: Develop and implement pilot-scale and subsequent large-scale projects to recharge groundwater with stormwater runoff capture and rainfall harvesting in the Plan Area. Examples include:
   a. Off-stream spreading basins and percolation ponds
   b. Temporary wet season flooding of public lands such as parks or open space
   c. Rainfall harvesting and stormwater runoff recharge with dispersed, low impact development infiltration trenches and dry wells, with possible incentives for retaining water on-site
3) Project - Stormwater Capture and Late-Year Release - Make controlled releases of captured stormwater to streams during late summer and early fall when conditions are typically dry in order to maximize the aquifer recharge, and improve fish habitat conditions.

5.5.2 Aquifer Storage and Recovery and Groundwater Banking

Aquifer storage and recovery with wells (ASR) and groundwater banking is another one of the key water management options for groundwater sustainability in the Plan Area. Groundwater banking involves the conjunctive use strategy optimizing the use of surface water and groundwater resources. Imported surface water would be used when it is available during the wet season or during wet years, to store or bank the water in the aquifers, and subsequently withdrawing the banked groundwater during the dry years. Conjunctive use includes both combined use of surface water and groundwater systems to optimize resource use and minimize adverse effects of using a single source, and the development of groundwater banking opportunities with local partners after local needs are met. The Groundwater Banking Feasibility Study (Section 3.1.6) provides a foundation for water management options and project decisions and priorities in the Plan Area. Actions listed below include pilot

projects, additional studies, and full-scale projects incorporating imported drinking water from the Russian River for groundwater banking.

Recommended Actions:

1) Pilot Projects - Pilot Groundwater Banking: Conduct pilot scale testing of groundwater banking using drinking water from the Russian River to assess feasibility, potential water quality interactions, volumes, monitoring needs, timing, best locations, estimate costs and potential benefits of implementation.
2) Additional Studies – Based on results from pilot-level ASR groundwater banking, assess the need for additional studies to further evaluate project- and regional opportunities for expanded conjunctive use in the Plan Area.
3) Full-Scale Project –Develop and implement full-scale ASR groundwater banking projects that use wet season and wet year imported water for groundwater banking.

5.5.3 Surface Water Use in Lieu of Groundwater

In-lieu recharge (or indirect recharge), another form of conjunctive use, differs from direct recharge methods (e.g., surface spreading or ASR) in that water is not artificially placed into the aquifer system. Rather, surface water supplies are used in normal or wet years or months when it is available to partially or completely replace the use of local groundwater and allow groundwater to recharge through natural sources. Then in dry years, when surface water supplies may be reduced or not available, groundwater can be relied upon to meet those demands not met by the surface water supply, improving a region's overall supply reliability. In order for an in-lieu recharge program to be successful, the in-lieu surface water supply to be used should reduce the demand on the local groundwater system and not be used to accommodate additional increases in demand.

In effect, this method has historically been applied by the Water Agency and many of its Water Contractors. For example, increased deliveries of Russian River water to the City of Rohnert Park in 2002 offset groundwater pumping and facilitated the recovery of groundwater levels in that area.

Recommended Actions:

1) Develop an integrated surface water/groundwater supply program to guide the conjunctive use of surface water and groundwater in a coordinated fashion. Parameters for the program would likely incorporate yearly and monthly climactic scenarios (e.g., precipitation and reservoir storage levels), historical groundwater pumping and groundwater level trends, and anticipated demands.
2) Evaluate potential funding opportunities for a surface water in lieu of groundwater program.

5.5.4 Low Impact Development (LID) in New Construction

LID stormwater management is a site design strategy to avoid and minimize hydrologic and water quality impacts associated with development. The strategy emphasizes design practices and techniques that effectively capture, filter, store, evaporate, detain, and infiltrate runoff close to its source. The stormwater management approach also seeks to conserve natural resources and preserve ecological functions. The LID concept is based on the premise that stormwater management involves more than just preventing flooding, and that runoff is a valuable resource if used wisely. Stormwater management recognizes the value of pre-existing hydrologic functions and their influence on the surrounding environment. The LID stormwater management approach in new development is generally more cost effective than older standard methods of altering the hydrology and managing stormwaters (Water Smart Development Guide, SCWA, 2011).

LID stormwater management relies on four fundamental principles:

I. **Avoid** hydrologic impacts by integrating site topography, soil, and hydrology assets intothe site plan and design features.
II. **Conserve** existing soils, vegetation, and hydrologic features.
III. **Minimize** impervious areas and maximize permeability.
IV. **Manage** stormwater on-site through LID features.

Recommended Actions:

1) Provide information to local community planners and developers on the Water Smart Development Guide and promote LID in new construction.
2) Develop incentives for local communities to employ LID in new construction such as reduced connection and permitting fees.
3) Provide information to rural property on the Slow It Spread It Sink It Guide and promote LID in rural settings.

5.6 COMPONENT 6 – INCREASE WATER REUSE

Water reuse within the Plan Area includes highly treated municipal wastewater (recycled water) and untreated household graywater that can be beneficially reused in a variety of nonpotable applications thus providing environmental and water supply benefits. Recycled water is typically conveyed to end users through purple-colored pipe distribution lines that are not directly connected to potable water supplies.

The State Water Resources Control Board (State Water Board) adopted a recycled water policy is 2009, which includes goals to increasing and beneficially using recycled water (Section 3.5.2). The SRWCB Recycled Water Policy includes requirement for the responsible application of recycled water, monitoring and salt and nutrient management plans.

Recycled water can be used in applications where potable water is often used (such as the irrigation of public parks and golf courses and for agriculture). In addition to allowing for potable water offsets, recycled water use can facilitate "in lieu groundwater recharge." For example, if a farm that has historically used well water for crop irrigation begins using recycled water instead, the groundwater aquifer beneath will "recover" through reduced pumping and natural recharge. Other benefits of recycled water include a local, reliable water supply that is less vulnerable to drought events. Recycled water is a sustainable water source, and allows potable supplies to be reserved for the best and highest use. Additionally, utilizing recycled water for irrigation also means a decrease in discharge of treated wastewater to local water bodies such as the Russian River.

All stakeholders do not perceive the use and application of recycled water as an environmentally sound practice. Continued information sharing on the appropriate use of recycled water is required to optimize recycled water resources. Additionally, monitoring for irrigation application of recycled water should be followed as developed by the Blue Ribbon Advisory committee and adopted by the State Water Board.

The use of recycled water is often limited by the ability to cost-effectively deliver recycled water to the end users. For example, many cities could in theory meet the irrigation demands of all their public parks with recycled water but building the pipelines to connect several parks to the treatment plant might be prohibitively expensive.

5.6.1 Increase Recycled Water for Agricultural Irrigation

Agriculture is the largest user of groundwater in the Plan Area and many agricultural operations have utilized recycled water in lieu of groundwater to reduce pumping demands. Some concerns have been and continue to be expressed by the public regarding the safety of agricultural irrigation application of recycled water. Opportunities exist in the future to expand recycled water availability (Section 3.3).

Recommended Actions:

1) Promote and support increased recycled water use for large and small scale agricultural irrigation to reduce groundwater demands.
2) Provide educational information to the Public on the appropriate use of recycled water for agricultural irrigation.
3) Coordinate with local wastewater treatment plant operators to catalogue current operations and agricultural recycled water applications in the Plan Area.
4) Evaluate opportunities for the use and storage of recycled water during the wet season, and subsequent use during the dry season.

5.6.2 Increase Recycled Water for Landscape Irrigation

Landscape irrigation, especially at parks, golf courses and hotels, is a large user of groundwater in the Plan Area. Similar concerns with recycled water have been and continue to be expressed by the public regarding the safety of landscape irrigation application of recycled water. Opportunities exist in the future to expand recycled water availability for landscape irrigation.

Recommended Actions:

1) Provide ongoing public education and outreach to local communities to continue to help promote recycled water use expansion, and to gage and address public concerns.
2) Coordinate with local wastewater treatment plant operators to catalogue current operations and landscape recycled water applications in the Plan Area.
3) Promote and develop incentives for the installation of purple piping in new developments in areas where recycled water availability is anticipated to grow.
4) Evaluate opportunities for the use and storage of recycled water during the wet season, and subsequent use during the dry season.

5.6.3 Graywater for Domestic Landscape Irrigation

Graywater refers to the untreated wastewater that flows out of bathroom sinks, showers, and laundry equipment, and does not include wastewater from toilets, kitchen sinks and dishwashers. Graywater, along with rainwater harvesting (Section 3.2), is one type of onsite water source that can be used to supplement water supplies and thereby offset potable water demands. Typically, graywater is used for outdoor irrigation but in some instances it has been used for indoor applications such as toilet flushing. Permitting of graywater systems in Sonoma County is conducted by PRMD.

In addition to offsetting potable water demands, graywater systems also reduce the load on sewer or septic systems. Graywater systems range from basic systems wherein water from a residential washing machine (clothes washer) is directed into prepared areas of the yard, to sophisticated commercial systems with multiple fixture connections and treatment processes.

Recommended Actions:

1) Encourage and promote expanded graywater use by local authorities providing financial incentives such as rebates or low-interest financing and by offering free technical support.
2) Develop and make readily available educational material that can help ensure that homeowners properly install and maintain graywater systems.
3) Promote local agencies and communities to develop plans and policies regarding graywater permitting requirements and potential public education efforts.
4) Make information available to the pubic that graywater systems are eligible for financing under the Sonoma County Energy Independence Program

5.7 COMPONENT 7 – INTEGRATED GROUNDWATER MANAGEMENT

Integrated groundwater management by definition includes identifying and implementing activities, developing strategies and adopting policies that recognize the links between groundwater and the broader hydrologic system, comprising climate, rivers, wetlands & other ecosystems, and including users of connected water. In practice, this means integrating a number of processes and programs to provide linkages and connections. Specific focused management components include:

- Groundwater management and land use planning
- UWMP tracking and integration
- Multi-agency and organization integration
- Climate change planning and
- Multi-benefit actions and activities

5.7.1 Groundwater Management and Land Use Planning

Groundwater management and land use planning are not integrated in practice. Land use planning decisions do not typically take into account groundwater resources availability and groundwater management programs do not generally have influence over land use planning decisions. The main goal of this management component is to identify possible actions that can help to facilitate better integration between land use planning and groundwater management program implementation.

Note to Readers: This section will be revisited after SRP Panel meeting on Land Use and Groundwater Management meeting next month.

Recommended Actions:

1) Brief local agency planning departments periodically on groundwater management program activities and milestones.
2) Update the PRMD groundwater availability map with information from the USGS characterization report and model report (when they become available).
3) Conduct an annual or biennial meeting between the local agency planners in the Plan Area with the Panel to exchange information on processes and programs, and to identify constraints and barriers.

5.7.2 Monitor and Track UWMP Progress and Incorporate Revisions into GMP Updates

Within the Plan Area, UWMPs are prepared every five years by the Water Agency (as a wholesaler) and the Cities of Cotati, Rohnert Park, Santa Rosa and Town of Windsor (as retailers). The City of Sebastopol has not yet reached the threshold of 3,000 connections, but is projected to do so in the next year or two. The intent of

this management component is to keep the GMP updated with UWMP updates and relevant information.

Recommended Actions:

1) Obtain updates every five years of all UWMPs prepared in the Plan Area.
2) Incorporate updated UWMP information into the GMP every five years.

5.7.3 Incorporate Multi-Agency and -Organization Integration into GMP

There are many federal, state and local agencies and other organizations involved in water-related activities, projects, and programs in the Plan Area. These multiple agencies and organizations have a great diversity of interests, purposes, mandates and agendas. The Plan intends to devise ways to identify these agencies and organizations and develop opportunities for optimizing efforts, resources and outcomes, and to help to build stronger multi-agency and -organization relationships over time.

Recommended Actions:

1) Develop an inventory of all agencies and organizations with water-related interests, mandates or jurisdiction within the Plan Area and provide make information available to the identified agencies and organizations on the Plan efforts and recommended actions.
2) Conduct a workshop with interested agencies and organizations to identify opportunities for integrating overlapping or supporting interests to optimizing efforts, resources, and outcomes.

5.7.4 Plan for Climate Change

Projected changes in climate in the Plan Area include increased variability in precipitation and rises in air temperature, resulting in shorter wet season, longer dry season, more droughts and more extreme high flows based on a regional climate change study (Section 3.1.5). Results indicated large spatial variability in climate across the region; although there is warming under all projections, potential change in precipitation by the end of the 21st century differed. Hydrologic models predicted water supply could be subject to increased variability and reduced reliability due to greater variability in precipitation with water demands likely to steadily increase due to increased evapotranspiration rates and climatic water deficit during extended dry season. The Plan encourages regional and local water and land use planning efforts to be aware of potential climate change effects on groundwater resources and recommends that climate change be incorporated into local and regional planning efforts.

Recommended Actions:

1) Provide information on projected changes in climate in the Plan Area to federal, state, local agencies and other organizations involved with water and land use planning.
2) Hold a facilitated workshop on climate change in the Plan Area involving federal, state and local agencies and organizations involved in water and land use planning.

5.7.5 Multi-Benefit Actions and Activities

Incorporating multi-benefit aspects and activities into actions and projects recommended in the Plan will help to address multiple issues and build broad and strong support from local stakeholders and potential funding sources. Actions that are principally designed to protect or sustain groundwater resources can often include other benefits, such as providing wildlife and aquatic habitat and diversity, ecosystem services, watershed enhancement and protection, soil conservation, scenic beauty, recreational value, increased flows and recharge, improved water quality, supply reliability and sustainability, and economic benefits. Additionally, projects that are designed primarily for other purposes, such as flood protection or habitat restoration, may also benefit groundwater resources. The Plan intends to recognize these principles and encourage the development of activities, projects and programs that recognize and provide multi-benefit actions and activities.

Recommended Actions:

1) Prepare a list of Panel Principles to encourage the development of activities, projects and programs that provide multi-benefit actions and activities
2) Develop an inventory of multi-benefit activities, actions and projects currently being implemented or planned in the Plan Area.
3) Hold a TAC meeting focused on discussing future potential multi-benefit activities, actions and projects for the Plan Area.
4) Identify funding opportunities, project and criteria and the schedule to apply for funds for multi-benefit activities, actions and projects for the Plan Area.