3.3 Groundwater Resources

This section describes existing groundwater resources within the action area and evaluates potential groundwater impacts that could result from implementation of the North Bay Water Recycling Program (NBWRP). The Impacts and Mitigation Measures section defines significance criteria used for the impact assessment and presents a discussion of potential project-related impacts. Determination of significance of impacts in this EIR/EIS apply only to CEQA, not to NEPA.

3.3.1 Affected Environment/Setting

Groundwater is the main supply for the majority of agricultural users in the action area. In addition, several entities, including Sonoma County Water Agency (SCWA), the City of Sonoma, and Valley of the Moon Water District (VOMWD), rely on groundwater to supplement surface water supplies. Groundwater use is limited in the Marin Municipal Water District (MMWD) and North Marin Water District (NMWD) service areas due to a lack of substantial underlying groundwater aquifers and poor groundwater quality. Neither NMWD nor MMWD use groundwater for community drinking water supplies. However, private domestic wells exist within Marin. The City of Napa does not use groundwater for drinking water supplies; however, unincorporated areas of Napa County (including the Milliken-Sarco-Tulucay Creeks [MST] basin area and the Carneros East service area) rely almost solely on groundwater for domestic uses.

Regional Conditions

The principal groundwater-bearing aquifers in the action area are comprised of alluvial deposits and cover most of the Sonoma, Napa, and Petaluma Valleys. These aquifers are largely continuous, and generally flow toward San Pablo Bay. In the area adjacent to the Bay, local flow has been reversed, likely due to an increase in groundwater pumping (Farrar and Metzger, 2003; Farrar et al., 2006). Groundwater levels in the alluvial deposits vary by region, but are generally between 5 and 75 feet below the ground surface (CDM, 2008). In the valley areas and lowlands bordering San Pablo Bay, groundwater is often considered shallow, and can often be found less than 15 feet below the ground surface (bgs).

Groundwater quality in most of the action area is generally considered adequate for domestic and irrigation uses; however, localized areas experience poor groundwater quality. The groundwater aquifer in parts of Sonoma and Napa Counties has high concentrations of boron, iron, total dissolved solids and chloride concentrations (DWR, 2003). A 2003 study by the USGS found arsenic, boron, iron, and manganese in concentrations above drinking water standards in groundwater wells in southern Napa County (Farrar and Metzger, 2003). Saline intrusion continues to be an issue in areas bordering San Pablo Bay.

Increased groundwater pumping, low rainfall, saline intrusion from San Pablo Bay, low soil permeability, and geothermal upwelling are believed to contribute to declining groundwater levels and poor groundwater quality in portions of the action area. Although the clay content holds water in the soil, it can restrict water percolation to the water table and can, therefore, reduce the volume of groundwater available for irrigation in certain areas. Groundwater pumping in Sonoma and Napa counties has increased in the past 20 years because of population growth and an increase in agriculture. Several pumping depressions are now evident within Sonoma and Napa Counties, and groundwater levels have generally declined in these areas (Farrar et al., 2006; Farrar and Metzger, 2003). The MST groundwater basin has been designated as a groundwater deficient basin by Napa County because of declining groundwater levels.

Local Conditions

This section describes the local groundwater conditions in each service area by groundwater basin. Several groundwater basins have been identified in the NBRWP action area. Descriptions of the groundwater basins have been obtained from the following sources:

- California Department of Water Resources' (DWR) *Bulletin 118 Update 2003* (DWR, 2003).
- *Geohydrologic Characterization, Water Chemistry, and Ground Water Flow Simulation Model of the Sonoma Valley Area, Sonoma County, California.* U.S. Geological Survey (USGS) Scientific Investigations Report 2006-5092 (Farrar et al., 2006).
- *Ground-Water Resources in the Lower Milliken–Sarco–Tulucay Creeks Area, Southeastern Napa County, California, 2000–2002.* USGS Water-Resources Investigations Report 03-4229 (Farrar and Metzger, 2003).
- *Sonoma Valley Final Groundwater Management Plan* (Sonoma County Water Agency [SCWA], 2007).
- *Napa County Baseline Data Report* (County of Napa, 2005).

LGVSD

MMWD and NMWD provide water service within this area of Marin County. As described above, groundwater use in the MMWD and NMWD service area is limited because they do not have substantial underlying groundwater aquifers. DWR Bulletin 118 identifies one groundwater basin in the LGVSD service area that is discussed below.

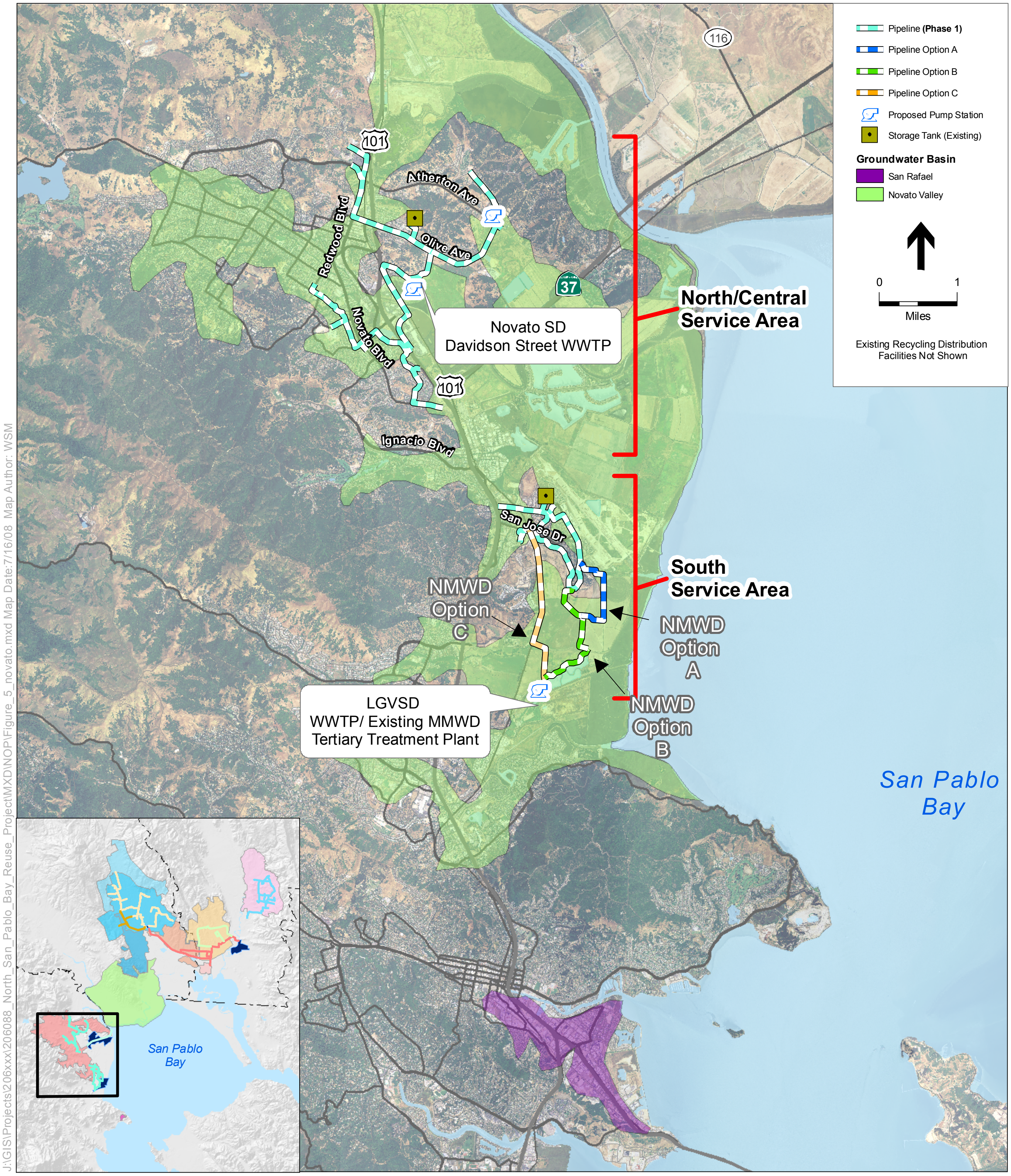
San Rafael Groundwater Basin

The San Rafael Groundwater Basin is a 1.4-square mile coastal basin that underlies the city of San Rafael, in Marin County (see **Figure 3.3-1**). The San Rafael Bay forms the eastern boundary of the basin (DWR, 2004a).

Geology and Hydrogeology. Primary water bearing units in the basin are unconsolidated Quaternary Alluvium. Annual precipitation in the basin averages 33 inches (DWR, 2004a).

Groundwater Production. No groundwater production information is available.

Groundwater Levels. No information is available for groundwater levels in this basin.



SOURCE: USDA, 2005; CDM, 2008; DWR, 2006; and ESA, 2008

NBWRA North Bay Water Recycling Program. 206088.01

Figure 3.3-1
Phase 1 Projects with Novato Valley and San Rafael Groundwater Basins

Groundwater Quality. Although no recent water quality data is available, data collected in 1954 from a well east of the basin showed chloride concentrations exceeding 100 parts per million. It is unknown whether this data is typical of the area or if it indicates potential sea-water intrusion (DWR, 2004a). Data collected in 1972 suggested the possibility of sea-water intrusion from San Francisco Bay (DWR 1975 *in* DWR 2004a).

Novato SD

MMWD and NMWD provide water service within this area of Marin County. DWR's *Bulletin 118* identifies one groundwater basin in the Novato SD service area that is discussed below.

Novato Valley Groundwater Basin

The Novato Valley is a depression in Marin County in the Coast Ranges west of San Pablo Bay and north of San Rafael (see **Figure 3.3-1**). San Antonio Creek forms the northern boundary of the groundwater basin and the Mendocino Range forms the western and southern boundary. The Novato Valley groundwater basin encompasses approximately 32 square miles.

Geology and Hydrogeology. Water bearing formations in the Novato Valley groundwater basin are mainly in alluvial deposits of Pleistocene to Holocene age that overlie non-water bearing rocks of the Franciscan assemblage (Cardwell, 1958 *in* DWR, 2004). Alluvial deposits consist of unconsolidated clay, silt, and sand with discontinuous lenses of gravel. Pleistocene alluvium is exposed in a small area in the northern side of the valley (Cardwell, 1958 *in* DWR, 2004). Alluvial deposits range in thickness from 60 feet near the City of Novato to 200 feet near San Pablo Bay (DWR, 1975 *in* DWR, 2004). Semi-confined conditions generally occur in the water bearing formations (Cardwell, 1958 *in* DWR, 2004).

Groundwater recharge occurs mainly from infiltration of streambeds and through direct percolation of precipitation that falls on the valley floor. Annual precipitation in the basin ranges from less than 20 inches near San Pablo Bay to more than 40 inches in upland areas of the Mendocino range (DWR, 2004).

Wells in sand and gravel layers 25 to 50 feet deep within the basin have an average yield of 50 gallons per minute (DWR, 1975 *in* DWR, 2004).

Groundwater Production. No groundwater production information is available.

Groundwater Levels. No information is available for groundwater levels in this basin; however, groundwater depth information from DWR is available for the Sears Point area and is discussed below.

Table 3.3-1 presents available groundwater data for the Sears Point area. Average water depth is 2.5 to 58.6 feet bgs, with a minimum depth of 1.5 feet and a maximum depth of 117.7 feet bgs.

TABLE 3.3-1
GROUNDWATER DEPTHS IN THE SEARS POINT AREA

	Period of Record		Below Ground Surface (feet)		
Well Location/ID	**Start**	**End**	**Average Water Depth**	**Minimum Depth**	**Maximum Depth**
03N06W11L001M	11/1/1995	10/12/1989			
04N06W21A001M	12/1/1989	3/18/2002	58.6	54	70.2
04N06W27B001M	10/13/1980	3/18/2002	28.1	7	117.7
04N06W36N001M	12/1/1989	11/30/1999	19.1	16.6	21.9

SOURCE: DWR, 2008

Groundwater Quality. Groundwater in the basin is high in calcium bicarbonate. Groundwater in the tidal areas of the basin has higher levels of sodium chloride and total minerals than groundwater farther away from San Pablo Bay (Cardwell, 1958; DWR, 1975 *in* DWR, 2004). Brackish water intrusions into the groundwater from tidal fluctuations are a main concern in the area around San Pablo Bay and can degrade groundwater quality (Cardwell, 1958 *in* DWR, 2004). In general, groundwater production for domestic uses within the basin is limited.

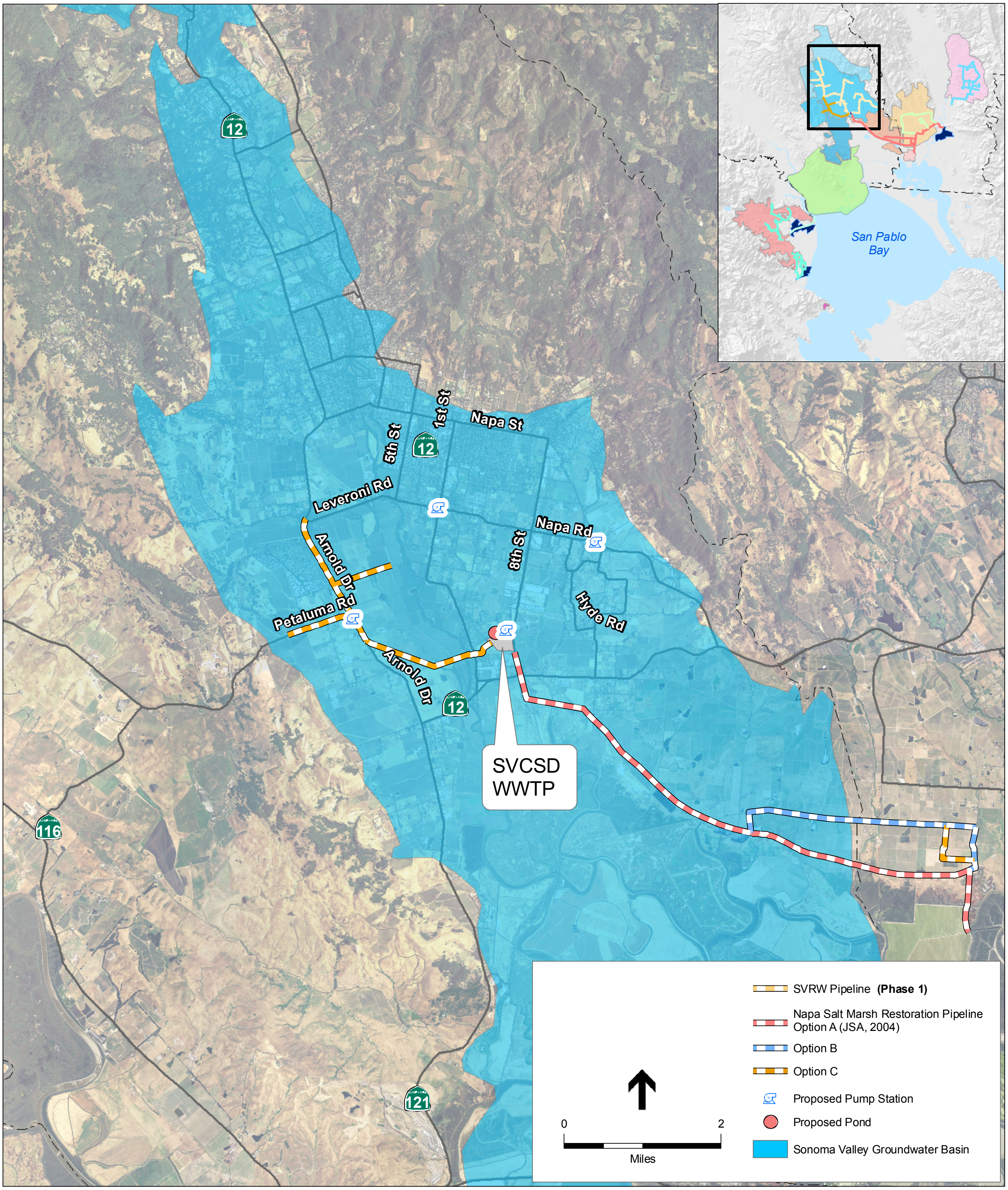
SVCSD

Groundwater makes up approximately 57 percent of all water used within the Sonoma Valley. The majority of all groundwater used in the Sonoma Valley is for agricultural irrigation (72 percent), followed by domestic uses (19 percent), and urban uses (9 percent) (SCWA, 2007). Groundwater provided less than 1 percent of the City of Sonoma's water supply and 27 percent of VOMWD supply in 2000 (Booker, 2006; SCWA, 2001a *in* CDM, 2008).

Sonoma Valley Groundwater Basin

Located in the southeastern portion of Sonoma County, the Sonoma Valley is a northwest trending depression between the Sonoma and Mayacmas Mountains (**Figure 3.3-2**). The Sonoma Creek watershed encompasses approximately 166 square miles and discharges to San Pablo Bay via Sonoma Creek. Water demand in the area is met with a combination of imported surface water from the Russian River, groundwater, and recycled water. Over the past 30 years, an increase in irrigated agriculture and rapid population growth have led to an increase in groundwater pumping and localized declining groundwater levels in some areas (SCWA, 2007; Farrar et al., 2006). Current groundwater issues for the Sonoma Valley groundwater basin include declining groundwater levels, saline intrusion, upwelling of geothermal waters, and groundwater/surface water interaction.

Previous studies by USGS (Farrar et al., 2006) and the Sonoma Valley Groundwater Management Plan (SCWA, 2007) describe groundwater resources in Sonoma Valley as a whole and do not differentiate between the two basins within it; therefore this discussion will describe groundwater resources for the entire valley, including the Sonoma Valley groundwater basin (a sub-basin of the Napa-Sonoma Valley groundwater basin) and the portion of the Kenwood groundwater basin that lies within the valley.



SOURCE: USDA, 2005; CDM, 2008; DWR, 2006; and ESA, 2008

Note: Existing Facilities Not Shown

NBWRA North Bay Water Recycling Program. 206088.01

Figure 3.3-2
Phase 1 Projects with
Sonoma Valley Groundwater Basin

Geology and Hydrogeology. All geologic formations in the Sonoma Valley contain groundwater, but differ in their water bearing properties. The four primary geologic units include Quaternary Alluvial Units, the Glen Ellen Formation, the Huichica Formation, and the Sonoma Volcanics. **Table 3.3-2** presents the characteristics of these water bearing formations. Bay Mud deposits cover the southern area of the valley to San Pablo Bay. Due to low permeability and high salinity, Bay Mud is not considered an aquifer for water supply (SCWA, 2007).

TABLE 3.3-2
WATER BEARING FORMATIONS OF THE SONOMA VALLEY GROUNDWATER BASIN

Formation	General Characteristics	Yield (gallons per minute)
Quaternary Alluvial Units	• Consist of cobbles, sand, silt, and clay interlaced with coarse-grained stream channel deposits near Sonoma Creek. • Unconfined.	100
Glen Ellen Formation	• Clay-rich stratified deposits of poorly sorted sand, silt, and gravel, interbedded with minor beds of conglomerate and volcanic tuffs. • Interspersed with the Huichica Formation and lies on top of the Sonoma Volcanics and Franciscan Complex in certain regions. • Confined to semi-confined.	20
Huichica Formation	• Thick silt and clay with interbedded lenses of sands, gravels, and tuff beds. • Overlies the Sonoma Volcanics. • Confined to semi-confined.	2 to 20, higher yields in the lower part of the unit.
Sonoma Volcanics	• Volcanic rocks interbedded with sedimentary deposits derived from volcanic rocks and lake beds. • Overlies sedimentary rock. • Confined to semi-confined.	10 to 50, up to 100.

SOURCE: SCWA, 2007; Farrar et al., 2006.

Groundwater recharge in Sonoma Valley occurs mainly through precipitation, by way of seepage from creeks, lakes, reservoirs, and direct infiltration of precipitation. Minor recharges can occur from infiltration from septic tanks, leaking water supply infrastructure, and irrigation (Farrar et al., 2006). It is assumed that no groundwater from outside the area can migrate into the valley because the basement rocks that form the sides of the valley and the surrounding mountains have low permeability (SCWA, 2007). Precipitation in the valley occurs as rain, with almost 90 percent occurring during November through April. Annual precipitation for the City of Sonoma had an average of 29.8 inches for water year 1953 through 2002, but can vary significantly from the 50-year average (National Oceanic and Atmospheric Administration 2003 *in* Farrar et al., 2006). Groundwater movement is generally from the mountain ridges down toward the valley axis and from the northwest end of the valley southeast toward San Pablo Bay (Farrar et al., 2007).

Groundwater pumping is assumed to be the main source of groundwater discharge, although groundwater also discharges from springs and to streams. Groundwater also discharges to the marshlands near San Pablo Bay by evaporation and transpiration from plants, and some water discharges to several sloughs that drain the marsh (Farrar et al., 2006).

Groundwater Production. In 2000, there were about 2,000 domestic, agricultural, and public supply wells within the Sonoma Valley. More than half of all water demand in the valley was met with groundwater (SCWA, 2007). Groundwater production in Sonoma Valley was estimated at 8,400 acre-feet (AF) in 2000, an increase of 2,200 AF since 1974 (Farrar et al., 2006).

Groundwater Levels. Groundwater levels in Sonoma Valley have fluctuated over the last 100 years as major changes in recharge or discharge have occurred. In the 1880s to 1930s, a large area of salt marshes was drained and groundwater levels dropped in the southern portion of Sonoma Valley. When groundwater pumping increased substantially in the 1960s, groundwater levels declined and some wells were even reported to go dry (Farrar et al., 2006; SCWA, 2007). After deliveries of imported surface water from the Russian River began in 1965, groundwater levels appeared to recover and stabilize through the 1980s (DWR, 1982 in SCWA, 2007).

Since the 1980s, an increase in irrigated agriculture and rapid population growth have led to an increase in groundwater pumping and localized declining groundwater levels in some areas (SCWA, 2007). Currently there are two areas, one southeast of Sonoma and one southwest of El Verano, that show pumping depressions (Farrar, 2007). An increase in groundwater production and low precipitation in the last several years is the likely cause of this decline in groundwater levels in the valley (Farrar et al., 2006). There is currently no evidence to indicate any land subsidence in the Sonoma Valley (SCWA, 2007).

As shown in **Table 3.3-3** below, available data from DWR (2008) suggests average groundwater depths in the Sonoma Valley range between 3 feet and 78 feet bgs. The minimum groundwater depths recorded range from 0.4 to 33.6 feet bgs, and the maximum groundwater depths range from 10.6 to 178.3 feet bgs.

Groundwater Quality. Water quality samples taken by USGS from 75 wells in 2002 to 2004 indicate that groundwater quality in the Sonoma Valley is generally acceptable for potable use (Farrar et al., 2006). From 1964 to 2004, both DWR and USGS have conducted groundwater and surface water sampling in the Sonoma Valley in streams, springs, and groundwater wells. Wells with concentrations of arsenic, boron, iron, manganese, and total dissolved solids (TDS) above drinking water standards were found in the northern portion of Sonoma Valley (SCWA, 2007). TDS values ranged from 137 to 702 milligrams per liter (mg/L), with 3 wells exceeding the secondary maximum contaminant level (MCL), which is not a health based value, but may impact hardness, deposits, or taste. Wells with depths from 200 to 500 feet had a higher percentage of samples that exceeded drinking water standards than wells screened above and below this interval. Sampling results have also indicated potential upwelling of geothermal water beneath the east side of Sonoma Valley along fractures and faults along the margin of the Bay Mud deposits (Farrar et al., 2006).

TABLE 3.3-3
GROUNDWATER DEPTHS IN SONOMA VALLEY BASIN

	Period of Record		Below Ground Surface (feet)		
Well Location/ID	**Start**	**End**	**Average Water Depth**	**Minimum Depth**	**Maximum Depth**
Central Sonoma Valley					
06N06W09Q001M	10/9/1980	7/3/2008	10.8	6.2	29.4
06N06W10M002M	10/31/1974	4/8/2008	25.4	4.4	58
06N06W22R002M	10/9/1980	11/1/2007	3.8	0.4	10.6
06N06W23M002M	10/6/1980	3/13/2002	10.3	2.4	59.3
Sonoma Valley					
05N05W08P002M	4/3/1974	4/9/2008	78.8	8	178.3
05N05W17B002M	10/13/1980	4/9/2008	58.3	33.6	79.7
05N05W17C001M	1/18/1950	8/18/1994	14.6	5.2	29.8
05N05W18R001M	2/15/1966	7/3/2008	8.1	1.7	34.3
05N05W30J003M	10/22/1965	3/13/2002	11.6	3.4	69
05N06W02N002M	4/3/1974	7/3/2008	70	20	122.5
05N06W13C001M	10/8/1980	4/7/2004	37.8	23.8	63
Southern Sonoma Valley					
04N05W06E001M	11/29/1973	4/5/2004	21.6	17.6	29.6
04N05W06M001M	10/13/1980	4/10/2008	15.0	10.8	22.5

SOURCE: DWR, 2008

Areas of saline groundwater have been identified between San Pablo Bay shore and Schellville. This saline groundwater is likely associated with seawater intrusion, connate groundwater associated with evaporate or marine sedimentary deposits, and/or thermal waters (SCWA 2007).

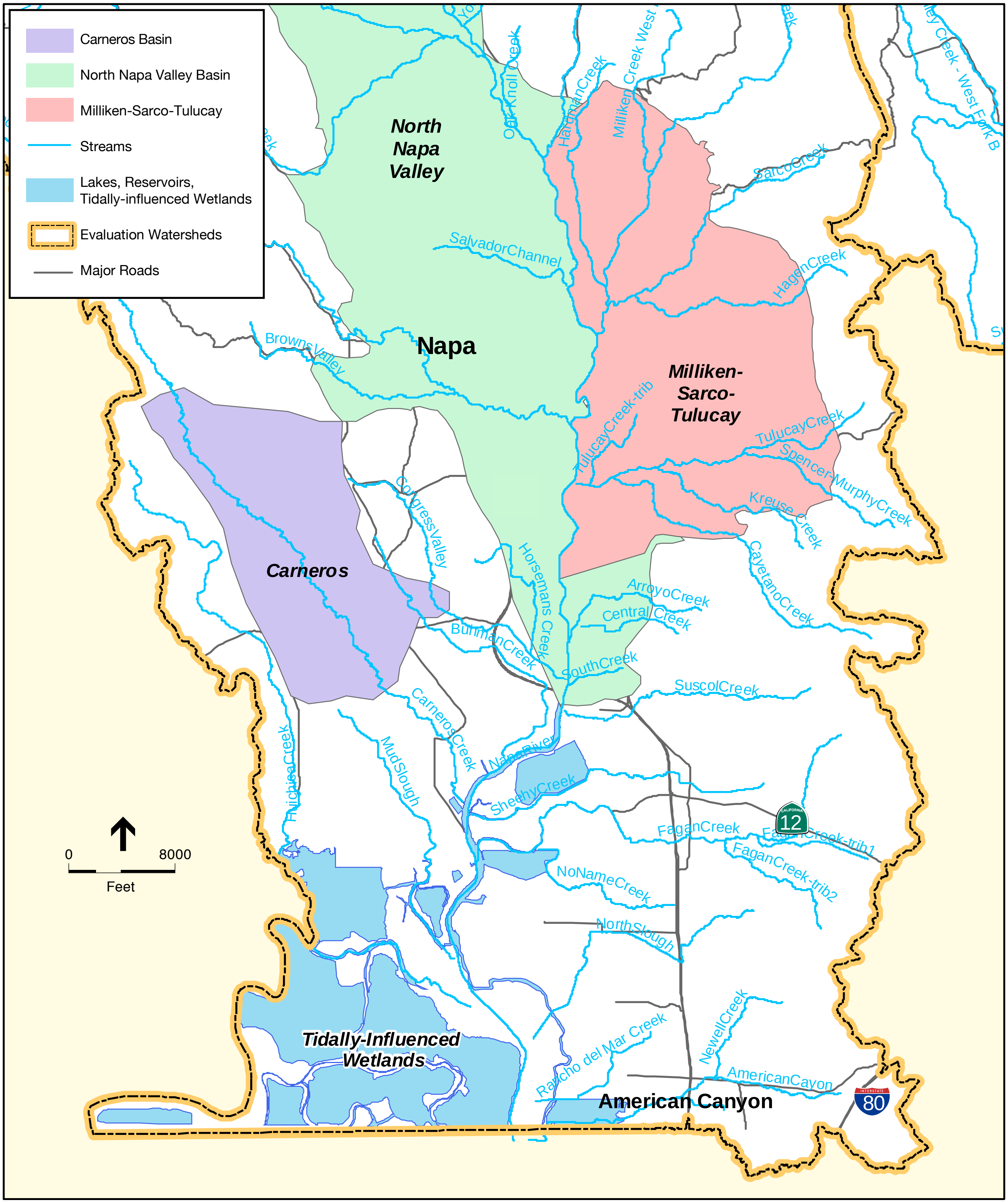
The area of saline groundwater south of Highway 12/121 did not change substantially from the 1940s through 1982. Surveys conducted in 2003 indicate that the saline groundwater may have shifted north of Highway 12/121 toward a groundwater depression southeast of the City of Sonoma. In the area of the intersections of Highways 12 and 121 and Sonoma Creek, the saline groundwater has receded (Farrar et al., 2007).

Napa SD

The City of Napa does not use groundwater for drinking water supplies. Unincorporated areas of Napa County that are not served by the City, including the MST area, rely on groundwater for domestic use as well as agriculture and open-space irrigation. Two groundwater basins have been identified in the Napa SD service area that could be affected by the NBRWP, the MST and Carneros groundwater basins. **Figure 3.3-3** shows the location of the Carneros and MST groundwater basins.

MST Groundwater Basin

The Lower MST Basin area is located on the eastern edge of the Napa Valley floor in southern Napa County, between the City of Napa and the Howell Mountains. The MST Basin covers an



SOURCE: USDA, 2005; CDM, 2006; Napa County, 2006; and ESA, 2008

NBWRA North Bay Water Recycling Program. 206088

Figure 3.3-3
Milliken-Sacro-Tulucay
and Carneros Goundwater Basins

area of about 15 square miles and has an estimated usable storage capacity of 200,000 AF (Napa Valley Flood Control District, 1991 in County of Napa, 2007). The MST Basin is the only basin designated as deficient by Napa County (County of Napa, 2007). The County of Napa has enacted an ordinance to protect groundwater in the MST deficient area.

Approximately 4,800 people in the MST area rely solely on groundwater from private wells. The majority of all groundwater pumped in the area (about 45 percent) is used for agriculture, with the remainder pumped for improved open-space irrigation (about 29 percent) and domestic use (about 27 percent) (Farrar and Metzger, 2003). Population growth and an increasing number of irrigated vineyards have resulted in declining groundwater levels.

Geology and Hydrogeology. The MST Basin lies in a northwest-trending valley in the Howell Mountains of the North Coast Range. The area is underlain by alluvial deposits and volcanic rocks that exceed 1,000 feet in thickness in some areas. Principal water bearing units in the area include alluvial deposits west of the Soda Creek Fault and the tuffaceous member of the Sonoma Volcanics east of the fault (Farrar and Metzger, 2003). Groundwater occurs primarily under confined conditions within the tuffaceous units of the Sonoma Volcanics (County of Napa, 2007).

Groundwater recharge in the MST Basin occurs from precipitation and infiltration on the valley floor and from infiltration in the Howell Mountains. Seepage from the three creeks also contributes to recharge. Agricultural irrigation has a minor contribution to recharge as the predominant crops are vineyards that use water-efficient irrigation techniques. Annual precipitation in the basin occurs almost exclusively from November through April. Annual precipitation averaged about 24.5 inches per year from 1918 through 2000 (National Oceanic and Atmospheric Association 2002 *in* Farrar and Metzger, 2003). Annual precipitation can deviate up to 200 percent from the 85-year average. Precipitation increases from south to north as the elevation increases. Average annual precipitation is highest in the Howell Mountain, almost 65 percent higher than the area with the lowest average annual precipitation (Farrar and Metzger, 2003).

Surface water resources in the area include the Milliken, Sarco, and Tulucay Creeks, which originate in the Howell Mountains and drain into the Napa River. The three creeks have a combined drainage area of approximately 41 square miles.

Groundwater generally moves laterally from the Howell Mountains into the MST area and towards the Napa River. Surface water runoff to the Napa River and high evapotranspiration rates make it difficult to accurately estimate potential groundwater recharge (Farrar and Metzger, 2003). A previous study estimated average annual recharge to be 5,400 AF per year (AFY) in 1975, with 3,050 AFY from streamflow infiltration, 2,100 AFY from subsurface inflow from the Howell Mountains, and 250 AFY from infiltration of precipitation (Farrar and Metzger, 2003). USGS estimates annual recharge to be approximately 6,000 AFY, but this number is uncertain due to the difficulty in estimating precipitation, runoff, and evapotranspiration for the region (Farrar and Metzger, 2003).

Groundwater discharges mainly occur from groundwater pumping and underflow in a westward direction, with a smaller quantity of discharges to streams (Farrar and Metzger, 2003). The USGS estimates underflow to be about 600 AFY in the area, about 2,050 AF less than estimated in 1975 (Farrar and Metzger, 2003).

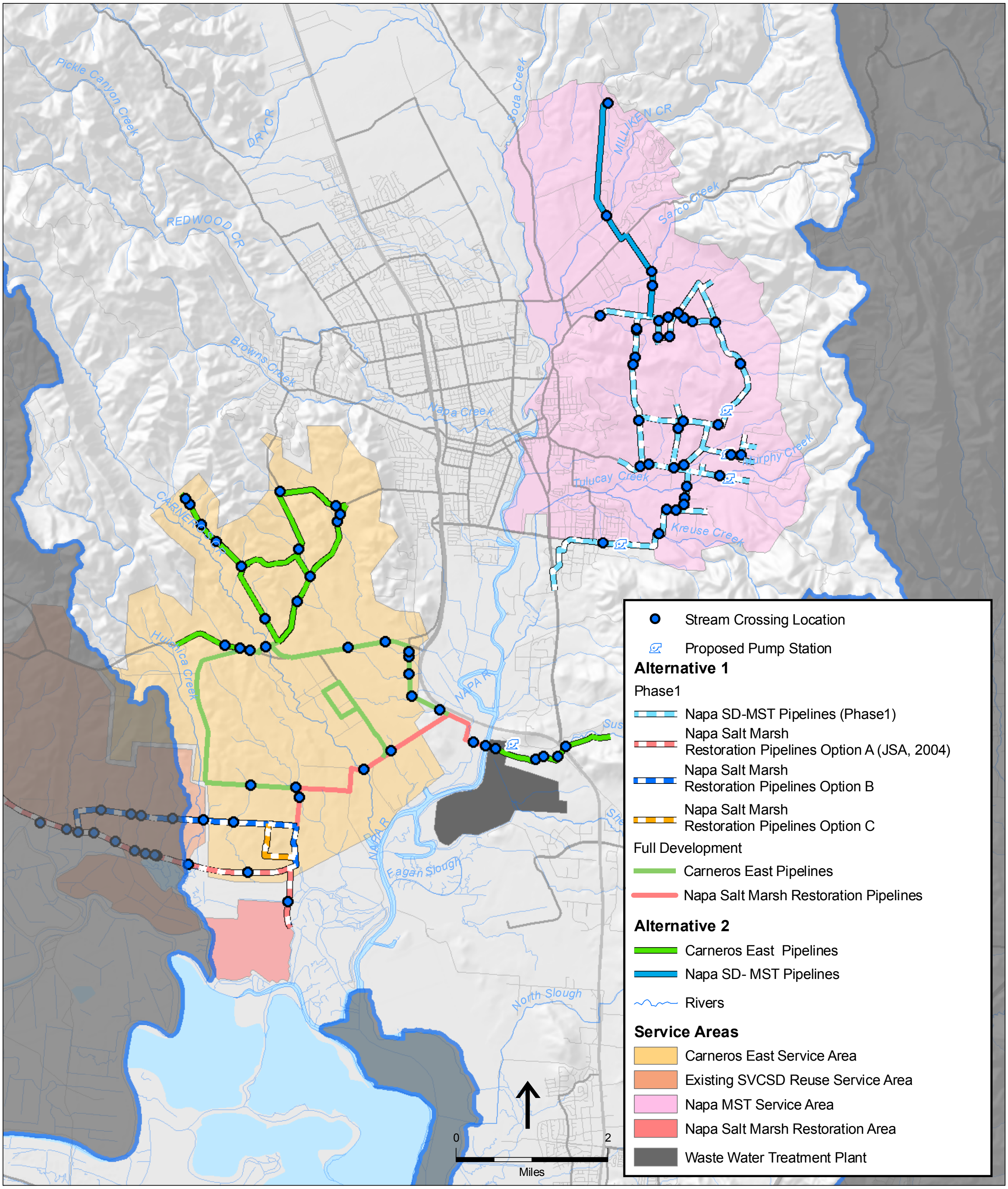
Groundwater Production. Based on driller logs and the number of parcels in the area, USGS estimates there are approximately 1,595 domestic wells and 185 irrigation wells in the MST area (Farrar and Metzger, 2003). About one-third of all domestic wells were constructed from 1975 to 2002. Groundwater production from 2000-2002 ranged from 3,600 to 7,100 AFY and averaged 5,350 AFY. This production is an increase of 2,350 AFY compared to 1975 estimates which average 3,000 AFY (Farrar and Metzger, 2003). Annual groundwater pumping has been estimated at 5,350 AF from 2000-2002, an 80 percent increase since 1975 (Farrar and Metzger, 2003).

Groundwater Levels. As described above, prior to pumping, groundwater in the area flowed west toward the Napa River from recharge areas in the mountains to the north, east, and south. Increased groundwater pumping since 1975 has changed the groundwater gradients in the area, resulting in a decrease in underflow towards the Napa River. Three large groundwater depressions are present in the MST Basin; one in the eastern portion, one in the central portion, and one in the northwestern portion of the basin. The groundwater deficient area is shown in **Figure 3.3-4**. Groundwater around the depressions that would normally have flowed in a southwest direction towards the Napa River now flows towards these depressions. From 1975 to 2001, some water levels increased in the area, but groundwater levels around the central and eastern depressions decreased from 50 to 124 feet bgs (Farrar and Metzger, 2003). The two largest groundwater depressions are located in regions with the largest number of active or potentially active wells (Farrar and Metzger, 2003). In the third depression in the northwest region, the greatest rate of groundwater decline occurred after 1970, when the largest numbers of new wells were drilled. The decrease in groundwater levels at the three depression areas has occurred even during periods of average annual precipitation. The general decline in groundwater levels suggest that groundwater pumping currently exceeds recharge (Farrar and Metzger, 2003).

According to available data from DWR, average groundwater depths in the MST basin range from 14.1 to 227.5 feet bgs (see **Table 3.3-4**). The minimum groundwater depth recorded ranges from 0.3 feet to 180.0 feet bgs, while the maximum depth ranges from 59.4 to 285.9 feet bgs.

Groundwater Quality. In the fall of 2001, USGS sampled 15 wells throughout the MST Basin. Several wells exceeded drinking water standards for various constituents. Dissolved oxygen (DO) concentrations in the wells ranged from less than 0.1 to 6.6 mg/L. The pH for all 15 wells ranged from 6.3 to 8.6; two wells did not meet the State secondary drinking water standard of 6.5 to 8.5 for taste, odor, or appearance (Farrar and Metzger, 2003). Specific conductance ranged from 124 to 1,220 microsiemens per centimeter (µS/cm) and one well exceeded the State secondary drinking water standard of 900 µS/cm (USGS, 2003).

Boron standards were exceeded in two wells, and arsenic standards were exceeded in three wells. Several wells had concentrations of dissolved iron and manganese that exceeded drinking water



SOURCE: CDM, 2008; ESRI, 2006; SWRCB, 2006; ESA, 2008; Field Collected Stream Data, 2008; DWR NHD Stream Data, 2007

Note: Existing Water Distribution Facilities Not Shown

NBWRA North Bay Water Recycling Program. 206088.01

Figure 3.2-4
Napa River Watershed Stream Crossings

TABLE 3.3-4
GROUNDWATER DEPTHS IN THE MST BASIN

	Period of Record		Depth Below Ground Surface (feet)		
Well Location/ID	**Start**	**End**	**Average Water Depth**	**Minimum Depth**	**Maximum Depth**
05N03W05M001M	6/15/1949	4/22/2008			
05N03W06B002M	11/9/1992	4/22/2008	227.5	180	285.9
05N03W07C003M	10/17/1978	4/23/2008	46.6	11.4	130
05N03W07P001M	10/17/1978	11/6/1992	77.6	1.7	213
05N04W12F001M	1/30/1950	3/20/1978	61.2	30.5	98.5
05N04W12H001M	4/4/1963	1/30/1978	48.3	10	88.6
05N04W13H001M	4/4/1963	4/23/2008	15.4	3.1	149.6
05N04W13H002M	7/17/1962	3/21/1972	14.1	11.8	20.8
05N04W14J003M	7/15/1920	4/24/2008	77	48.8	199.2
06N03W31B001M	4/6/1992	12/15/1949	137.4	69	230
06N03W31F001M	12/15/1919	10/15/1973	26.2	0.3	64.8
06N03W31H001M	12/15/1949	3/20/1978	67.4	14.6	145.9
06N03W31N001M	11/15/1937	10/1/1974	46.8	16.7	59.4
06N03W31N002M	4/4/1963	3/20/1978	60.6	24.9	98.2
06N04W23J001M	2/1/1950	4/21/2008	74.6	0.7	119.6
06N04W23Q003M	10/17/1978	4/21/2008	83.6	12	114.2
06N04W26G001M	10/13/1978	4/21/2008	56.1	30.8	95.1
06N04W35G003M	1/31/1950	10/24/1988	35.4	4	85.5
06N04W36G001M	10/17/1978	4/22/2008	121.7	74	179.5
06N04W36H001M	3/10/1950	3/20/1978	28.8	15.4	127

SOURCE: DWR, 2008

standards. The source of the arsenic, boron, iron, and manganese is most likely minerals in the volcanic rocks or from the rocks of the Franciscan Complex or Great Valley Sequence. Groundwater from three wells in the central part of the basin, ranging in total depth from 228 to 260 ft, had the highest dissolved solids (greater than 400 mg/L) and highest chloride concentrations (54 to 175 mg/L) (Farrar and Metzger, 2003). Temperatures in the wells were fairly high, ranging from 17.5 degrees Celsius (°C) to 27 °C, with a temperature gradient almost double that of the national average at approximately 0.02°C per foot. All wells with depths greater than 400 feet had a temperature over 22 °C (Farrar and Metzger, 2003).

Carneros Groundwater Basin

The Carneros groundwater basin underlies the Carneros Valley in the southwestern portion of Napa County.

Geology and Hydrogeology. The valley floor in the area consists of alluvium underlain by Pleistocene Huichica Formation and the Sonoma Volcanics. Alluvium is thin in the area and the majority of it is located above the saturated zone. The Huichica Formation is the primary water-bearing material in the basin. No estimates of storage are available. Lower well yields in the area indicate storage is likely less than the MST Basin (County of Napa, 2005). Recharge to the basin is primarily from infiltration of precipitation along the hillside bordering the Carneros Valley and from infiltration from streambeds.

Groundwater Production. While no detailed information is available for the Carneros Basin, groundwater production is estimated at 1,500 AF based on 2000 to 2002 pumping estimates for the region (County of Napa, 2005).

Groundwater Levels. While no recent data is available for groundwater levels, groundwater depths for eight wells in the Carneros East area are presented below in **Table 3.3-5**. Average groundwater depths in the wells ranged from 7.7 feet to 41.4 feet bgs, with a minimum depth of 0.2 to 28.2 feet bgs and a maximum of 16.5 feet to 96.2 feet bgs (DWR, 2008).

Groundwater Quality. No groundwater quality data is available for the Carneros groundwater basin (County of Napa, 2005).

TABLE 3.3-5
GROUNDWATER DEPTHS IN THE CARNEROS BASIN

	Period of Record		Below Ground Surface (feet)		
Well Location/ID	Start	End	Average Water Depth	Minimum Depth	Maximum Depth
04N04W04C001M	7/19/1962	3/20/1978			
04N04W05B001M	7/18/1962	3/20/1978	17.4	3.7	54.1
04N04W05D002M	3/13/1951	3/20/1978	7.7	0.2	16.5
05N04W19R002M	7/18/1962	3/20/1978	21.2	0.5	62.7
05N04W20R002M	7/18/1962	3/20/1978	12.5	0.2	96.2
05N04W22M001M	11/1/1949	3/20/1978	41.4	0.2	64.1
05N04W28R001M	6/20/1918	3/20/1978	40.7	28.2	60.9
05N04W29H001M	2/25/1930	3/20/1978	28.7	13.2	44.2

SOURCE: DWR, 2008

3.3.2 Regulatory Framework

State

Groundwater use is generally not regulated by the State of California. Groundwater use is typically managed at the local level. The State's role in groundwater management is mainly to provide financial assistance to local agencies to aid in groundwater management (DWR 2003).

Assembly Bill 3030 (AB3030), Water Code Section 10750 (commonly referred to as the Groundwater Management Act), encourages local agencies to develop groundwater management plans that cover certain aspects of management. Subsequent legislation has amended this chapter to make the adoption of a management program mandatory if an agency is to receive public funding for groundwater projects, creating an incentive for the development and implementation of plans. The Groundwater Management Act lists 12 elements that should be included within the groundwater management plans to ensure efficient use, good groundwater quality, and safe production of water. These 12 elements are (State Water Code, Section 10753):

- Control of saline water intrusion;
- Identification and management of well head protection areas and recharge areas;
- Regulation of the migration of contaminated groundwater;
- Administration of a well abandonment and destruction program;
- Mitigation of conditions of overdraft;
- Replenishment of groundwater extracted by water producers;
- Monitoring of groundwater levels and storage;
- Facilitation of conjunctive use operations;
- Identification of well construction policies;
- Construction and operation (by the local agency) of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects;
- Development of relationships with State and Federal regulatory agencies; and
- Review of land use plans and coordination with land use planning agencies to assess activities that create a reasonable risk of groundwater contamination.

Senate Bill 1938 (SB 1938), Water Code Section 10753.7, requires local agencies seeking State funds for groundwater construction or groundwater quality projects to have the following: 1) a developed and implemented groundwater management plan that includes basin management objectives[1] (BMOs) and addresses the monitoring and management of groundwater levels, groundwater quality degradation, inelastic land subsidence, and surface water/groundwater interaction; 2) a plan addressing cooperation and working relationships with other public entities; 3) a map showing the groundwater subbasin the project is in, neighboring local agencies, and the area subject to the groundwater management plan; 4) protocols for the monitoring of groundwater levels, groundwater quality, inelastic land subsidence, and groundwater/surface water interaction; and 5) groundwater management plans with the components listed above for local agencies outside the groundwater subbasins delineated by the DWR Bulletin 118, published in 2003.

Local

The local general plans, policies, and regulations associated with impacts to groundwater within the affected jurisdictions are presented in **Appendix 3.3** of this EIR/EIS.

1 BMOs are management tools that define the acceptable range of groundwater levels, groundwater quality, and inelastic land subsidence that can occur in a local area without causing significant adverse impacts.

3.3.3 Environmental Consequences / Impacts

Significance Criteria under CEQA

Based on the Appendix G of the *CEQA Guidelines*, project implementation would result in significant impacts and environmental consequences on groundwater resources if it would:

- Substantially degrade groundwater quality;
- Result in an increase in the potential for flooding; or
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

Environmental Consequences/Impact Analysis

This section analyzes the potential environmental consequences/impacts of the NBWRP alternatives on groundwater resources. With the exception of the MST area, this analysis assumes that water use (in areas that currently use groundwater) would not change as a result of implementation of the NBWRP alternatives. Provision of recycled water would be used to offset groundwater use; it would not contribute to an increase in water use.

Because specific recycled water users were not identified at the time of this document, the analysis assumes all irrigated lands currently rely on groundwater and therefore the use of recycled water would result in a corresponding offset in the existing use of groundwater supplies. In reality, there may be small areas of irrigated lands that rely on surface water or other municipal sources. In these instances, the offset provided would not be solely applicable to existing groundwater use, but would in fact provide a corresponding offset to what ever combination of irrigation supplies are currently in use at an existing user site.

Impact 3.3.1: Long-term groundwater levels. The NBWRP would provide an alternative irrigation supply to existing groundwater pumping; offset of groundwater pumping could maintain or raise groundwater levels in portions of the action area. (Beneficial)

The NBWRP would create a new source of water that would offset the use of surface and groundwater supplies for urban and agricultural irrigation. **Table 3.3-6** shows the quantity of recycled water that would be available under each alternative. **Charts 3.3-1** and **3.3-2** summarize the potential maximum reduction in groundwater pumping[2] within the Sonoma Valley and MST Area associated with each of the Action Alternatives, including comparison to the No Project Alternative (CEQA baseline) and No Action Alternative (NEPA baseline). This reduction in pumping would occur within the Sonoma Valley and MST irrigation areas, which currently use groundwater for irrigation. The use of recycled water to offset groundwater would allow

[2] The potential maximum reduction in groundwater pumping assumes that 100 percent of the recycled water would be used to off-set groundwater.

TABLE 3.3-6
RECYCLED WATER AVAILABLE UNDER EACH OF THE ALTERNATIVES

Service Area	Specific Region	No Project	No Action Alternative	Phase 1	Basic System	Partially Connected System	Fully Connected System
		(Acre-Feet Per Year)					
LGVSD	Peacock Gap	0	0	0	0	207	207
	NMWD URWP (South)	0	0	202	202	202	202
	Sears Point	0	0	0	0	0	0
Novato SD	NMWD URWP (northern central, and west portions)	0	193	542	542	1,070	1,070
	Sears Point	0	0	0	0	968	1,044
	Southern Sonoma Valley	0	0	0	0	0	1,587
SVCSD	Central Sonoma Valley	0	0	0	0	0	1,511
	Sonoma Valley	0	874	874	2,719	2,719	2,719
	Southern Sonoma Valley	0	0	0	0	1,662.5	0
	Napa Salt Marsh[1]	0	--	--	--	--	--
Napa SD	Carneros East and Salt Marsh	0	0	0	1,055	1,440	1,440
	MST	0	0	2,137	2,137	2,826	2,826
	Napa (local)	0	0	0	0	155	155
	Napa Salt Marsh[1]	0	--	--	--	--	--
Total	**Compared to No Project**	**0**	**1,067**	**3,757**	**6,655**	**11,250**	**12,761**
Total	**Compared to No Action**	**--**	**1,067**	**2,690**	**5,588**	**10,182**	**11,694**

[1] Releases to Napa Salt Ponds 7 and 7A, are estimated as follows: No Project Alternative – 0 AFY; No Action Alternative – 3,460 AFY; Basic Alternative – 5,824 AFY; Partially Connected – 2,933 AFY; Fully Connected – 3,085 AFY. Actual releases will depend upon year type. Because this is a beneficial use that is not related to recycled water supply, this number is tracked separately in each of the alternatives.

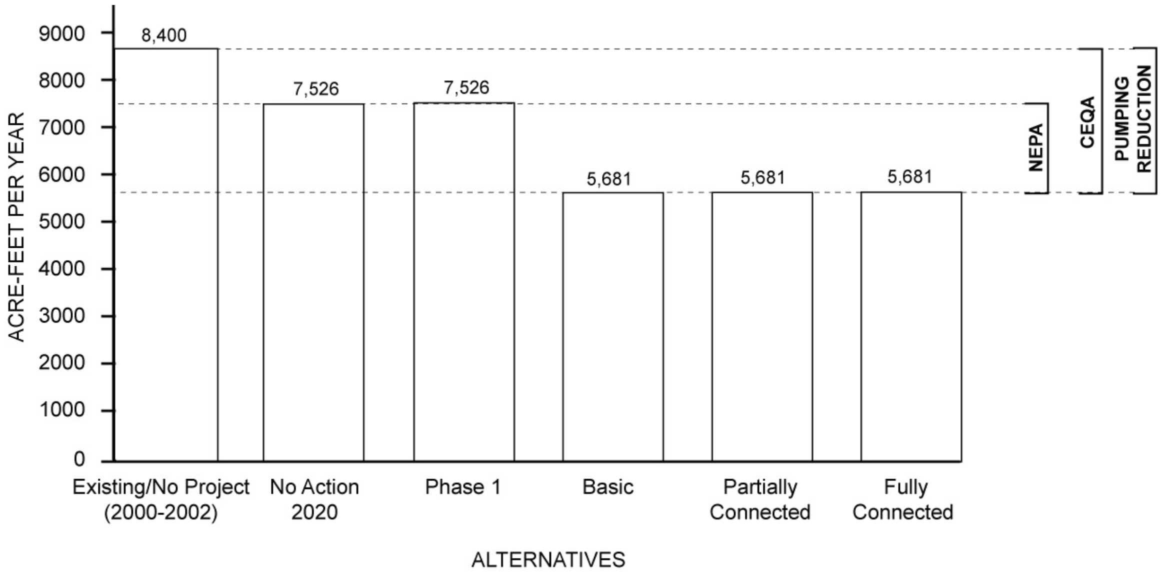
SOURCE: CDM, 2009; ESA 2009.

groundwater to remain in storage in the aquifers and over the long term could help to maintain or even raise groundwater levels. This would help to reduce the risk of saline intrusion from San Pablo Bay, and is considered a beneficial impact. A discussion of potential impacts for the Action Alternatives by Member Agency is provided below. Please refer to Section 3.4, Water Quality, for a discussion of potential impacts to groundwater quality.

No Project Alternative

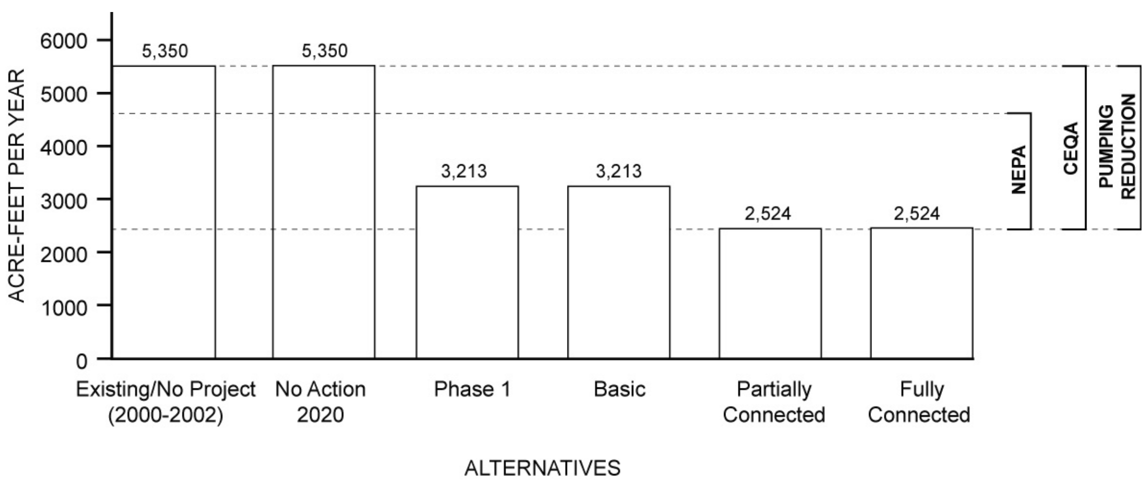
The NBWRP would not be implemented under the No Project Alternative, therefore no impact is expected. For a discussion of the No Project under future conditions, see No Action Alternative below.

CHART 3.3-1
POTENTIAL MAXIMUM OFFSET IN SONOMA VALLEY GROUNDWATER PUMPING BY ALTERNATIVE



SOURCE: CDM, 2009; ESA, 2009.

CHART 3.3-2
POTENTIAL MAXIMUM OFFSET IN MST AREA GROUNDWATER PUMPING BY ALTERNATIVE



SOURCE: CDM, 2009; ESA, 2009.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination, or federal funding.

For comparison to the Action Alternatives, it is estimated that approximately 1,067 AFY of recycled water would be available from projects implemented by Member Agencies on an individual basis (see Table 3.3-6). This recycled water supply would be available to offset groundwater pumpage.

Under 2020 conditions, it is likely that groundwater pumpage within the Sonoma Valley area would continue at or near current levels, and that groundwater conditions would be further reduced in terms of groundwater levels and groundwater quality. Future levels of groundwater pumpage and resulting groundwater conditions are difficult to predict, although it is likely that current trends would continue. These conditions would be slightly reduced through the implementation of recycled water projects, which would provide 1,067 AFY of recycled water to offset groundwater pumpage. Within areas where groundwater is currently used for irrigation, this would result in 874 AFY available in the Sonoma Valley (approximately 14% reduction in current pumpage). This would allow groundwater to remain in storage in the aquifers and over the long term could help to maintain or even raise groundwater levels. This would help to reduce the risk of saline intrusion from San Pablo Bay. This impact would be considered beneficial, and would occur in service areas where groundwater is currently used for irrigation.

Phase 1 (Project level)

Compared to the CEQA Baseline, Phase 1 projects would provide approximately 3,757 AFY within the action area to offset potable water. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 2,690 AFY of recycled water.

The beneficial impacts related to groundwater offset associated with Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the additional recycled water available under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/ NMWD

Phase 1 projects would provide approximately 202 AFY of recycled water to Hamilton Field to offset potable water use. Although these are private wells within the LGVSD and NMWD service areas, Hamilton Field is served by surface water supplies from NMWD. Therefore, there would be no offset of groundwater pumping, with beneficial effects to groundwater levels in this area. Please refer to Section 3.4, Water Quality for a discussion of potential impacts to groundwater quality.

Groundwater is the main water supply used for irrigation in the portion of the action area. Therefore, it is assumed that a portion of the recycled water would be used for agricultural irrigation and would offset groundwater pumping. Localized groundwater depressions are evident within the Sonoma Valley. The use of recycled water to offset groundwater would help to maintain or even increase groundwater levels in the area over the long-term. When compared to both the No Project and No Action baseline conditions, this impact would be considered beneficial.

Novato SD/ NMWD

Phase 1 projects would provide approximately 542 AFY of recycled water to the NMWD north and central areas to offset potable water use. The Novato area is served by surface water supplies from NMWD. Therefore, there would be no impact on groundwater levels in this area.

SVCSD

Phase 1 projects would provide approximately 874 AFY of recycled water to Sonoma Valley to offset potable water use. Land use in the Sonoma Valley portion of the action area is both urban and agricultural. Groundwater is the main water supply used for irrigation in the portion of the action area that contains dairy/pasture lands and vineyards. Therefore, it is assumed that a portion of the recycled water would be used for agricultural irrigation and would offset groundwater pumping. Localized groundwater depressions are evident within the Sonoma Valley. The use of recycled water to offset groundwater would help to maintain or even increase groundwater levels in the area over the long-term. When compared to both the No Project and No Action baseline conditions, this impact would be considered beneficial.

Phase 1 of the Napa Salt Marsh Restoration Project would provide approximately 3,460 AFY, depending upon year type, of recycled water to the Napa Salt Marsh Wildlife Area to assist in habitat restoration. This would offset potable water uses for restoration.

Napa SD

Phase 1 projects would provide a total of approximately 2,137 AFY of recycled water to the MST area. About 1,416 AFY of this recycled water would be used primarily for the irrigation of existing vineyards. Because groundwater is the only water supply within the MST area, recycled water would help to reduce groundwater pumping by providing alternate water source for irrigation. The MST groundwater basin has been designated by Napa County as a deficient basin because of declining groundwater levels. The use of recycled water would help to maintain and may even raise groundwater levels in the MST area over the long term. This impact would be considered beneficial.

Phase 1 projects would have the ability to provide 521 AFY of recycled water beyond the irrigation demands of existing vineyard uses in the MST area. This additional recycled water would be generated by the Napa SD, and would be available to serve varying types of land uses within the MST area. Because this recycled water is above the amount needed to offset existing groundwater pumpage, it would not contribute to further reduction in groundwater pumpage.

This recycled water would be available to support irrigation of various land uses, and could contribute to currently un-irrigated lands within the MST area converting to irrigated agriculture uses consistent with their General Plan designations. Assuming a use rate of 0.25 acre-feet/acre for vineyards in Napa (CDM, 2008), this amount of recycled water would be capable of supporting approximately 2,086 acres of vineyard. Assuming a use rate of 2.5 acre-feet/acre for dairy (CDM, 2008), this amount of recycled water would be capable of supporting approximately 208 acres of dairy. It should be noted that existing un-irrigated parcels within the MST area are not restricted from agricultural uses that are consistent with their General Plan and Zoning designations, and that are in conformance with the Napa County Groundwater Conservation Ordinance, which provides for a usage rate of 0.3 acre-feet/acre per year, over a 3-year average. Therefore, it is unlikely that provision of recycled water in and of itself would directly result in the conversion of these parcels to irrigated agricultural uses. However, the availability of an alternative supply to groundwater could be one of several contributing factors that would allow lands that are currently un-irrigated to be placed in irrigated agriculture, consistent with their General Plan land use designations. Please refer to **Chapter 5, Growth Inducement**, for further discussion of land use within the MST area. In the event that un-irrigated lands are converted to vineyard uses, the availability of recycled water would offset the need for additional groundwater pumpage. Therefore, vineyard conversion would not contribute to further reduction in groundwater pumpage.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System would provide approximately 6,655 AFY of recycled within the action area. Compared to the No Action Alternative (NEPA Baseline), the Basic System would provide approximately 5,588 AFY within the action area.

The beneficial impacts related to groundwater offset associated with the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the additional recycled water available under this alternative. The amount of recycled water provided under each alternative is provided in Table 3.3-6. The potential corresponding offset in groundwater pumpage within the Sonoma Valley and MST Areas under the Basic System is provided Charts 3.3-1 and 3.7-2.

LGVSD/NMWD

The impacts of the Basic System would be the same as those described for Phase 1. There would be no impact on groundwater.

Novato SD/NMWD

The impacts of the Basic System would be the same as those described for Phase 1. There would be no impact on groundwater.

SVCSD

Under the Basic System, approximately 2,719 AFY of recycled water would be delivered to Sonoma Valley and a portion of this is expected to offset groundwater use. This is an increase of 1,845 AFY from Phase 1. The impact would result in additional recycled water that could offset groundwater. This impact would be beneficial.

Under the Basic System, the beneficial impacts of Napa Salt Marsh Restoration Project would be equivalent to Phase 1.

Napa SD

Under the Basic System, 2,137 AFY of recycled water would be delivered to the MST area to offset groundwater water use, and would result in a beneficial impact, as described above for Phase 1. In addition, approximately 1,055 AFY would be delivered to the Carneros East area to offset groundwater use by existing agricultural irrigators. A large portion of the Carneros East area relies on groundwater for agricultural irrigation and therefore recycled water would offset groundwater use. The use of recycled water in the Carneros East and MST areas would decrease the reliance on groundwater supplies and would help to maintain or raise groundwater levels in the area over the long term. This impact would be considered beneficial.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide approximately 11,250 AFY of recycled water within the action area. Compared to the No Action Alternative (NEPA Baseline), the Basic System would provide approximately 10,183 AFY within the action area.

The beneficial impacts related to groundwater offset associated with the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the additional recycled water available under this alternative. The amount of recycled water provided under each alternative is provided in Table 3.3-6. The potential corresponding offset in groundwater pumpage within the Sonoma Valley and MST Areas under the Partially Connected System is provided Charts 3.3-1 and 3.3-2.

LGVSD/NMWD

Under the Partially Connected System, approximately 202 AFY would be delivered to Hamilton Field and would result in the same impact as described above for the Basic System. In addition, 207 AFY would be delivered to the Peacock Gap area. The Peacock Gap area receives water from MMWD and does not use groundwater. There would be no impact on groundwater levels.

Novato SD/NMWD

Under the Partially Connected System, NMWD north and central areas would receive a total of 1,070 AFY (an increase of 528 AFY from the Basic System), and Sears Point would receive 968 AFY of recycled water. As described above, recycled water use in the NMWD service area would not affect groundwater, as it would replace only surface water supplies. Recycled water would be used in Sears Point to irrigate dairy/pasture land, irrigated farm land, and vineyards. This would help to reduce the use of groundwater and could maintain or even increase groundwater levels over the long term. This would be a beneficial impact.

SVCSD

Under the Partially Connected System, approximately 2,719 AFY would be delivered to Sonoma Valley and a portion of this water would offset groundwater use. This would result in a beneficial impact, as described for the Basic System. In addition, 1,662.5 AFY -feet per year of recycled water would be delivered to the Southern Sonoma Valley service area. Use of recycled water for agricultural irrigation would help to reduce existing groundwater pumping, and would help to maintain or even increased groundwater levels over the long term. This would be a beneficial impact.

Under the Partially Connected System, the beneficial impacts of Napa Salt Marsh Restoration Project would be equivalent to Phase 1.

Napa SD

Under the Partially Connected System, the recycled water that would be delivered to the MST and Carneros East areas would increase compared to the Basic System. The groundwater deficient MST area would receive a total of 2,826 AFY, of which 1,416 AFY would offset existing irrigation. Therefore, an additional 1,210 AFY would be available for other uses, or approximately 689 AFY more recycled water available for other uses than provided under the Basic Alternative. This additional recycled water supply would not be anticipated to offset or affect groundwater pumpage, because the maximum groundwater offset in the MST area would be accomplished under the Basic Alternative. However, this additional recycled water could increase groundwater levels over the long term. This would be a beneficial impact.

Assuming a use rate of 0.25 acre-feet/acre for vineyards in Napa, this amount of recycled water would be capable of supporting an additional 2,756 acres of vineyard compared to the Basic Alternative. Assuming a use rate of 2.5 acre-feet/acre for dairy, this amount of recycled water would be capable of supporting an additional 275 acres of dairy compared to the Basic Alternative. It should be noted that existing un-irrigated parcels within the MST area are not restricted from agricultural uses that are consistent with their General Plan and Zoning designations, and that are in conformance with the Napa County Groundwater Conservation Ordinance, which provides for a usage rate of 0.3 acre-feet/acre per year, over a 3-year average. Therefore, it is unlikely that provision of recycled water in and of itself would directly result in the conversion of these parcels to irrigated agricultural uses.

Carneros East area would receive an additional 1440 AFY. This recycled water would help to offset groundwater use and could maintain or even increase groundwater levels over the long term. This would be a beneficial impact.

Approximately 155 AFY would be delivered to irrigation customers close to the Napa SD WWTP. This recycled water would help to offset groundwater use and could maintain or even increase groundwater levels over the long term. This would be a beneficial impact.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide approximately 12,761 AFY of recycled within the action area. Compared to the No Action Alternative (NEPA Baseline), the Fully System would provide approximately 11,694 AFY within the action area.

The beneficial impacts related to groundwater offset associated with the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the additional recycled water available under this alternative. The amount of recycled water provided under each alternative is provided in Table 3.3-6. The potential corresponding maximum offset in groundwater pumping within the Sonoma Valley and MST Areas under the Fully Connected System is provided Charts 3.3-1 and 3.3-2.

LGVSD/NMWD

No additional recycled water would be provided; impacts would be identical to the Partially Connected Alternative.

Novato SD/NMWD

For the Fully Connected System, NMWD and Sears Point would receive the same amount of recycled water as the Partially Connected System and impacts would be similar. Southern Sonoma Valley would also receive the same amount of recycled water (1,587 AFY) although under the Fully Connected System, it would be supplied by Novato SD and LGVSD, rather than SVCSD. The beneficial impacts to groundwater of the Fully Connected System would be the same as those discussed for the Partially Connected System.

SVCSD

Under the Fully Connected System, Sonoma Valley would receive the same quantity of recycled water as described for the Partially Connected System (2,719 AFY). In addition, Central Sonoma Valley would receive 1,511 AFY. The majority of this water would be used for agricultural irrigation by existing groundwater pumpers and would offset groundwater pumpage. The use of recycled water would help to reduce groundwater pumping and could maintain or even increase groundwater levels over the long term. This impact would be beneficial.

Under the Fully Connected System, the beneficial impacts of Napa Salt Marsh Restoration Project would be equivalent to Phase 1.

Napa SD

No additional recycled water would be provided; impacts would be identical to the Partially Connected Alternative

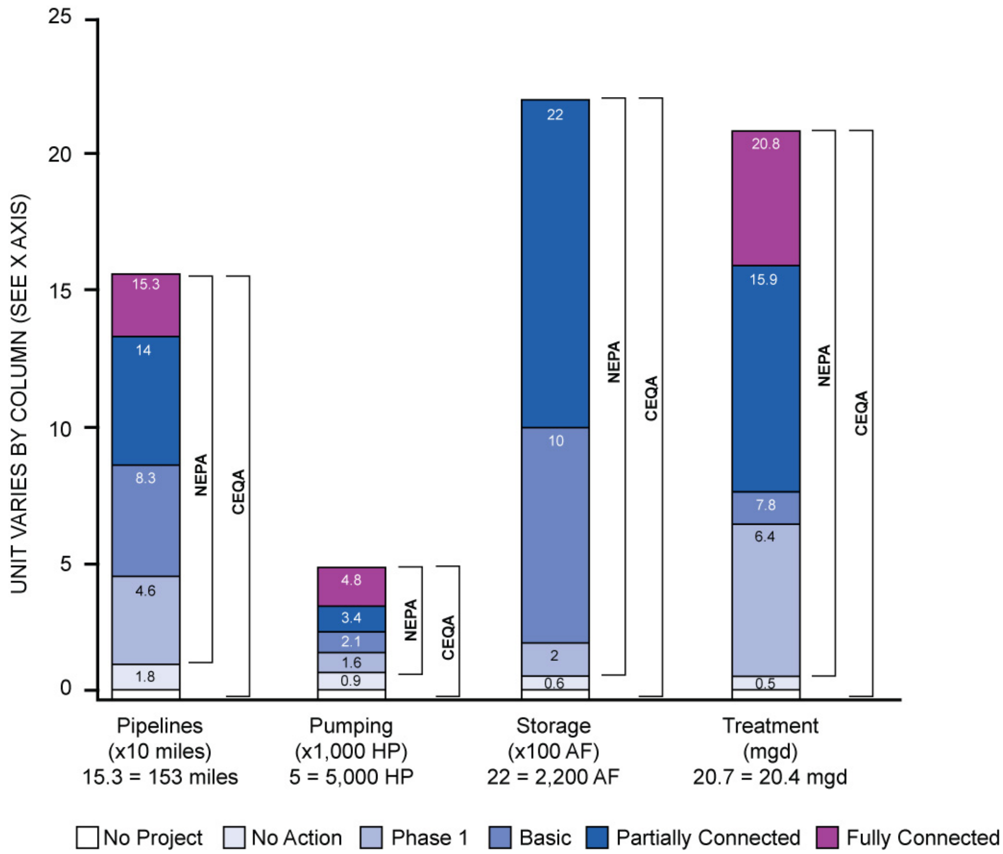
---

Impact 3.3.2: Hydrostatic Pressure. Proposed facilities may be affected by shallow groundwater levels and natural groundwater fluctuations. (Less than Significant Impact)

As described under Section 3.3.1, there may be regions in the action area that could have shallow groundwater (less than 15 feet below the ground surface). Proposed facilities, including pipelines, pump stations, and storage facilities, would be constructed several feet below the ground surface and therefore would be subject to hydrostatic pressure relating to groundwater.

Proposed facilities for each Alternative are summarized in **Chart 3.3-3**. Standard design features would be implemented to reduce the potential for damage due to fluctuating groundwater levels. Possible design features include drainage blankets, perimeter pumps to temporarily decrease hydrostatic pressure, perimeter drainage trenches, and specific groundwater monitoring scenarios.

CHART 3.3-3
COMPARISON OF NEPA AND CEQA BASELINES FOR PROPOSED FACILITIES, BY ALTERNATIVE



SOURCE: CDM, 2009

Implementation of **Mitigation Measure 3.3.1**, which includes incorporation of such design features, the impacts of shallow groundwater on the proposed storage facilities would be considered less than significant; therefore potential impacts would be reduced to a less than significant level.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact is expected. For a discussion of the No Project under future conditions, see No Action alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination, or federal funding. Therefore, a subset of the impacts identified for the NBWRP would likely occur irrespective of the NBWRP.

For comparison to the Action Alternatives, it is estimated that approximately 17.5 miles of new pipeline, 912 HP of pumping capacity, treatment facilities providing 0.5mgd of tertiary capacity, and approximately 65 AF of storage would be constructed by Member Agencies on an individual basis (see Chart 3.3-3, No Action).

Groundwater impacts common to all below grade facilities include effects of groundwater fluctuation and hydrostatic pressure. All recycled water storage and pumping facilities located below grade would have the potential to encounter fluctuating groundwater conditions, and would incorporate standard engineering measures to ensure that facilities are not adversely affected. Under the No Action Alternative, it is anticipated that one 65 AF storage reservoir would be constructed at the SVCSD WWTP.

Phase 1 (Project level)

Compared to the CEQA Baseline Phase 1 projects would provide 46 miles of new pipeline, 1,655 HP of pumping capacity, treatment facilities providing 6.4 mgd of tertiary capacity, and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 28 miles of new pipeline, 743 HP of pumping capacity, treatment facilities providing 5.9 mgd of tertiary capacity, and no additional storage.

The groundwater impacts to proposed facilities under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Proposed facilities for each Alternative are summarized in Chart 3.3-3. Standard design features would be implemented to reduce the potential for facilities to be affected by fluctuating groundwater levels. Possible design features include drainage blankets, perimeter pumps to temporarily decrease hydrostatic pressure, perimeter drainage trenches, and specific groundwater monitoring scenarios. Implementation of **Mitigation Measure 3.3.1** for the proposed storage facilities would ensure that the impacts are less than significant

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 83 miles of new pipeline, 2,158 HP of pumping capacity, treatment facilities providing 7.8 mgd of tertiary capacity, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Basic System would provide 65 miles of new pipeline, 1,246 HP of pumping capacity, treatment facilities providing 7.3 mgd of tertiary capacity, and 955 AF of storage.

The groundwater impacts to proposed facilities under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Proposed facilities for each Alternative are summarized in Chart 3.3-3. The impacts associated with the Basic System would be equivalent to the impacts discussed for Phase 1, although more facilities would be constructed. This additional impact would be less than significant.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 139 miles of new pipeline, 3,454 HP of pumping capacity, treatment facilities providing 15.9 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 122 miles of new pipeline, 2, 542 HP of pumping capacity, treatment facilities providing 15.4 mgd of tertiary capacity, and 2,155 AF of storage.

The groundwater impacts to proposed facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Proposed facilities for each alternative are summarized in Chart 3.3-3. The impacts associated with the Partially Connected System would be equivalent to the impacts discussed for the Basic System, although more facilities would be constructed. This additional impact would be less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 153 miles of new pipeline, 5,021 HP of pumping capacity, treatment facilities providing 20.8 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 135 miles of new pipeline, 3, 907 HP of pumping capacity, treatment facilities providing 20.3 mgd of tertiary capacity, and 2,155 AF of storage.

The groundwater impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Proposed facilities for each alternative are summarized in Chart 3.3-3. The impacts associated with the Fully Connected System would be equivalent to the impacts discussed for the Partially Connected System, although more facilities would be constructed. This impact would be less than significant.

Mitigation Measures

Mitigation Measure 3.3.1: The Member Agencies will implement the following measures:

- All proposed improvements will be designed and constructed in accordance with current geotechnical industry standard criteria.
- Implement industry standard geotechnical measures to address high groundwater conditions as appropriate to reduce the potential for impacts related to groundwater fluctuation, in accordance with accepted geotechnical practices. Possible design features include drainage blankets, perimeter pumps to temporarily decrease hydrostatic pressure, perimeter drainage trenches, and specific groundwater monitoring scenarios.

Impact Significance after Mitigation: Less than Significant.

Impact 3.3.3 High Groundwater Conditions. The NBWRP could result in localized increases in groundwater levels over the long term that could effect structures or contribute to flooding. (Less than Significant)

The NBWRP would potentially maintain or even increase groundwater levels over the long term because recycled water would be used to offset groundwater pumping. However, the majority of the recycled water would offset groundwater in areas with declining groundwater levels. The quantity of recycled water used to offset groundwater is not expected to increase the potential for high groundwater conditions that could affect structures or contribute to flooding. Therefore, this impact is considered less than significant.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact is expected. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination, or federal funding. Therefore, a subset of the impacts identified for the NBWRP would likely occur irrespective of the NBWRP.

For a comparison baseline to the Action Alternatives, it is estimated that these individual recycled water projects would provide approximately 1,067 AFY of recycled water, providing a potential corresponding offset in groundwater pumpage. Recycled water is expected to be mainly used in the areas experiencing declining groundwater levels. Overall, the quantity of recycled water is not expected to be enough to raise groundwater levels to the extent that they could cause localized flooding.

LGVSD/ NMWD and Novato SD/ NMWD

Recycled water would only offset surface water supplies in this area. Groundwater levels are not expected to change as a result of the NBWRP and therefore there would be no increase in the potential for flooding from shallow groundwater. There would be no impact.

SVCSD and Napa SD

Although the use of recycled water would offset groundwater and could potentially maintain or even increase groundwater levels over the long term, this is not expected to increase the potential for localized flooding. Recycled water would be used in areas that are experiencing declining groundwater levels. The quantity of recycled water available is not expected to increase groundwater to levels that could result in localized flooding. This impact would be less than significant.

Phase 1 (Project level)

Compared to the CEQA Baseline the Phase 1 projects would provide 3,757 AFY of recycled water. Compared to the No Action Alternative (NEPA Baseline), the Phase 1 projects would provide 2,690 AFY of recycled water. These supplies would offset existing groundwater pumpage within the action area.

The potential for groundwater offset to contribute to flooding under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the amount of recycled water constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

The amount of recycled water available under each Alternative is summarized in Table 3.3-6. The impacts associated with the Basic System would be equivalent to the impacts discussed for Phase 1, although more recycled water would be available resulting in a corresponding reduction in groundwater use. However, as previously noted, it is expected that most recycled water would be used in areas that are currently experiencing declining groundwater levels. The quantity of recycled water used to offset groundwater in these areas is not expected to substantially raise groundwater levels or cause localized flooding. This impact would be less than significant.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 6,655 AFY of recycled water. Compared to the No Action Alternative (NEPA Baseline), the Basic System would provide 5,588 AFY of recycled water. These supplies would offset existing groundwater pumpage within the action area.

The potential for groundwater offset to contribute to flooding under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the amount of recycled water constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

The amount of recycled water available under each alternative is summarized in Table 3.3-6. The impacts associated with the Basic System would be equivalent to the impacts discussed for Phase 1, although more recycled water would be available resulting in a corresponding reduction in groundwater use. However, as previously noted, it is expected that most recycled water would be used in areas that are currently experiencing declining groundwater levels. The quantity of recycled water used to offset groundwater in these areas is not expected to substantially raise groundwater levels or cause localized flooding. This impact would be less than significant.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 11,250 AFY of recycled water. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 10,183AFY of recycled water.

The groundwater impacts to proposed facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

The amount of recycled water available under each alternative is summarized in Table 3.3-6. The impacts associated with the Partially Connected System would be equivalent to the impacts discussed for the Basic System, although more recycled water would be available resulting in a corresponding reduction in groundwater use. However, as previously noted, it is expected that most recycled water would be used in areas that are currently experiencing declining groundwater levels. The quantity of recycled water used to offset groundwater in these areas is not expected to substantially raise groundwater levels or cause localized flooding. This impact would be less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline the Fully Connected System would provide 12,761 AFY of recycled water. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 11,694 AFY of recycled water.

The groundwater impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

The amount of recycled water available under each Alternative is summarized in Table 3.3-6. The impacts associated with the Fully Connected System would be equivalent to the impacts discussed for the Partially Connected System, although more recycled water would be available, with a corresponding reduction in groundwater use. However, as previously noted, it is expected that most recycled water would be used in areas that are currently experiencing declining groundwater levels. The quantity of recycled water used to offset groundwater in these areas is not expected to substantially raise groundwater levels or cause localized flooding. This impact would be less than significant.

Mitigation Measures

No Mitigation Measures are required.

Impact Significance after Mitigation: Less than Significant.

Impact 3.3.4: Groundwater Quality. The use and storage of recycled water could affect groundwater quality for potable and agricultural uses. (Less than Significant)

The use of recycled water in close proximity to domestic groundwater wells may result in adverse water quality effects that could have health risks. Recycled water use is expected to have a less than significant effect within urban areas as most urban water users within the action area rely on imported surface water rather than groundwater. As noted above, urban use of groundwater in the LGVSD service area is limited, while 9 percent of groundwater is used for urban uses in the SVCSD service area, and small percentage of groundwater is used for domestic purposes in the Napa SD service area. Any recycled water that infiltrates into the groundwater would not be expected to pose a health risk. Compliance with Title 22 standards, for tertiary treated water, would ensure recycled water could not be used within 50 feet of any existing domestic groundwater well.

Many rural areas that would use recycled water for irrigation also rely on groundwater wells for domestic water use. Use of recycled water in these areas is not expected to pose a water quality risk to existing groundwater. At least half of the recycled water available under each of the alternatives would be used to irrigate existing vineyards in Napa and Sonoma Valleys. Agricultural growers in these areas mainly use drip irrigation systems, which have an 80 to 95 percent use efficiency[3] when used correctly (Vickers 2001). Additionally, some premium wine producers practice a Reduced Demand Irrigation (RDI), a technique that decreases irrigation at certain times of the season to increase the quality of the fruit (CDM, 2008). Due to the efficiency of vineyard irrigation systems, it is unlikely that a substantial amount of recycled water would be able to percolate through the soils and into the groundwater aquifer. Recycled water that does percolate into the ground below the root zones would generally improve in quality as it reaches the groundwater aquifer because the soils act as natural filters.

The use of recycled water for agricultural irrigation or urban landscape irrigation under the NBWRP is not expected to contribute to adverse water quality impacts associated with existing groundwater wells. Title 22 provides specific requirements for the separation of areas irrigated with recycled water from domestic groundwater supply wells. All users of disinfected tertiary recycled water would be required to adhere to the following Title 22 minimum distance requirements for recycled water use near domestic groundwater wells:

- 50 feet for disinfected tertiary recycled water unless additional conditions are met; and
- 100 feet for impoundments of disinfected tertiary recycled water (Title 22).

The storage of recycled water is not expected to cause adverse water quality effects associated with seepage. As described in the sections above, new storage facilities would generally be compacted at the bottom to prevent leakage. Existing storage facilities are expected to have very low seepage rates, if any, due to the predominantly clay soils in the region, especially in the flat areas where storage ponds are typically constructed. The amount of the groundwater actually infiltrating to subsurface levels and thus affecting the groundwater quality would be negligible (SVCSD, 2006). Additionally, the storage facilities would be located at least 100 feet from any domestic groundwater well.

No Project Alternative

No project would be implemented under the No Project Alternative. No impact would occur. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination, or federal funding.

---

[3] Efficiency refers to the amount of water that would be taken up by the plant rather than lost through percolation into the ground or surface water run-off.

For comparison to the Action Alternatives, it is estimated that approximately 1,067 AFY of recycled water would be available and 65 AF of storage would be provided from projects implemented by Member Agencies on an individual basis (see Table 3.3-6 and Chart 3.3-3).

All storage facilities would be designed to prevent leakages. The amount of recycled water in storage facilities that could infiltrate to subsurface levels would be considered negligible. In addition, storage facilities would adhere to Title 22 requirements and would be located 100 feet away from any domestic groundwater wells to reduce the potential risk of adverse water quality effects.

The majority of the recycled water under this alternative would be used for vineyard irrigation, followed by urban landscaping. These uses are not expected to result in a large quantity of recycled water that could percolate into the soils or impact groundwater quality. As required by Title 22, no recycled water would be used within 50 feet of any domestic groundwater well. Overall, groundwater quality impacts from the use and storage of recycled water are expected to be less than significant.

LGVSD/NMWD

Under the No Action Alternative, no recycled water would be used or stored in the LGVSD service area. There would be no impact.

Novato SD/NMWD, SVCSD and Napa SD

Under the No Action Alternative, recycled water would be used for urban irrigation in the Novato SD service area, for urban and agricultural irrigation in the SVCSD and Napa SD service area, and for habitat restoration in the SVCSD Napa Salt Marsh area. A storage facility (65 AF) would be constructed at the SVCSD WWTP. All storage facilities would be designed and operated to prevent leakages. The amount of recycled water in storage facilities that could infiltrate to subsurface levels would be considered negligible. In addition, storage facilities would adhere to Title 22 requirements and would be located 100 feet away from any domestic groundwater wells to reduce the potential risk of adverse water quality effects. Less than 200 AFY of recycled water under this alternative would be used for landscaping. These uses are not expected to result in a large quantity of recycled water that could percolate into the soils. As required by Title 22, no recycled water would be used within 50 feet of any domestic groundwater well. Overall, groundwater quality impacts from the use and storage of recycled water are expected to be less than significant.

Phase 1 (Project level)

Compared to the CEQA Baseline the Phase 1 projects would provide 3,757 AFY of recycled water and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Phase 1 projects would provide 2,690 AFY of recycled water and no additional storage.

The potential for groundwater use or storage to adversely affect groundwater quality under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the amount of recycled water provided and stored under this alternative (see Table 3.3-6 and Chart 3.3-3). A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Under Phase 1, existing storage facilities would be used to store recycled water with the exception of new storage at SVCSD WWTP. As described above, these facilities would be designed to minimize or prevent leakage, and would be located at least 100 feet from any domestic groundwater well. No adverse groundwater quality impacts are expected from storage facilities. This impact would be less than significant.

Recycled water used in urban areas would be for landscape irrigation. Recycled water use agricultural areas would be used to irrigate vineyards, with smaller quantities used for landscaping, dairy pasture, and irrigation of farmlands. Use of this small quantity of water is not expected to affect groundwater quality. Any recycled water that percolates into the groundwater aquifer would be of a small quantity and would be naturally filtered during percolation through the soils. Adherence to Title 22 standards would ensure no recycled water is used within 50 feet of a domestic well. Groundwater quality impacts from the use and storage of recycled water would be less than significant.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 6,655 AFY of recycled water, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Basic System would provide 5,588 AFY of recycled water and 955 AF of storage. These supplies would offset existing groundwater pumpage within the action area.

The potential for groundwater use or storage to adversely affect groundwater quality under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the amount of recycled water constructed under this alternative (see Table 3.3-6 and Chart 3.3-3). A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Under the Basic System, existing storage facilities would be used to store recycled water with the exception of new storage at SVCSD WWTP and within the Southern Sonoma Valley. As described above, these facilities would be designed to minimize or prevent leakage, and would be located at least 100 feet from any domestic groundwater well. No adverse groundwater quality impacts are expected from storage facilities. This impact would be less than significant.

Recycled water used in urban areas would be for landscape irrigation. Recycled water use agricultural areas would be used to irrigate vineyards, with smaller quantities used for landscaping, dairy pasture, and irrigation of farmlands. Recycled water irrigation practices, which are regulated by Title 22, are not expected to affect groundwater quality. Any recycled water that percolates into the groundwater aquifer would be of a small quantity and would be naturally filtered during percolation through the soils. Adherence to Title 22 standards would ensure no recycled water is used within 50 feet of a domestic well. Groundwater quality impacts from the use and storage of recycled water would be less than significant.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 11,250 AFY of recycled water and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 10,183 AFY of recycled water and 2,155 AF of storage.

The potential for groundwater use or storage to adversely affect groundwater quality facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative (see Table 3.3-6 and Chart 3.3-3). A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Under the Basic System, existing storage facilities would be used to store recycled water with the exception of new storage at SVCSD WWTP and within the Southern Sonoma Valley. As described above, these facilities would be designed to minimize or prevent leakage, and would be located at least 100 feet from any domestic groundwater well. No adverse groundwater quality impacts are expected from storage facilities. This impact would be less than significant.

Recycled water used in urban areas would be for landscape irrigation. Recycled water use agricultural areas would be used to irrigate vineyards, with smaller quantities used for landscaping, dairy pasture, and irrigation of farmlands. Recycled water irrigation practices, which are regulated by Title 22, are not expected to affect groundwater quality. Any recycled water that percolates into the groundwater aquifer would be of a small quantity and would be naturally filtered during percolation through the soils. Adherence to Title 22 standards would ensure no recycled water is used within 50 feet of a domestic well. Groundwater quality impacts from the use and storage of recycled water would be less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 12,761 AFY of recycled water and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 11,694 AFY of recycled water and 2,155 AF of storage.

The groundwater impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative (see Table 3.3-6 and Chart 3.3-3). A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Under the Basic System, existing storage facilities would be used to store recycled water with the exception of new storage at SVCSD WWTP and within the Central Sonoma Valley. As described above, these facilities would be designed to minimize or prevent leakage, and would be located at least 100 feet from any domestic groundwater well. No adverse groundwater quality impacts are expected from storage facilities. This impact would be less than significant.

Recycled water used in urban areas would be for landscape irrigation. Recycled water use agricultural areas would be used to irrigate vineyards, with smaller quantities used for landscaping, dairy pasture, and irrigation of farmlands. Recycled water irrigation practices, which are regulated by Title 22, are not expected to affect groundwater quality. Any recycled water that percolates into the groundwater aquifer would be of a small quantity and would be naturally filtered during percolation through the soils. Adherence to Title 22 standards would ensure no recycled water is used within 50 feet of a domestic well. Groundwater quality impacts from the use and storage of recycled water would be less than significant.

Mitigation Measure

No Mitigation Measures are required.

Impact Significance after Mitigation: Less than Significant.

Impact 3.3.5: Groundwater recharge. Impervious surfaces constructed under the NBWRP could affect groundwater recharge in the action area. (Less than Significant)

Impervious surfaces are generally designed and constructed to collect and discharged precipitation directly to waterways or runs offsite. The construction of impervious surfaces can therefore reduce the potential for percolation and groundwater recharge. The NBWRP is not expected to substantially affect groundwater recharge in the action area. The pipelines would not change the impervious surfaces in any watershed because the pipelines would be covered with the same type of surface after construction as was present before construction. Pump stations would create some additional impervious surfaces. Some pump stations would be constructed on existing WWTP sites that are already impervious, so these pump stations would not affect groundwater recharge. See Section 3.2, Surface Water, for additional discussion of pump station locations. Booster pump stations would be small and often sited on areas that are already impervious. Treatment facilities would be constructed as part of existing WWTP sites that are already impervious; therefore, they would not affect groundwater recharge and are not discussed further. Storage facilities would increase impervious areas, but the new storage facilities would be constructed in areas that would not substantially alter existing groundwater recharge.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact is expected. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination, or federal funding. Therefore, a subset of the impacts identified for the NBWRP would likely occur irrespective of the NBWRP.

For comparison to the Action Alternatives, it is estimated that approximately 17.5 miles of new pipeline, 912 HP of pumping capacity, treatment facilities providing 0.5 mgd of tertiary capacity, and approximately 65 AF of storage would be constructed by Member Agencies on an individual basis (see Chart 3.3-3, No Action).

All proposed facilities have the potential to introduce impervious surface areas, which when installed over large areas, has the potential to effect local groundwater recharge. As described in Section 3.2, Surface Water, the majority of the infrastructure would be constructed in previously disturbed areas, such as existing paved parking lots or areas of compacted earth. The pipelines would not change the impervious surfaces in any watershed because the pipelines would be covered with the same type of surface after construction as was present before construction. The total footprint of the booster pump stations would be relatively small (1,000 square feet each) and would be unlikely to substantially affect groundwater recharge. Treatment facilities and pump stations at the WWTPs would be constructed as part of existing WWTP sites that are already impervious; therefore, they would not affect recharge. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD

There would be no project facilities constructed under the No Action Alternative, therefore no impact would occur.

Novato SD/NMWD

The No Action Alternative would include one new booster pump station near the intersection of Olive Avenue and Atherton Avenue that would add approximately 1,000 square feet of impervious surface. The size of the pump station, however, is relatively small, and would not likely result in noticeable changes to groundwater recharge. Therefore, impacts to groundwater recharge would be less than significant.

SVCSD

The No Action Alternative would include a new pump station at the existing WWTP that would be constructed within a disturbed area and would therefore have no effect on groundwater recharge. This alternative would also include one new booster pump station near the intersection of State Route 116 and Arnold Drive that would add approximately 1,000 square feet of impervious surface. The size of the pump stations, however, is relatively small, and would not likely result in noticeable changes to groundwater recharge. Therefore, impacts to groundwater recharge would be less than significant. The SVCSD Napa Salt Marsh Project would not include a pump station and would have no impacts to groundwater.

Napa SD

There would be no project facilities constructed under the No Action Alternative, therefore no impact would occur.

Phase 1 (Project level)

Compared to the CEQA Baseline, Phase 1 projects would provide 46 miles of new pipeline, 1,655 HP of pumping capacity, treatment facilities providing 6.4 mgd of tertiary capacity, and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 28 miles of new pipeline, 743 HP of pumping capacity, treatment facilities providing 5.9 mgd of tertiary capacity, and no additional storage.

The potential effect to groundwater recharge from installation of impervious surface areas under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD

No new storage would be constructed in the LGVSD service area. There would be no impacts on groundwater recharge.

Novato SD/NMWD

Phase 1 would include the same new booster pump station as included in the No Action Alternative. Similarly, the small increase in impervious area would not substantially affect groundwater recharge. Phase 1 impacts on groundwater recharge would be less than significant.

SVCSD

The new pump station and storage facility proposed under Phase 1would be constructed at the existing WWTP on existing impervious surfaces. There would be no impact on groundwater recharge. Impacts related to the Napa Salt Marsh Restoration Project would be equivalent to those under the No Action Alternative.

Napa SD

Phase 1 would include booster pump stations in the MST service area located on Imola, Wild Horse Valley Road, East 3rd Avenue, and 3rd Avenue. Each pump station would have a footprint of approximately 1,000 square feet; the small change in impervious area would not substantially affect groundwater recharge. Phase 1 impacts on groundwater recharge in the Napa SD service area would be less than significant.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 83 miles of new pipeline, 2,158 HP of pumping capacity, treatment facilities providing 7.8 mgd of tertiary capacity, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Basic System would provide 65 miles of new pipeline, 1,246 HP of pumping capacity, treatment facilities providing 7.3 mgd of tertiary capacity, and 955 AF of storage.

The potential effect to groundwater recharge from installation of impervious surface areas under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD

No new structures would be constructed in the LGVSD service area. There would be no impacts on groundwater recharge.

Novato SD/NMWD

Impacts to groundwater recharge in the Novato SD service area would be the same as those described under Phase 1. The impacts would be less than significant.

SVCSD

As part of the Basic System, a new storage facility would be constructed at the existing WWTP in a disturbed area. This would not affect groundwater recharge. In addition, the Basic System would include additional pumping capacity within the Sonoma Valley Recycled Water Project. The exact site for this pump station has not yet been identified; however, preference would be given to disturbed sites to minimize impacts. The Basic System impacts on groundwater recharge in the SVCSD service area would be less than significant.

Napa SD

Impacts to groundwater recharge in the Novato SD service area would be the same as those described under Phase 1. The impacts would be less than significant.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 139 miles of new pipeline, 3,454 HP of pumping capacity, treatment facilities providing 15.9 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 122 miles of new pipeline, 2, 542 HP of pumping capacity, treatment facilities providing 15.4 mgd of tertiary capacity, and 2,155 AF of storage.

The potential effect to groundwater recharge from installation of impervious surface areas under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD

No new structures would be constructed in the LGVSD service area. There would be no impacts on groundwater recharge.

Novato SD/NMWD

Impacts to groundwater recharge in the Novato SD service area would be the same as those described under the Basic System. The impacts would be less than significant.

SVCSD

The Partially Connected System would include additional pumping capacity in the existing SVCSD reuse area, the Sonoma Valley Recycled Water Project, and Southern Sonoma Valley service area. The exact locations for the pump stations and ponds have not yet been identified, but preference would be given to already disturbed areas. Additionally, a new storage facility would be built that would result in a new impervious surface. The storage facility would be located in an area that would not substantially affect groundwater recharge. The Partially Connected System impacts on groundwater recharge the SVCSD service area would be less than significant.

Napa SD

The Partially Connected System would include additional pumping capacity in the Carneros East and MST service areas. The exact locations for the pump stations have not yet been identified, but preference would be given to already disturbed areas to minimize impacts. The Partially Connected System impacts on groundwater recharge in the Napa SD service area would be less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 153 miles of new pipeline, 5,021 HP of pumping capacity, treatment facilities providing 20.8 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 135 miles of new pipeline, 3,907 HP of pumping capacity, treatment facilities providing 20.3 mgd of tertiary capacity, and 2,155 AF of storage.

The potential effect to groundwater recharge from installation of impervious surface areas under Fully Connected System would be equivalent to and greater than the impacts discussed for the

Partially Connected System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD

No new structures would be constructed in the LGVSD service area. There would be no impacts on groundwater recharge.

Novato SD/NMWD

No additional pump stations would be constructed in the LGVSD service area. The Fully Connected System impacts on groundwater recharge would be less than significant.

SVCSD

The Fully Connected System would include additional pump stations at the SVCSD WWTP and in the Central Sonoma Valley, Sonoma Valley Recycled Water Project, and the existing SVCSD reuse area. The pump station at the WWTP would be on a site where most surfaces area already impervious and would therefore have no impact on groundwater recharge. The exact locations for the remaining pump stations have not yet been identified, but preference would be given to already disturbed areas. A new storage facility would be constructed that would result in a new impervious surface. The storage facility would be located in an area that would not substantially affect groundwater recharge. The Fully Connected System impacts on groundwater recharge in the SVCSD service area would be less than significant.

Napa SD

The impacts on groundwater recharge would be the same as those discussed under the Partially Connected System. The impacts on groundwater recharge would be considered less than significant.

Mitigation Measure

No Mitigation Measures are required.

Impact Significance after Mitigation: Less than Significant.

3.3.4 Impact Summary by Service Area

Table 3.3-7 provides a summary of potential project impacts related to groundwater resources.

TABLE 3.3-7
POTENTIAL IMPACTS AND SIGNIFICANCE – GROUNDWATER RESOURCES

Proposed Action	Impact by Member Agency Service Areas			
	LGVSD/ NMWD	**Novato SD/ NMWD**	**SVCSD**	**Napa SD/ Napa County**
Impact 3.3.1: Localized groundwater impact.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	NI	B	B
Phase 1	B	NI	B	B
Alternative 1: Basic System	NI	NI	B	B
Alternative 2: Partially Connected System	NI	B	B	B
Alternative 3: Fully Connected System	NI	B	B	B
Impact 3.3.2: Local groundwater levels.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LTS	LTS	NI
Phase 1	LTS	LTS	LTS	LTS
Alternative 1: Basic System	LTS	LTS	LTS	LTS
Alternative 2: Partially Connected System	LTS	LTS	LTS	LTS
Alternative 3: Fully Connected System	LTS	LTS	LTS	LTS
Impact 3.3.3: Flooding.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	LTS	LTS	LTS	NI
Phase 1	LTS	LTS	LTS	LTS
Alternative 1: Basic System	LTS	LTS	LTS	LTS
Alternative 2: Partially Connected System	LTS	LTS	LTS	LTS
Alternative 3: Fully Connected System	LTS	LTS	LTS	LTS
Impact 3.3.4: Groundwater quality.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LTS	LTS	LTS
Phase 1	LTS	LTS	LTS	LTS
Alternative 1: Basic System	LTS	LTS	LTS	LTS
Alternative 2: Partially Connected System	LTS	LTS	LTS	LTS
Alternative 3: Fully Connected System	LTS	LTS	LTS	LTS
Impact 3.3.5: Groundwater recharge.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LTS	NI	NI
Phase 1	NI	LTS	NI	LTS
Alternative 1: Basic System	NI	LTS	LTS	LTS
Alternative 2: Partially Connected System	NI	LTS	LTS	LTS
Alternative 3: Fully Connected System	NI	LTS	LTS	LTS

NI = No Impact
LTS = Less than Significant impact, no mitigation required
LSM = Less than Significant with Mitigation

3.3.5 References

California Department of Water Resources (DWR), *Bulletin 118 Update 2003, 2003,* http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm, Accessed on August 26, 2008.

California Department of Water Resources (DWR), *Bulletin 118 Update 2003 – Novato Valley Basin (2-30), Updated February 27, 2004,* http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm, Accessed on August 26, 2008.

California Department of Water Resources (DWR), 2004a, *Bulletin 118 Update 2003 – San Rafael Valley Basin (2-29), Updated February 27, 2004,* http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/pdfs_desc/2-29.pdf, Accessed on August 26, 2008.

California Department of Water Resources (DWR), *Water Data Library: Groundwater Level Data, 2008,* http://wdl.water.ca.gov/gw/, Accessed on September 28, 2008.

Camp Dresser & McKee, Inc. (CDM), Data related to Recycled Water Use and Acreage Served and Wastewater Discharge under the Project Alternatives, 2009.

Camp Dresser & McKee (CDM), U.S. Bureau of Reclamation and Sonoma County Water Agency *Phase 3 Engineering and Economic/ Financial Analysis Report for the North San Pablo Bay Restoration and Reuse Project*, June 2008.

City of Novato, Community Development Department, *City of Novato General Plan,* adopted 8 March 1996, revised 25 March 2003.

City of San Rafael, Community Development Department, *City of San Rafael General Plan 2020*, Air and Water Quality. November 15, 2004.

County of Napa, *Napa County Baseline Data Report, Chapter 16 – Groundwater Hydrology, Version I - November 2005,* 2005, http://www.co.napa.ca.us/gov/departments/29000/bdr/index.html, Accessed on August 5, 2008.

County of Napa, *Napa County General Plan Update Draft Environmental Impact Report,* February 2007, http://www.napacountygeneralplan.com/library/deir.htm, Accessed on August 15, 2008.

Farrar C.D., Metzger, L.F., Nishikawa, T., Koczot, K.M., and Reichard, E.G., *Geohydrologic Characterization, Water Chemistry, and Ground Water Flow Simulation Model of the Sonoma Valley Area, Sonoma County, California,* U.S. Geological Survey (USGS) Scientific Investigations Report 2006-5092, 2006.

Farrar C.D., and Metzger L. F, *Ground-Water Resources in the Lower Milliken–Sarco– Tulucay Creeks Area, Southeastern Napa County California, 2000–2002*. USGS Water-Resources Investigations Report 03-4229, 2003.

Sonoma County, Sonoma County Permit and Resource Department, *Sonoma County General Plan 2020,* September 23, 2008.

Sonoma County. 2007a. *Sonoma County General Plan 2020 Draft Environmental Impact Report: Hydrology and Water Resources.*

Sonoma County Water Agency (SCWA), *Final Sonoma Valley Groundwater Management Plan,* December 2007.

Vickers A., *Handbook of Water Use and Conservation*, Amherst, Massachusetts: WaterPlow Press, 2001.