6.6 WATER RESOURCES

6.6.1 Introduction

The California Water Plan Update of 2003 describes the importance of water as follows: "All aspects of the California economy are dependent on water." [1] The article continues to explain that California has resources to meet many, but not all, of its water demand in most years with its present population. Except in multi-year droughts, many urban areas have sufficient supplies for existing populations. However, even in average years, some agricultural demands are not fully met. The past few decades have seen more water being dedicated for environmental needs. California also continues to rely on unsustainable overdraft of some if its groundwater basins.[2]

California's 34 million residents, 9 million acres of irrigated agricultural land, and abundant environmental needs require over 80 million acre-feet of water in a normal year (in a drought, this drops to about 59 million acre-feet). By 2020, the Department of Water Resources (DWR) projects that the state may be short by over 2 million acre-feet of water in a normal year and by over 6 million acre-feet in a drought year. [3]

The state Water Resources Control Board (SWRCB), together with the nine Regional Water Quality Control Boards (RWQCB) are responsible for protecting California's water resources. Pursuant to the Porter-Cologne Water Quality Control Act, water quality control plans for each of the nine regions shall become part of the California Water Plan. The DWR operates the State Water Project and is responsible for overall water planning for the state. The Bureau of Reclamation operates the Central Valley Project (CVP), the largest water project in California. The CVP supplies water to more than 250 long-term water contractors extending from Shasta County in the north to Kern County in the south. The majority of CVP water goes to agricultural uses. [4]

How water resources are planned and used in Shasta County are key to both regional as well as statewide water issues. For this reason, water resource issues are important to each of the three element groups: Public Safety, Resources, and Community Development. Flooding and dam inundation are discussed in the Public Safety Group. Water supply for domestic purposes is discussed in the Community Development Group and in the two studies: 1) Water Use and Wastewater Treatment in Shasta County, and 2) The Shasta County Water Resources Master Plan - Phase 1 Report - Current and Future Needs, Phase 2B Report, and Phase 2C - Final Report.

A long-range, countywide water planning study - the Shasta County Water Resources Master Plan (SCWRMP) was initiated in October, 1996. The plan is being undertaken by the Shasta County Water Agency, in conjunction with water purveyors, water users, and other interested parties. The Plan will address countywide water needs, with particular attention to the SCR area. Phase One of the Plan determined 1995 water needs, 1995 water supplies, and 2030 water needs. Approximately half of all applied water diverted within the County is used in the SCR area. Phase Two focused on cooperation in the SCR, uniting water purveyors into a regional water management framework. Phase Two will also analyze existing and potential water sources, particularly the Redding Groundwater Basin. (See Figure PF-1- Public Facilities Element - for location map of general boundaries of the Redding Groundwater Basin.) Phase Three will select and implement an integrated water resources plan for the SCR. These and other efforts to quantify water resources and to foster cooperation and integration among the various water purveyors should be pursued in the SCR and other areas of the County as resources become available. The SCWRMP represents a comprehensive analysis of water resources in Shasta County and should be consulted for further detailed information beyond the data provided in this element.

The impacts of human activities on the availability, demand, and quality of water in Shasta County are the subjects of this element. This element contains a discussion of water resources and water quality as required by the State-mandated Conservation and Open-Space Elements. Under the Conservation Element, State law requires:

> A conservation element for the conservation, development and utilization of natural resources including water and its hydraulic force . . . (and) rivers and other waters . . . That portion of the Conservation Element including waters should be developed in coordination with any countywide water agency and with all district and city agencies that have developed, served, controlled, or conserved water for any purpose for the county or city for which the plan is prepared. Coordination shall include the discussion and evaluation of any water supply and demand information described in Section 65352.5, if that information has been submitted by the water agency to the city or county. The conservation element may also cover: . . . (1) The reclamation of land and waters... (2) Prevention and control of the pollution of streams and other waters... (3) Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan... (5) Prevention, control and correction of the erosion of soils, beaches, (6) Protection of watersheds, and (7) Flood control (Government Code Section 65302(d).

Under the Open-Space Element, water resources are designated as open-spaces when considered as any one of the following:

- Open-space for the preservation of natural resources including . . . rivers, streams, bays, and estuaries; . . . lakeshores, banks of rivers and streams, and watershed lands. (Government Code Section 65560(b-1)

- Open-space for the managed production of resources including . . . areas required for recharge of groundwater basins, bays, estuaries, marshes, and rivers and streams which are important for the management of commercial fisheries . . ."(GCS 65560(b-2)

- Open space for outdoor recreation including, but not limited to, ...lakeshores, beaches, and rivers and streams ...banks of rivers and streams, trails, ... and areas which serve as links between major recreation and open-space reservations, including ...banks of rivers and streams. (GCS 65560(b-3)

- Open space for public health and safety, including, but not limited to, ... flood plains, watersheds, ... areas required for the protection of water quality and water reservoirs...(GCS 65560(b-4).

Additionally, two water supply planning bills were enacted into law in 2001 that require greater coordination and more extensive data to be shared between water suppliers and local land use agencies for large development projects and plans. Senate Bill 610 (2003) requires a water supply assessment for any development project or related land use plan of more than 500 housing units, 500,000-square feet of retail use, 250,000-square feet of office use, 500 hotel rooms, 40 acres, or 650,000-square feet of business park use or a mixed-use project with any combination equal to the scale described above. If there is not adequate water to reliably supply the project (and all the other present and future water demands anticipated) in normal, dry, and multiple dry years, new water sources need to be identified.

Senate Bill 221 (2003) prohibits any land use agency from approving a subdivision map of more than 500 housing units (or a proposed subdivision of less than 500 units if the project represents 10 percent or more of all connections of a smaller water purveyor - one with fewer than 5,000 connections) unless there is written verification from a water provider that a sufficient and reliable water supply is available. Sufficient water supply is defined as adequate water to supply the new growth in normal, dry, and multiple dry years, taking into account of existing and planned water demands on the system.

6.6.2 Findings

Water Supply

There are two sources of water supplies - surface waters and groundwaters, and two general methods of delivering water supplies - community systems and individual or on-site systems. Each type of delivery system may use either surface or groundwater as its supply source. The ground and surface water resources are not uniformly distributed throughout the County, and in different areas of the County, different delivery systems have developed over time.

Shasta County lies at the headwaters of the State's largest watershed, the Sacramento River Basin. About 6.5 percent (5.8 million acre-feet) of all surface runoff in the State of California originates within Shasta County. This represents more than one-fourth of the total surface runoff within the Sacramento River system, the State's largest source of domestic and agricultural water supplies. [5]

The California Department of Water Resources has identified two significant groundwater basins in Shasta County. One is located in the Sacramento River Valley and is named the Redding Groundwater Basin. The other is located in the Fall River Valley and carries its name. Although the firm, or reliable, water yield from these two groundwater basins is unknown, the storage capacity of the 510-square-mile Redding Basin is estimated to contain approximately 5.5 million acre-feet of groundwater and the 120-square-mile Fall River Valley Basin is estimated to contain approximately one million acre-feet of storage. While recognizing that only a small fraction of this groundwater can be used under safe yield management, the total groundwater storage volume of these two basins is comparable to Shasta Lake's maximum storage of 4.5 million acre-feet.[6]

The majority of the water supply in Shasta County comes from surface flows and is collected in the mountainous regions of the County. Streams, creeks, and rivers carry these surface waters to lower elevations, where a portion is eventually stored in lakes, reservoirs, and groundwater basins. In contrast to groundwater, surface waters are subject to a complex State legal system establishing the rights of individuals and other entities to these flows. The primary surface water resources in Shasta County are impounded within or conveyed through Lake Shasta and Whiskeytown Reservoirs. Rights to these impounded waters are allocated under the jurisdictions of the federally owned and managed Central Valley Project (CVP), subject to preexisting water rights. TABLE W-1 shows the allocation of CVP water in Shasta County. Some recipients of this water in turn sell a portion of their allocation to other agencies, when possible. Rights to other major surface water resources of the County have been similarly allocated to different individuals and entities. Pacific Gas and Electric is a major controller of water rights, which it uses for power generation purposes. Several County Service Areas have water rights as well as the Anderson-Cottonwood Irrigation District (ACID), the City of Redding, and some private individuals and corporations. The CVP holds all other rights and the County has no interest in these rights other than its contracts.

The U.S. Bureau of Reclamation, at the time of the construction of Shasta and Whiskeytown Dams, acquired substantial appropriative rights from the State, subject to area of origin restrictions. The construction of Whiskeytown Lake and other features of the Trinity River Division of the CVP provided a supplemental supply of water that led to the development of irrigation systems in the Bella Vista and Happy Valley areas. Historically, an average of 999,500 acre-feet of water is imported annually to the Sacramento River Basin from the Trinity River. Annual imports from the Trinity River have recently been reduced to 800,000 acre-feet, and the final resolution of long-term inflow stream requirements in the Trinity River is pending. The water is imported through a tunnel that links Trinity Lake and Whiskeytown Lake.[7] The Bureau maintains contracts for the sale of that CVP water to service agencies in Shasta County and elsewhere. There are currently 14 public agencies and private parties in Shasta County contracting for CVP water. These contracts cover approximately 255,200 acre-feet of water (see Table W-1). Approximately two-thirds of the basin's water needs are met by 12 water purveyors.[8]

Surface water represents 77 percent of all diversions, groundwater represents 16 percent, and reclaimed water 0.3 percent. Surface water diversions accounted for 258,550 acre-feet, groundwater 77,124 acre-feet, and reclaimed water 1,160 acre-feet. In total, 565,572 acre-feet are diverted for beneficial use in Shasta County.[9]

A total of 151,000 acres of land in Shasta County with established water uses were mapped as part of the SCWRMP. Primary water use is for agriculture, urban, industrial, and recreation needs. About 580,000 acre-feet of water is required per year to sustain existing land uses. It is estimated that the need will increase to 671,850 acre-feet by the year 2030. A comparison of available water supplies with current and future needs in the Redding Basin shows annual shortages from about 26,500 acre-feet now, to about 81,200 acre-feet by the year 2030.[10]

The Housing Element, in the section titled "Availability of Water Resources", provides a useful summary, including maps, of the number and location of public sewer and water services in the unincorporated area.

Careful review of the data in W-1 raises issues with important implication for future development in the SCR planning area. First, the substantial allocation of base water supply of the Anderson-Cottonwood Irrigation District must be noted. Presently most of its allocation is used for irrigation and is subject to institutional and regulatory limitations. However, the use of this water for non-agricultural purposes still represents a tremendous potential which must be kept in mind. Second, with the exceptions of the Cities of Anderson, Shasta Lake, Redding, and Shasta County, none of the other water-controlling entities are responsible for land use planning, yet decisions they make regarding the provision of water service have significant land use implications. Under their enabling authority, these decisions must primarily consider their financial implications for the customers served by the various contracting entities, and secondary consideration is given to their countywide land use implications. Decisions made in the best interests of the customers of the CVP water contracting entity are not always in the best interests of countywide land use planning.

These CVP allocations represent a significant resource upon which many land uses depend, and will continue to depend upon. However, these allocations are subject to terms, conditions, and restrictions which limit their use. During times of drought, cutbacks have reduced allocations by as much as 75 percent for some districts and uses. Furthermore, surplus allocations are not easily transferred between districts. Transfers of project water are unique and limited arrangements that cannot necessarily be relied upon in times of need. In response to the vagueness of CVP allocations,

some CVP dependent districts, such as the Bella Vista Water District and the Clear Creek Community Services District, have begun well drilling programs which will rely more on local groundwater in the future. Bella Vista is working in conjunction with the City of Redding. Clear Creek cannot use its wells except in emergencies.

TABLE W-1
ALLOCATION OF CVP WATER IN SHASTA COUNTY

	Water Allocation (Acre-Feet)		
Contracting Entity	**Base Supply[1]**	**Project Water[2]**	**Total**
Anderson Cottonwood Irrigation District	165,000	10,000	175,000
Bella Vista Water District	0	24,000	24,000
Centerville Community Service District	900[3]	2,900	3,800
Clear Creek Community Service District	0	15,300	15,300
Daniell (Private Owner)	13	7	20
Keswick Community Service Area	0	500	500
Mountain Gate Community Service Dist.	0	350	350
City of Redding (COR)	17,850	3,150	21,000
COR Buckeye Area	0	6,140	6,140
Riverview Golf Course (Private Owner)	255	25	280
Shasta Community Service District	0	1,000	1,000
Shasta County Water Agency	0	2,100	2,100
City of Shasta Lake	0	5,500	5,500
Thuralson/Michiels (Private Owner)	70	135	205
USFS Centimudi Boat Ramp	0	10	10
TOTAL	**184,088**	**71,117**	**255,205**

[1]Base Supply is a local water right which existed prior to construction of the CVP and which is protected in CVP contracts.

[2]Project Water is water made available as a result of the CVP. This water is purchased from the Bureau of Reclamation. Volumes, terms and charges are subject to annual renegotiation.

[3]Not subject to cutbacks.
Source: Shasta County Water Resources Plan, Phase One Report, 1997

Water Needs and Supplies

Table W-2 shows the projected water needs and critical dry-year water supplies for 12 of the Redding Basin purveyors for the years 2005 and 2030. The water needs are based on a combination of population and land use projections through 2030 and reflect long-term average conditions. Critical dry-year supplies reflect cutbacks in CVP contract supplies that occur when the CVP's reservoir levels and river inflow reach critical low levels. Critical dry-year cutbacks are projected to occur on a 1-in-10 year average frequency, with reductions of 40 percent for M&I contract supplies and no water delivery for agricultural supplies. [11]

In critically dry years beyond the year 2005, more than half of the purveyors in the basin will need additional water supplies to meet the needs of their customers. Purveyors that rely on CVP contracts and do not have access to other supplies are particularly vulnerable to supply shortfalls. Those with access to high-yielding aquifers of the Redding Basin can rely on groundwater to meet their growing demands, but most of the purveyors do not have this option.[12]

The SCWRMP concludes that most of the Redding Basin water purveyors currently depend on CVP contracts for their water supplies. Some Redding Basin water purveyors have only one significant source of supply, and the total available resources of several purveyors are inadequate to provide a reliable supply to customers during dry periods and, in some cases, normal years. Water supplies for some purveyors with existing CVP water supply contracts have been inadequate to meet needs in several years since 1990. Water transfers from one purveyor to another have historically been hindered by apparent State and Federal institutional restrictions. Continued, increased, and more formal local agency cooperation will be needed to meet the future water supply needs of the Redding Basin.

BVWD suffered a major cutback in 1994 and another reduction in 1997. Cutbacks in the supplies available to water purveyors have occurred as a result of increasing demands on the State's water supply systems and the effects of these dry periods. Table W-3 describes some of the recent cutbacks in CVP Supplies.

The SCWRMP also concludes that Federal and State water policies and legislative direction are decreasing the yields of the Federal and State water projects, causing increased deficiencies to local purveyors who depend on water supply contracts.

Two major groundwater basins within the County, the Redding and Fall River Valley basins, have been identified as significant sources of groundwater. In addition, volcanic and alluvial soils that contain groundwater, known as water bearing soils, are located in the Northeast, Lassen, Eastern Forest, and portions of the Eastern Upland and possibly Western Upland planning areas. Water bearing soils provide most, if not all, of the water used by existing development in these areas.

TABLE W-2
PROJECTED WATER NEEDS AND SUPPLIES FOR M&I AND AGRICULTURAL
PURVEYORS WITH CRITICAL DRY-YEAR CUTBACKS 2005 & 2030 (values in acre-feet)

	2005				2030			
PURVEYOR	**WATER NEED**	**EXISTING WATER SUPPLY**	**DEFICIT**	**SURPLUS**	**WATER NEED**	**EXISTING WATER SUPPLY**	**DEFICIT**	**SURPLUS**
City of Anderson	2,900	2,100	-800		5,400	2,100	-3,300	
Anderson-Cottonwood ID	92,700	108,800		+16,100	92,700	108,800		+16,100
Bella Vista WD	23,700	11,420	-12,280		26,700	11,420	-15,280	
Centerville CSD	1,500	2,600		+1,100	2,200	2,600		+400
Clear Creek CSD	9,400	3,990	-5,410		10,600	3,990	-6,610	
Cottonwood WD	800	600	-200		1,100	600	-500	
Jones Valley CSA	260	400		+140	400	400		
Keswick CSA	210	300		+90	300	300		
Mountain Gate CSD	1,270	1,270			1,900	1,270	-630	
City of Redding	35,600	23,400	-12,200		62,000	23,400	-38,600	
City of Shasta Lake	3,440	1,730	-1,710		6,300	1,730	-4,570	
Shasta CSD	670	660	-10		1,000	660	-340	
	172,450	**157,270**	**-32,610**	**+17,430**	**210,600**	**157,270**	**-69,830**	**+16,500**

Source: Redding Basin Water Resources Management Plan, Phase 2B Report, Ch_2M-Hill, 2001

Unlike geographically definable groundwater basins, however, the location and amount of water found in alluvial and volcanic soils is difficult to quantify.

The Water Use and Wastewater Treatment in Shasta County contains an extensive discussion of the surface and groundwater resources of Shasta County. A major conclusion of this discussion is that the water resources of Shasta County are more than adequate to meet its existing and future needs. The problem is that these resources are not uniformly distributed throughout the County. This fact has major implications for the geographic distribution of future growth, as discussed in the Community Development Group.

TABLE W-3
RECENT CUTBACKS IN CVP SUPPLIES

Purveyor/Year of Shortage	USBR Reduction in CVP Contract Supply
All - 2001	**40% cut from Agricultural Allocation, 15% from M&I Allocation**
ACID -1994	25% cut from Agricultural Allocation
BVWD - 1994	65% cut from Agricultural Allocation, 25% from M&I Allocation
BVWD - 1997	10% cut from Agricultural Allocation,

ACID = Anderson-Cottonwood Irrigation District M&I = Municipal and Industrial
BVWD = Bella Vista Water District
USBR = U.S. Bureau of Reclamation

Source: Shasta County Water Resources Master Plan Phase 1 Report, Current and Future Needs. Prepared by Shasta County Water Agency, CH2M Hill, & California Department of Water Resources, October 1997.

Another important finding of the Water Use and Wastewater Treatment in Shasta County is the lack of precise, quantifiable data on the groundwater resources of the County, including the Redding and Fall River Valley groundwater basins. Safe yields, the maximum quantities of water that can be continuously withdrawn from a groundwater basin without adverse effect, on these and other groundwater basins are unknown. This has implications for the process by which water is stored in these basins. Table W-4 identifies the water consumption by major industries. Table W-5 identifies the Redding Basin Water Budget as estimated by the SCWRMP.

Groundwater basins and water-bearing soils are recharged (replenished) by the natural process of percolation. This is a process whereby precipitation and percolating stream flow collects in a water table by filtration through the soil. Natural features are essential to groundwater recharge, particularly floodplains and streams that pass over gravel or other porous materials. The flat agricultural lands of the Sacramento River Valley and the Fall River Valley are the most significant areas for this process in Shasta County. It is important that these types of features are protected so that water transfer to ground basins is maintained. Preservation of natural recharge systems is

particularly important for Shasta County as there are no human processes to augment them. In many counties where urbanization is widespread, groundwater bodies are artificially recharged by using water from reservoirs. Shasta County has not experienced a level of growth and development resulting in groundwater overdrafting, and therefore artificial groundwater recharge is not justified.

TABLE W-4
INDUSTRIAL WATER USERS

WATER USER	CONSUMPTION	WATER SUPPLY SOURCE
Sierra Pacific, Anderson Division	500,000 gallons per day	Four on-site wells
Wheelabrator Shasta Energy Co.	1.15 million gallons per day	Two on-site wells
Sierra Pacific Mill, Burney	500,000 gallons per day	On-site wells

Source: Shasta County Water Resources Master Plan Phase 1 Report, Current and Future Needs. Prepared by Shasta County Water Agency, CH2M Hill, & California Department of Water Resources, October 1997.

TABLE W-5
REDDING BASIN WATER BUDGET

INFLOW		OUTFLOW	
Source	Acre-Feet/Year	Source	Acre-Feet/Year
Sacramento River Inflow	7,261,000	Sacramento River Outflow	9,064,000
Other Streams	1,673,089	ACID Diversion	165,000
Precipitation	934,718	Deep Percolation of Precipitation	164,951
Groundwater Discharge to Surface Streams	266,305	Evapotranspiration of Precipitation	604,817
Irrigation Return	47,163	Consumptive Use	103,338
Treated Effluent	11,185	Deep Percolation of Applied Water	20,787
Groundwater Pumpage	37,302	Septic Tank Discharge	4,807
		Surface Stream Seepage	59,000
		Canal Seepage	44,063
TOTAL	10,230,762		10,230,763

ACID = Anderson-Cottonwood Irrigation District
Source: Shasta County Water Resources Master Plan Phase 1 Report, Current and Future Needs, Appendix F, Prepared by Shasta County Water Agency, CH2M Hill, & California Department of Water Resources, October 1997.

Water Quality

For the most part, surface water quality in the County is good, as is indicated by fish populations and recreational fishing activities. Potential hazards to surface water quality include the following non-point pollution problems: high turbidity from sediment resulting from erosion of improperly graded construction projects, concentration of nitrates and dissolved solids from agriculture or surfacing septic tank failures, contaminated street and lawn run-off from urban areas, and warm water drainage discharges into cold water streams. The most critical period for surface water quality is following a rainstorm which produces significant amounts of drainage runoff into streams at low flow, resulting in poor dilution of contaminates in the low flowing stream. Such conditions are most frequent during the fall at the beginning of the rainy season when stream flows are near their lowest annual levels. Besides the greases, oils, pesticides, litter, and organic matter associated with such runoff, heavy metals such as copper, zinc, and cadmium can cause considerable harm to aquatic organisms when introduced to streams in low flow conditions.

Urban storm water runoff was managed as a non-point discharge (a source not readily identifiable) under the Federal Water Pollution Control Amendments of 1972 (PL 92-500, Section 208) until the mid-1980's. However, since then, the Federal Environmental Protection Agency has continued to develop implementing rules which categorize urban runoff as a point source (an identifiable source) subject to National Pollution Discharge Elimination System (NPDES) permits. Rules now affect medium and large urban areas, and further rulemaking is expected as programs are developed to meet requirements of Federal water pollution control laws.

Along the Sacramento River, chemical and physical water quality is usually within desirable limits for most uses, although quality tends to deteriorate during periods of heavy runoff. Biochemical oxygen demand (BOD) in the river rarely exceeds the 2.5 mg/l desirable limit for domestic uses.[13] High coliform (bacteria) counts are sometimes recorded, however, thus requiring filtration and chlorination of water prior to drinking.

Water quality in the lower Sacramento River for domestic use is adversely affected by high levels of storm-discharged turbidity. Water quality impacts on lower Sacramento River aquatic life include elevated levels of dioxin and elevated heavy metal levels resulting from undiluted acid mine drainage (AMD) from old copper mines located west of the Shasta/Keswick Dam area. The principal source of Sacramento River heavy metal contamination is from runoff from the Iron Mountain Mine complex from Spring Creek. Anadromous fish that migrate beyond Cottonwood Creek run the risk of acid mine poisoning from the Spring Creek drainage. Dioxin is believed to have resulted from discharges from area wood products mills and pose a potential health threat if river-contaminated fish are consumed beyond State recommended quantities.[14]

The Sacramento River is one of the County's (and the State of California's) most important natural resources and opportunities to encourage or promote improving water quality conditions should be strongly supported and integrated with associated planning, recreation improvement, and enhancement activities whenever possible.

Surface water pollution is also caused by erosion. Excessive and improperly managed grading, vegetation removal, quarrying, logging, and agricultural practices all lead to increased erosion of exposed earth and sedimentation of watercourses during rainy periods. In slower moving water bodies these same factors often cause a buildup of siltation, which ultimately reduces the capacity of the water system to percolate and recharge groundwater basins, as well as adversely affecting both aquatic resources and flood control efforts.

The quality of water in underground basins and water-bearing soils is considered generally good throughout most of Shasta County. The 1997 SCWRMP concluded that the quality of both groundwater and surface water in the Redding Basin is generally excellent and suitable for all anticipated beneficial uses. As these basins or soils are the primary sources of water in the rural upland areas of the County, it is very important to prevent contamination. Potential hazards to groundwater quality involve the concentration of nitrates and dissolved solids from agricultural practices and septic tank failures. Several small pockets are found in the eastern portions of Fall River Valley where groundwater testing shows elevated levels of nitrates. Also, several areas within the Eastern Upland planning area contain potential groundwater quality and quantity limitations.

The ability of soils to support septic tanks or on-site wastewater treatment systems is generally severely limited in Shasta County, particularly on older valley terrace soils and certain loosely-confined volcanic soils in the eastern portions of the County. Septic tank failures have occurred in Shasta County, but the magnitude of this problem is largely unknown. While the County has adopted more stringent standards regarding their use several times during the last decade, additional study and understanding of the cumulative impacts of large scale use of septic systems in high rainfall and poor soil areas needs to occur. Once the long-term septic capability of an area is understood, it can provide an important basis for setting land use densities that assure protection of water quality.

Beyond the institutional issues outlined above, the availability of ground and surface water resources and delivery systems has major implications for the density/intensity of land use for development purposes. The valley areas of the SCR and Northeast Shasta planning areas present the least constraints on future development with respect to the availability of water, while the other planning areas of the County are constrained in varying degrees. These findings are generally mirrored by those issues pertinent to wastewater treatment.

One major opportunity which should be utilized is the development of a program for monitoring of wells in certain areas of the County where groundwater quantities are unknown or the quality is either not certain or substandard. This would ensure that new development will not jeopardize existing wells and will be able to meet its own long-term needs. To be useful, well monitoring must be conducted over long periods of time. Data collected when a well is initially drilled is valuable, but it provides no information regarding the well's long-term performance and impact on surrounding wells.

There are several areas in the County where groundwater quantity and/or quality may be of concern. The 1984 DWR study of the Eastern Upland area showed potential groundwater limitations in the Inwood and Whitmore areas, as well as in the vicinity of Salt Creek east of Bella Vista and a much more extensive area located generally north of State Highway 299 in the Eastern Upland planning area. In the Salt Creek area, very limited groundwater is found to be generally saline, connate water. DWR's 1975 groundwater bulletin and the USGS's 1983 report both noted that certain shallow groundwaters in the northern half of the Redding Basin are sometimes saline, containing sodium and boron. This characteristic is most true near the northern fringes of the Basin. The USGS report observed that there was the possibility to induce saline water upward in the Basin if pumping of the main water producing formations was increased.[15] In the extreme eastern portions of the Fall River Valley, elevated nitrate levels have been found in shallow wells, some of which exceed State drinking water standards. Also, other areas may exist which do not contain adequate local water supplies to accommodate the population densities which are indicated on the land use maps.

6.6.3 Objectives

The projected year 2030 total water demands are 671,850 acre-feet for Shasta County and 342,350 acre-feet for the Redding Basin. These numbers represent an increase from 579,900 acre-feet for Shasta County and 280,460 acre-feet for the Redding Basin in 1995.[16] To meet future water supply needs for both areas, the following objectives and policies are recommended.

W-1 Further investigate opportunities for conjunctive management to improve local water supply reliability in the Redding Basin.

W-2 Take all reasonable actions to protect against the export of water resources from Shasta County which will be needed for ongoing and future beneficial uses within the County.

W-3 Develop a common pool of surface water resources that could be available to all Redding Basin contractors, with appropriate individual agreements between the purveyors.

W-4 Adopt a common strategy to guide the actions of individual purveyors between now and the renegotiations of the long-term water supply contracts. This strategy should provide the flexibility to accommodate transfers between purveyors in the basin throughout direct transfers of surface water or through increased groundwater pumping into the ACID canal.

W-5 Consider jointly-sponsored planning studies or capital improvement projects among purveyors with similar interests and needs.

W-6 Develop a basinwide strategy to provide opportunities (not inconsistent with the regional planning framework) that individual purveyors might not be able to realize acting individually.

W-7 Begin preparation of a programmatic environmental document to assess the benefits and impacts of a basinwide water resources management plan.

W-8 Update the current Groundwater Management Plan to reflect new state requirements and to address any changes that result from selection of a preferred alternative for basinwide water resources management.

W-9 Institute effective measures to protect groundwater quality from potential adverse effects of increased pumping or potential sources of contamination.

6.6.4 Policies

W-a Sedimentation and erosion from proposed developments shall be minimized through grading and hillside development ordinances and other similar safeguards as adopted and implemented by the County.

W-b Septic systems, waste disposal sites, and other sources of hazardous or polluting materials shall be designed to prevent contamination to streams, creeks, rivers, reservoirs, or groundwater basins in accordance with standards and water resource management plans adopted by the County.

W-c All proposed land divisions and developments in Shasta County shall have an adequate water supply of a quantity and a quality for the planned uses. Project proponents shall submit sufficient data and reports, when requested, which demonstrate that potential adverse impacts on the existing water users will not be significant. The reports for land divisions shall be submitted to the County for review and acceptance prior to a completeness determination of a tentative map. This policy will not apply to developments in special districts which have committed and documented, in writing, the ability to provide the needed water supply.

W-d The potential for cumulative water quality impacts resulting from widespread use of septic systems in poorly suited soil areas shall be periodically evaluated by the County for the need to provide greater monitoring and possible changes to applicable sewage disposal standards.

W-e The Shasta County Water Agency should encourage and promote interagency water planning efforts within the County, particularly in the Redding Basin.

W-f The County shall encourage and participate in interagency planning efforts, such as the Redding Area Water Council, to protect and enhance the quality of all groundwater and surface water resources.

Footnotes:

1. California Water Plan Update 2003, Vol 1, Chapter 2, January, 2004, pg. 2.
2. Ibid, Vol. 1, Findings & Recommendations, pg. 1
3. California General Plan Guidelines, 2003, pg. 128.
4. California Water Plan Update 2003, Vol. 1, Chapter 2, January, 2004, pgs. 7-15
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