8.3 HYDROLOGY AND WATER QUALITY

This section describes the natural and physical water environments that occur within Mariposa County, including lands managed by the United States Department of the Interior (USDI) and United States Department of Agriculture (USDA) and State of California. It addresses potential specific and cumulative impacts to hydrology and water quality of these lands that affect private property in the county, and its villages and towns.

8.3.01 HYDROLOGY

The western portion of the County is relatively flat, with gently rolling hills that gradually increase toward the east. Moving eastward, the hills become more pronounced and the elevation quickly rises and falls through mountains and valleys. The elevation begins around 300 feet in the west and rises to nearly 11,000 feet in the east. Most inhabited regions are below 5,000 feet.

Precipitation varies between the lower elevations in the western and southern portions of the County and the higher elevations in the eastern and northern portions of the County. Average precipitation ranges from about 15 inches annually in the lower elevations to about 50 inches at the higher elevations. Most of the annual precipitation falls between November and late April. Precipitation at the lower elevations occurs mainly in the form of rainfall with snowfall becoming the dominant form at the higher elevations. Melting of the winter snowpack at the higher elevations becomes the major source of runoff to the Merced River during the spring and summer months.

SURFACE WATER HYDROLOGY

Mariposa County contains three major drainage basins: the Merced River, Chowchilla/Fresno River, and a localized cluster of streams of the east valley known as the Lower Mariposa group of streams. These three basins and their component watersheds are part of the much larger San Joaquin River system that drains the western slopes of the Sierra Nevada (see Figure 8-6).

All three basins contain significant acreage managed by the Bureau of Land Management (BLM), United States Forest Service (USFS) and the National Park Service (NPS). The lower portions of the three basins contain significant watershed acreage managed by BLM. Most of this land is subject to grazing, and much of the precipitation falls as rain. At higher elevations, however, the NPS owns and manages considerable acreage of pristine forests, riparian woodlands, meadows, and exposed rock strata in Yosemite National Park that act as sources of both surface waters and groundwater recharge. Much of the precipitation on NPS lands falls in the form of snow, which in wet years, produces significant snowpack.

The two national forests in Mariposa County are the Sierra and Stanislaus, administered by the Forest Service. In contrast to NPS, USFS manages relatively small areas of both the middle and upper portions of the Merced River basin and the upper portions of the Chowchilla/Fresno River basin for purposes of "Multiple Use": grazing, mining, recreation, timber, water, and wildlife.

Most of the surface water rights in Mariposa County are owned by jurisdictions from outside the county, the major owner being the Merced Irrigation District (MID). The MID delivers the water to agricultural concerns in the Central Valley.

In the south of the county, the Madera Irrigation District appropriates Merced River Basin water based on a court settlement and pre-1914 water rights to Big Creek. The Big Creek Diversion operated by the Madera Irrigation District conveys water across the Merced River Basin/Chowchilla River Basin divide in a ditch and flume system. According to the County of Mariposa, the surface water rights to the Chowchilla River Basin are fully appropriated, "and water rights may not be available." (County of Mariposa, General Plan, 1994).

MERCED RIVER BASIN

This subsection describes the surface water resources of the major watersheds of the Merced River Basin. The main stem of the Merced River and its South Fork have been designated a "Wild and Scenic River". A "Wild and Scenic River" designation preserves rivers in their free-flowing state to maintain water quality and protect the beauty of its environment for the benefit and enjoyment of future generations. Most of the watershed lies within Yosemite National Park. The *Sierra Nevada Forest Plan Amendment FEIS* (Forest Service, January 2001) identifies the Merced River as an "Emphasis Watershed" – i.e. a relatively undisturbed native watershed. Almost 85 percent of the watershed of the South Fork of the Merced River is on lands managed by the Sierra National Forest (USDA, Forest Service 2000). The South Fork of the Merced River originates in Yosemite National Park and meanders through the park for a short distance before moving onto Sierra National Forest lands west of the park.

BIG CREEK

Located on federal land, Big Creek is considered an "Emphasis Watershed" (Forest Service, January 2001). More than 200 acres of the Fish Camp Town Planning Area lies in the upper Big Creek watershed. Big Creek's average flow in 1983 was approximately 12 cubic feet per second, with a maximum flow of 66 cubic feet per second (County of Mariposa, Fish Camp Planning Area Specific Plan and EIR, 1983). Associated with the planning area are several meadows that drain into the creek. The Madera Irrigation District appropriates water from Big Creek and conveys it to its users in the Chowchilla/Fresno River Basin through its Big Creek Diversion system.

MAXWELL CREEK

The Maxwell Creek watershed contains the Coulterville Town Planning Area. In addition, McMahon Dam (52 feet high) is a privately owned reservoir on Maxwell Creek located just west of the town.

MERCED RIVER

The main stem of the Merced River and its South Fork have been designated a "Wild and Scenic River" within Yosemite National Park. A comprehensive management plan known as the *Merced River Plan* has been formulated by the National Park Service (USDI, NPS 2000) and establishes a "River Protection Overlay" to ensure that the river channel and adjacent areas are protected. This overlay will provide a buffer area for natural flood-flows, channel formation, riparian vegetation, and wildlife habitat and will protect riverbanks from human-caused impacts and associated erosion (USDI, NPS 2000).

Figure 8-6: Mariposa County Drainage Basins and Watersheds

Do to the size of this image; Figure 8-6 has been created as a separate file

The rights to most of the Merced River water resources are allocated to the Merced Irrigation District (MID) by a permit issued by the Department of Water Resources (DWR). The New Exchequer Dam, which is operated by the MID and forms Lake McClure, together with McSwain Dam, deliver water to Merced County consumers. The Merced River Basin in Mariposa County also contains several small, privately owned reservoirs. These include Green Valley Dam (33 feet high) on Smith Creek, a tributary of the North Fork of the Merced River, and Metzger Dam (30 ft. high) on Dutch Creek, which is a tributary of Bean Creek and the North Fork of the Merced River. The Greeley Hill and Kinsley planning areas overlap this area of the basin.

Tributaries to the South Fork of the Merced River drain portions of Chowchilla Mountain, Midpines, and southern Yosemite National Park. The lower end of the Merced River watershed drains the portions of the Don Pedro subdivision and Hunters Valley. The Lake Don Pedro Community Services District provides potable water to customers in the Don Pedro area in both Mariposa and Tuolumne counties. The Community Services District's sphere of influence includes the approved, but not developed, South Shore subdivision. This water originates from Lake McClure on permits from the MID.

Saxon Creek Project

The Saxon Creek Project consists of a pump station located adjacent to the Merced River near Saxon Creek. Water from the Saxon Creek Project is pumped through a 43,000-foot, 12-inch pipeline. A one million-gallon steel water tank is located at the highest elevation; water flows by gravity to the 10-inch pipeline leading to the water treatment facility below the Stockton Creek Dam. This water is used by the residents of the Mariposa Public Utility District.

The Lower Mariposa County Group of Streams

Bear Creek (including Burns and Hornitos Creeks)

The Bear Valley and Hornitos watersheds are drained primarily by Bear Creek, originating near the town of Bear Valley. Northern areas of the basin drain directly into the Merced River. Downstream, Bear Creek drains part of the Catheys Valley area.

Bear Reservoir on Bear Creek is 319 feet high, and is a DWR facility operated by the U.S. Army Corps of Engineers (ACOE), Sacramento District. At the upper end of the Bear Creek catchment is a smaller, privately owned dam known as Whispering Oaks Dam (31 feet high).

Mariposa Creek (including Agua Fria and Stockton Creeks)

Within federal lands, the section of Mariposa Creek above Mariposa Reservoir is considered an "Emphasis Watershed" (USDA, Forest Service 2000). Together with Agua Fria Creek and Stockton Creek, Mariposa Creek drains the largest area of the Lower Mariposa County group of streams. Upper portions of the Agua Fria Creek watershed drain the Mount Bullion area.

At the lower end of the watershed, Mariposa Creek is dammed by the Mariposa Creek Dam (88 feet high). Mariposa Creek Dam is a DWR facility operated by the ACOE, Sacramento District. Mariposa Creek is the main hydrological feature within the town of Mariposa and Bridgeport areas. During 1992, when the Mariposa TPA was prepared, the creek was intermittent and seasonal above the core of the town. In town, and in areas downstream, springs, combined with urban runoff, feed the flow. However, in the sense of growth potential, the creek is not the controlling hydrologic feature as the TPA states (County of

Mariposa, 1992). Rather, the controlling feature is better regarded as the reservoir for the town along Stockton Creek. The Mariposa Public Utilities District (MPUD) operates the Stockton Creek Dam (95 feet tall) on Stockton Creek, a tributary of Mariposa Creek. Eventually, Mariposa Creek enters the Central Valley, crosses into Merced County, and discharges into the San Joaquin River.

Owens Creek

Owens Creek drains part of the Catheys Valley and White Rock planning areas. Before reaching the valley floor, Owens Creek is dammed. Owens Reservoir (75 feet high) on Owens Creek is a DWR facility operated by the ACOE, Sacramento District.

CHOWCHILLA/FRESNO RIVER BASIN

Chowchilla River

The Bootjack, Chowchilla, and Ponderosa areas are drained to the south by creeks that are tributaries of the Chowchilla River. Three forks of the main stem drain Mariposa County private and public lands: the East, Middle, and West Forks of the Chowchilla River.

On federal land, the East Fork of the Chowchilla River is considered an "Emphasis Watershed" (USDA, Forest Service 2000). Together with the North Fork, this stream flows to the foothills where it is dammed to form Eastman Lake. Eastman lake has a capacity of 1,780 surface acres, holds 150,000 acre-feet of water and is used for flood control, irrigation and recreation.

Horse Creek

The Chowchilla/Fresno River Basin in Mariposa County also contains a small, privately owned reservoir known as Hendrick's Dam (33 feet high) on Horse Creek, a tributary of Striped Rock Creek.

SURFACE WATER QUANTITY

The Merced - Lower Mariposa County group of streams and the Chowchilla/Fresno River Basins contain significant watersheds on federal land. Two national forests, the Sierra and the Stanislaus, are responsible for the management of these watersheds. In addition, a significant part of the Upper Merced River watershed is under the control of the NPS and is managed by Yosemite National Park. Additionally, the BLM manages significant acreage in the lower foothills of Mariposa County. Long-term federal land management has contributed significantly to the preservation of surface water quality in the County.

8.3.02 GROUNDWATER RESOURCES

The DWR has provided data regarding nine wells in the project Area (Table 8-6). The locations for these wells are shown in Figure 8-7. Much of the groundwater in the county is recovered from hard rock wells drilled into plutonic granites of the Sierra Nevada (County of Mariposa, 1983). The General Plan states:

Figure 8-7: Mariposa County Water Well Locations

Do to the size of this image; Figure 8-7 has been created as a separate file

Granite is the first rock unit encountered in the downward migration of groundwater. Granitic masses are implaced through a series of intrusions, which create structural characteristics that govern groundwater flow. These joints, exfoliation sheets, fractures, faults and subsequent differentiated granitic intrusives, dikes and sills, create natural pathways and containment features, which affect groundwater movement. An analysis of granitic terrain for hydrologic capabilities utilized topographic features, aerial infrared mapping and botanical studies. This information serves to delineate features that show probable continuity with subsurface water flow. In addition it is recognized that the soil mantle (see Soil, Section 5.209), acting as a filtration and containment system which facilitates percolation and subsequent recharge to the fissure crack system, functions as a temporary water reservoir, subject to the effects of fluctuating precipitation.

However, specific granitic groundwater basins in Mariposa County have not been studied in depth.

Table 8-6: Existing Potable Water Wells in Mariposa County

Location & Well Number[1]	Elevation[2]	Date of Groundwater Measurement	Depth to Groundwater[2]
02S 17E 19 J01M	3150	02/26/1971	32.8
03S 16E 03 C01M	1675	02/26/1971	30.0
03S 16E 03 F01M	1650	02/26/1971	9.2
05S 15E 07 A01M	320	03/17/1971	14.2
05S 18E 07 K01M	2240	02/26/1971	27.0
05S 17E 17 N01M	1170	02/26/1971	27.3
05S 18E 18 C01M	2134	02/26/1971	1.9
05S 18E 36 Q01M	1750	02/26/1971	48.7
08S 17E 20 G01M	337	4/01/1971	26.9*

[1] Section, Range, Township, Well Number

[2] Depth measured in feet* = Measurement taken 10/28/1971 = 36.7

Source: DWR, San Joaquin District Water Management Section

GRANITIC HYDROGEOLOGY ON PRIVATE LANDS

The 1983 Mariposa County General Plan provides observations and conclusions from well drillers and hydrogeologists concerning the average characteristics of Sierran hard rock wells:

- Wells have a mean depth of 115 feet.
- Average pump depth is between 50 to 100 feet.
- Three to five gallons per minutes is the average estimated yield.
- Most wells serve between two and three people.
- The yield tests made by drillers and pump companies cannot always be relied upon, since they are usually of only one or two hours duration.
- The month in which the well was drilled is a significant factor that affects the likelihood that a well will require deepening. Forty-three percent of the deepened

wells were drilled when ground water levels are high (November through the following April) vs. 31 percent of the total wells in the survey.

- Only 36 percent of the owners had a measurement of the depth to water in their wells; only 6 percent had more than one measurement. The measurements would be useful to owners of wells that fail in dry years. They could anticipate the shortage from water level records and start conserving water at an earlier date, or attempt to augment their supply before the shortage caused serious inconveniences.
- Wells located high on slopes or on top of mountains tend to have more seasonal variation in depth to water and yield.
- A typical domestic well is 50 to 200 feet deep and produces less than 10 gallons per minute. However, since drilling of a domestic well is usually stopped when 5 to 10 gallons per minute are obtained, these low yields are not representative of the maximum yield obtainable. Large yields (greater than 50 gpm) can probably be developed at some locations, but storage and recharge to sustain them will not always be present. Topographic position is a significant factor in predicting the success of a hard rock well. Those at the base of the slope or in a valley are more likely to produce a useful amount of water than those sited on the side or top of a mountain. Yield estimates, based on short tests of a few hours duration or less, are sometimes too optimistic. In particular, estimates made in the winter or spring when water levels are high should be viewed with suspicion.
- Some of the factors that may be used to rate individual sites are topography, evidence of rock fracturing, storage capacity of the rock and soil above the well location, and the amount of catchment area that may be expected to recharge the ground water that the well is tapping. Proper evaluation of these factors would result in a decrease in the percentage of unsuccessful wells. Jointing features influence well depth in crystalline rock. Research indicates that water-bearing properties of crystalline rocks are dependent on the occurrence of joints and faults and the extent of weathering. Interstitial openings caused by weathering are mostly at depths of less than 100 feet. Joints are less abundant and openings along joint planes are smaller as depth increases. Openings along fault surfaces also tend to close with depth. These geological observations that indicate a decrease in rock permeability with depth are verified by a study of well yields and water injection tests. Mean yields per foot of well are 0.23 to 0.30 gpm at 100 feet but only 0.013 to 0.04 gpm at 1000 feet, and injection rates per foot of drill hole under 100 psi pressure are 0.11 to 0.4 gpm at 100 feet but only 0.014 to 0.038 gpm at 1000 feet. Median values of both well yields and injection rates are from one-half to one-third of the mean values. Geologic structure is more important than rock type in determining yields and injection rates. The decrease in rock permeability with depth indicates an increase in the unit cost of water with depth. The optimum depth of a well is, therefore, determined largely by economic factors. Unless geologic factors are favorable, wells in crystalline rocks should be less than 600 feet deep. In general, domestic wells should be less than 150 to 250 feet deep.

The 1983 Mariposa County General Plan concludes that: "The water-bearing characteristics of most crystalline rocks are primarily controlled by weathering and structure. Rock type alone is commonly of secondary importance. In the absence of geological and geophysical guidance, drilling in crystalline rocks encounters highly variable amounts of water. In unweathered rock, from 5 to 15 percent of the wells are failures, median yields are less than 8 gpm, and roughly 10 percent will have yields of 50 gpm or more. Water production per foot

of well decreases rapidly with an increase in well depth. This decrease is roughly ten-fold between depths of 100 and 1000 feet. The optimum depth of water wells in crystalline rocks is determined largely by economic factors unless the geologic structure is known in detail. Although a detailed economic study was not made, rough estimates suggest that the depth of single domestic wells should be less than 150 to 250 feet and wells of larger production should be less than 600 feet. In many places, the optimum depth of domestic wells will be less than 100 feet.

METAMORPHIC HYDROGEOLOGY ON PRIVATE LANDS

The 1983 Mariposa County General Plan also deals with the groundwater resources of metamorphic rocks and presents these facts:

Metamorphic formations in Mariposa County show remarkable hydrologic versatility because of the pressure of the following: bedding planes, parallel rock units of varying resistance, numerous brecciated shear and fault zones and variable permeability in surface area.

The 1983 plan also provided information on early geological studies of Jurassic metavolcanic sequences in the County and concluded:

Solid metamorphic rocks have porosities of less than three percent and most commonly less than one percent. The few pores that are present are small and generally are not interconnected. As a result, permeabilities are so small that they can be regarded as zero for all practical purposes. However, appreciable porosities and permeabilities are developed through fracturing and weathering of the rock. The permeability of fresh metamorphic rock therefore is by virtue of its joints, faults, bedding plane partings, solution enlargement of these secondary features, and geologic contacts. Highly fractured zones in the Sierra Foothills are known to carry large amounts of water. The fracture zones are almost always associated with small scale faulting. Jointing, usually in several sets, is invariably present. Joints usually represent tensional or shear forces and are distinguished from faults in that there has been no visible movement parallel to the surface of the joint. Tests (Davis and Turk) have indicated that permeabilities parallel with the old bedding-planes in metamorphic rocks are several times the average permeability. Contact zones between major rock types commonly are represented by fracturing and deformation. The deformed rocks tend to develop water-bearing fractures near discontinuities such as along hard, brittle quartz veins, which cut soft phyllite. Some of the metamorphic rock contains carbonate minerals that are subject to relatively rapid solution by circulating ground water dissolution of certain unstable minerals associated with quartz dikes in the metamorphic rocks also increases local permeability. Furthermore, it points out relationships between topography and well yields. Limited data suggest that the highest well yields are in or close to broad ravines. Many ravines reflect erosion along structurally weakened rocks. The weakness is due to closely spaced joint systems or fault zones, which explain the higher yields of the wells

The structure of metamorphic formations plays an equally important role in well development. The 1983 General Plan states:

Observation of joints, faults, and bedding planes at this project indicate that these features are usually close to vertical. Spacing between joints is generally greater than five feet owing to the single orientation of most water bearing fractures and permeability of the rocks as a whole is strongly anisotropic. Wells that are near vertical will, therefore, bend to intersect only a very few water-bearing crevices. Horizontal wells in this terrain can be much more

successful because of the greater number of fractures, which will be intersected. However, the expense of drilling or excavating large vertical shafts and of drilling the laterals is sometimes much greater than the value of the water produced. Nevertheless, horizontal wells have been profoundly successful in deeply weathered rock or hillsides where horizontal drilling can start from the surface.

The 1983 General Plan concludes that only the framework for an analysis of Mariposa County groundwater system exists. Full studies of groundwater basins and a synthesis of existing data is necessary to gain adequate knowledge of present conditions and future trends.

GROUNDWATER RESOURCES FROM PUBLIC LAND

The Yosemite Valley Plan SEIS states that groundwater is used in the Yosemite Valley, Wawona, and El Portal areas for domestic water supplies. Use of groundwater as a source of drinking water for park visitors on NPS lands demonstrates that groundwater resources of the mountainous areas of Mariposa County have the potential to serve residential customers with high quality drinking water (USDI, NPS 2000). This is in contrast to groundwater resources of the Central Valley and lower foothills that are often contaminated by high levels of nitrates from the many years of agriculture, and are unsuitable for residential customers.

8.3.03 WATER QUALITY

REGULATORY SETTING

The California Environmental Protection Agency (CalEPA) administers State and federal water quality regulations. CalEPA's Central Valley Regional Water Quality Control Board (RWQCB) is active in drafting revised water quality enforcement policies that may be used by jurisdictions such as the County of Mariposa.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM

The State Water Resources Control Board, with the assistance and advice from the Regional Water Quality Control Boards, is drafting policies for the enforcement of the National Pollution Discharge Elimination System (NPDES) permits (State Water Resources Control Board, 2000). The RWQCB policy draft for storm water states:

Certain construction and industrial activities require compliance with either the General NPDES Permit for Storm Water Discharges Associated with Construction Activity (Construction Storm Water Permit) or the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity Excluding Construction (Industrial Storm Water Permit). Failure to submit a Notice of Intent for coverage under the general permits or a notice of non-applicability, after specific notification to the discharger, is a significant violation. Failure to either develop a Storm Water Pollution Prevention Plan (SWPPP), to substantially implement a SWPPP, to conduct required monitoring, or to submit annual reports is a significant violation.

In most urban areas, discharges of storm water to and from separate municipal storm sewer systems (MS4s) require compliance with a Municipal NPDES Storm Water Permit. Failure to either submit a report of waste discharge, to develop a storm water management plan, to substantially implement the storm water management plan, to conduct monitoring, or to submit an annual report is a significant violation.

Most storm water permits require the discharger(s) to comply with general performance practices or standards (e.g., best management practices, best available technology economically achievable, best conventional technology, and maximum extent practicable). If storm water and/or authorized non-storm water discharges cause or substantially contribute to an exceedance of an applicable water quality standard, the discharger is usually required to take specific actions (e.g., modify its Storm Water Management Plan) to resolve such exceedances. For storm water and/or authorized non-storm water discharges that cause or substantially contribute to an exceedance of an applicable water quality standard, significant violations include the failure to comply with the procedures to address exceedances required by the permit. Discharges of non-storm water that are unauthorized by the permit are significant violations. The criteria for significant violations in section III (A) of this policy apply to NPDES storm water permits that contain effluent limitations (State Water Resources Control Board, 2000).

FEDERAL CLEAN WATER ACT SECTION 401

Almost all development projects, ranging from linear transportation facilities to development of homesites or infrastructure (sanitary pipelines, gas pipelines, potable water lines, electrical transmission lines, and cellular telephone tower pads, etc.) located in or near meadows, streams, and in valley bottoms need wetland delineations and ACOE jurisdictional determinations. The RWQCB regulates the water quality Section 401 certification activity. The RWQCB draft policy states:

"Discharges into waters of the United States that require a federal permit or license also require certification from the SWRCB or RWQCB that the discharge will comply with the State's water quality standards. Failure to obtain certification prior to a discharge that causes or contributes to a condition of nuisance or pollution or violates water quality standards is a significant violation. Failure to substantially comply with conditions specified in the certification is a significant violation." (State Water Resources Control Board, 2000).

In conclusion, the draft State Board policy states:

> Any discharge of waste resulting in, or likely to result in, a violation of a water quality objective or a receiving water limitation in groundwater or surface water, or in the creation of a condition of nuisance, is a significant violation unless specifically authorized by the SWRCB or RWQCB. For storm water discharges, RWQCB's may allow the iterative approach discussed in SWRCB Orders WQ 91-03, 91-04, 96-13, 98-01 and 99-05." (State Water Resources Control Board, 2000).

FEDERAL MINING ACT OF 1872 AND CALIFORNIA ADMINISTRATIVE CODE

Suction and dredge mining continue to be activities that may have adverse effects on the water quality of the County's rivers, lakes and streams. Riparian areas are also often affected (USDA, USFS 2000). Key issues of concern to the Forest Service include erosion and habitat alterations. With proper standards in place, mining activities are of economic benefit to Mariposa County. The recreational rewards of gold panning from the County's streams cannot be overemphasized.

Placer mining claims are staked under the provisions of the federal Mining Act of 1872, which allows tenants to obtain real property rights to Public Land (BLM and USFS lands) if mineral assessments are filed with the BLM and verified.

The State also regulates dredge mining under the California Administrative Code, Title 14, Section 228. These regulations have a bearing on protection of water quality from dredge mining areas.

CALIFORNIA FISH AND GAME CODE

The Streambed Alteration Agreement process (California Fish and Game Code 1600, see Biology Section) also has a bearing on activities that may have adverse effects on the water quality of the County's rivers, lakes and streams. The CDFG regulates activities that may affect streambeds. Section 1601 of the California Fish and Game Code states that:

> General plans sufficient to indicate the nature of a project for construction by, or on the behalf of, any governmental agency, state or local, and any public utility, of any project which will divert, obstruct or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the Department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, or will use material from the streambeds designated by the Department, shall be submitted to the Department.

The CDFG has stated that their jurisdiction is any area that is within the 100-year floodplain although, more often than not, the actual line of State jurisdiction is the top-of-bank. Impacts to streambeds and the quality of water in streams within this jurisdiction are considered significant and require a CDFG 1600 series permit.

SURFACE WATERS

The Central Valley Regional Water Quality Control Board's *Basin Plan* identifies much of the upper portions of the Merced Basin as having good water quality (USDI, NPS 2000).

The *Sierra Nevada Forest Plan Amendment,* adopted in 2001, will have a beneficial effect on the quality of surface runoff entering the County. The document identifies strategies for the establishment of "Riparian Habitat Conservation Areas (RHCA's)." These management areas:

> Help to maintain the integrity of aquatic systems by: 1) influencing the delivery of coarse sediment, organic matter and woody debris to streams; 2) providing root strength for channel and inner gorge stability; 3) maintaining riparian microclimate, including stream shade; 4) protecting water quality; 5) maintaining or enhancing riparian vegetation; and 6) maintaining the durability and function of floodplains and riparian terraces.

Several of the Town Planning Area Specific Plan EIRs and commentaries have raised concerns regarding surface water quality. For instance, the Coulterville TPA Land Use, Open Space, and Conservation Element (1980) contains a statement that suggests that the TPA wants to reduce the impact on groundwater quality (to Maxwell Creek) and quantity by providing community sewer and water systems.

At Fish Camp, the town has raised concerns about the effects of growth on the water quality of Big Creek. Big Creek is regarded as an important and fragile resource in the Fish Camp area. The Fish Creek TPA states:

> Big Creek provides an important scenic and recreational resource to the Fish Camp area. The purity of its water and the relative abundance of native rainbow and introduced German brown trout have traditionally been one of the major attractions of the area.

The TPA goes on to state:

> Big Creek can be affected by several factors created by increased development. Possible impacts include septic contamination, siltation created by increased soil erosion, and contaminants carried in runoff from impervious surfaces…Increased silt levels in Big Creek may clog gravel beds and have a detrimental impact on trout spawning areas…

BANK EROSION

The Sierra Nevada Forest Plan Amendment DEIS contains considerable general information that discloses the relationships between multiple forms of land use and the quality of surface waters. The conditions of individual watersheds profoundly affect downstream water quality. Factors related to the degradation of watersheds include vegetation removed during timber harvest, road building and frequency of stream crossings, "natural sensitivity" of the watershed, historical disturbance such as placer mining, dredge mining, and wildfire frequency (USDA, Forest Service, 2000). About 23 percent of the "emphasis watersheds" in the mountain range area that are covered by the Sierra Nevada Forest Plan Amendment DEIS carry a risk of high fire frequency (USDA, Forest Service, 2000).

The County has developed erosion control standards and is currently implementing them (County of Mariposa 1999).

NON-POINT POLLUTION SOURCES

According to the Sierra Nevada Forest Plan Amendment DEIS, most pollutants come from diffuse sources; i.e. locations not concentrated into ditches, flumes, pipes, etc. Runoff from paved surfaces, rooftops, and drainage from pastures is an example of non-point water pollution. The Sierra Nevada Forest Plan outlines several new grazing standards that could be applied to private lands in Mariposa County. These are "common sense" measures such as: 1) not allowing livestock to use more than 20 percent of the current years' growth of willow growth in riparian areas, and 2) keeping livestock from disturbing more than 20 percent of the stream bank in any one season (USDA, Forest Service, 2000).

GROUNDWATER QUALITY

The quality of groundwater in Mariposa County varies in relation to a number of variables: 1) proximity to location(s) of groundwater recharge areas, 2) quality of water being charged into the water table, 3) proximity of groundwater to non-point and/or point sources, 4) geologic strata and movement of groundwater in the strata or sediments, and 5) mineralogy of the rocks and sediments through which groundwater flows. Information regarding groundwater in Mariposa County is generally lacking and specific issues as to water quality, quantity, and recharge capabilities require further investigation.

In the Catheys Valley planning area, groundwater quality is often poor due to relatively high levels of nitrates in the water. High levels of nitrates in the water can be attributed to the land's utilization for cattle grazing and turkey ranches. In 1993, a specific study of groundwater quality was conducted in the Catheys Valley region as a condition of development for a proposed residential subdivision. Melvin C. Simon and Associates geological consultants conducted the surveys, found the extent of the nitrate contamination to be clearly widespread, and concentrated within the upper 50 to 100 feet of the aquifer (Ground Water Quality Evaluation, 1993). The Environmental Protection Agency has established a Maximum contaminant level (MCL) of 10 mg/L nitrate (NO_3) as nitrogen. Concentrations above 10mg/L as N, equivalent to 44 mg/L of NO_3, present a health hazard. Nitrate concentrations taken from wells at the B.I.C. Farms site ranged from a low of 0.13 mg/L to a high of 289 mg/L (Ground Water Quality Evaluation, 1993). The NO_3 concentration at 298 mg/L is about 7 times the maximum allowable contaminant level of 44 mg/L of NO_3. Because of the known nitrate problem in the Catheys Valley planning area, future development will be subject to conducting groundwater quality evaluations for nitrate contamination levels on a case-by-case basis (Personal communication, David Conway, 2001).

At the other extreme, groundwater quality is often good in the Merced River Basin. Federal regulations require that potable water systems "rely on groundwater be continually monitored and operated within set levels for turbidity, waterborne pathogens, and other potential pollutants" (USDI, NPS 2000).

8.3.04 AVAILABILITY OF GROUNDWATER AND SURFACE WATER AS A GROWTH LIMITING FACTOR

The availability of water resources to Mariposa County residential and business concerns is a primary growth limiting factor. In summary, the following constraints to development are apparent:

- Geologic strata that collect and trap groundwater in Mariposa County are not conducive to the formation of large groundwater basins;
- A paucity of basin wide groundwater studies (relative to Chowchilla for example) is not conducive to long term planning for development;
- Water rights issues dictate a need for the involvement of the federal government, other counties, and private water resource agencies (e.g. the Madera and Merced irrigation districts) in Mariposa County water resource planning;
- Most of the public and private stakeholders are outside of Mariposa County in neighboring Madera and Merced counties, or are under the control of the federal government;
- Development of infrastructure to convey surface water may affect growth.

8.4 MINERALS

The early mineral history of Mariposa County begins primarily with the discovery of gold and the development of mining in the region. Placer gold was initially discovered in the County sometime prior to 1849, resulting in one of the biggest gold rushes in history. A large portion of the gold mined in California was found along Highway 49 near Mariposa. Agua

Fria and Mariposa were among the first placer deposits to be worked in the County. During the 1850's, several rich quartz veins were discovered in the mountains near Bear Valley and Hornitos. The mineral resources of Mariposa County have been an integral part of the County's history and have been an economic asset to the region and the State.

The mineral deposits in Mariposa County are located mainly along the gold rush belt. This belt, commonly called the "Mother Lode", stretches through the Sierra Nevada foothills for about 150 miles, extending north and northwest from the vicinity of Mariposa through Tuolumne, Calaveras, Amador, El Dorado, Placer, and Nevada counties. (Britannica, 1999).

Although historically gold has been the most predominant mineral in the area, many other ore deposits are located in parallel formations to the east and west of the main "Mother Lode" fault system. According to the Development Constraints Report, substantial quantities of copper, lead, zinc, silver and tungsten have been mined in the County. Nonmetallic minerals have also be found, including barite, limestone, dolomite, mica, schist, slate, granite, silica, and sand and gravel. Mineral production reached its peak in 1939 when $1,759,286 worth of mineral materials was sold. Currently, mineral production is not a major contributor to the County's economy. The California State Mining and Mineral Museum is one of California's newest State Parks. Located at the Mariposa Fairgrounds, it is the State's chief exhibit of gems, gold and minerals.

8.4.01 MINES AND QUARRIES

Home to the first hard rock gold mine in California, mining activity in Mariposa County has historically been primarily for gold. One of the highest grades of crystalline gold found worldwide is still mined at the Colorado Quartz Mine west of Midpines. Although not in operation today, the most productive mines have been the Hite, Princeton, Mt. Gaines, Pine Tree, Josephine, Mariposa, Hasloe, Washington, Bandarita, Mary Harrison, Red Cloud, and Clearinghouse mines (Development Constraints Report, 1980).

According to the County Planning Department, current mining and quarry operations in the County are fairly small and are more diverse than in past years. There are six mines and quarries operating, each employing an average of 10 to 19 workers (Department of Finance, 1997). Some of these operations are shown on

Figure 8-8.

Mines and quarries are inspected annually by the County Planning Department and must have a permit and a reclamation plan for operation. All of the mines and quarries are listed under the Surface Mining and Reclamation Act of 1975 (California Department of Conservation). Pursuant to Article 5, §2770 of the Act:

a. Except as provided in this section, no person shall conduct surface mining operations unless a permit is obtained from, a reclamation plan has been submitted to and approved by, and financial assurances for reclamation have been approved by, the lead agency for the operation pursuant to this article.

The following sections briefly describe the current mining operations in Mariposa County.

BEAR VALLEY QUARRY (PERMIT TERMINATED)

Located on a large tract of land between Bear Valley and Mt. Bullion town planning areas (Agricultural Exclusive Zone – 160-acre minimum parcel size), Bear Valley Quarry was the largest mining operation in the County. However, the mine's permit was revoked by the Planning Commission in the spring of 2000 because the owner was operating in violation of his mining permit. The quarry formerly mined and crushed slate for road base and quarried slate for decorative purposes. In June 2002, the Planning Commission filed documents to reclaim the quarry and two parties have expressed interest in reopening it. To date, no applications to reopen the mine have been received.

COLORADO QUARTZ MINE (MINE ID 91-22-0004)

This mine is located west of Midpines (Mountain Home Zone – five-acre minimum parcel size) and is involved with extracting specimen gold. It is surrounded by a roughly 300-acre Bureau of Land Management parcel with smaller residential parcels to its northeast.

IRON SPRINGS CONSOLIDATED (MINE ID 91-22-0010)

This quarry extracts and crushes slate for road base. It is east of Bridgeport in the Agricultural Exclusive Zone.

FREMONT AND LONG CONSOLIDATED (MINE ID 91-22-0009)

Fremont and Long Consolidated are involved with decomposed granite and are located southeast of Iron Springs Consolidated. It is in the Agricultural Exclusive Zone.

MT. GAINES CONSOLIDATED (MINE ID 91-22-0010)

Located north of Hornitos in an Agricultural Exclusive Zone, Mt. Gaines Consolidated sells stockpiled material for road base and surfacing.

YOSEMITE SLATE QUARRY (MINE ID 91-22-0007)

This quarry is located on an 85-acre parcel, although only five acres are being quarried. The operation involves extracting slate for decorative purposes. It is located just west of the town of Mariposa on Agricultural Exclusive Zone. They are a relatively small company, with two full time employees and up to two part-time employees. They produce an average of 700 tons of slate per year.

8.5 AIR QUALITY

Mariposa County is located within the Mountain Counties Air Basin, which also includes Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra, and Plumas Counties (Figure 8-9). These counties are grouped together based on similar meteorological and geographic conditions, utilizing political boundary lines whenever practicable. Ambient air quality standards are adopted after consideration of public health and safety, and public welfare concerns including, but not limited to, health, illness, irritation to the senses, aesthetic value, interference with visibility, and effects on the economy. Standards relating to health effects are based upon the recommendations of the State Department of Health Services (Health and Safety Code (H&S) §39606 Designation and Standards for Air Basins). While counties are grouped together into air basins to assist the State in managing air quality on a regional level, each county in the Mountain Counties Air Basin has its own set of rules and regulations to maintain air quality locally. The Mariposa County Air Pollution Control District regulates air quality in Mariposa County (California Air Resources Board, 2001).

8.5.01 REGULATORY SETTING

FEDERAL AND STATE CLEAN AIR ACTS

Pursuant to the Federal Clean Air Act of 1970 and subsequent revisions, the U.S. Environmental Protection Agency (EPA) established federal ambient air pollutant concentration standards and maximum allowable emission rates for certain individual sources of air pollutants. Air quality is controlled through the attainment and maintenance of ambient air quality standards and enforcement of emission limits. A system also was set up in which EPA delegated to each state the responsibility for attaining air quality standards within its borders. Under the state programs, individual facilities generally are required to obtain permits to construct new or modified facilities and to operate such facilities. Specific emission limits for various equipment and facility types need to be met.

National Ambient Air Quality Standards (NAAQS) have been established for six air pollutants: ozone (O_3), carbon monoxide (CO), particulate matter less than ten microns in diameter (PM_{10}), nitrogen oxides (NO_x), lead (Pb), and sulfur dioxide (SO_2) as shown in Table 8-7. These six air pollutants are termed "criteria" pollutants because the standards established for them were based upon documented human health criteria. Primary standards for air pollutants were established to protect public health, while secondary standards were established to protect the public welfare by preventing impairment of visibility and damage to vegetation and property. Annual average standards are never to be exceeded. Short-term standards (e.g., 1-hour and 24-hour averages) are not to be exceeded more than once a year. The 1977 Amendments to the Clean Air Act require that each state identify areas within its borders that do not meet the national ambient air quality standards develop and obtain EPA approval of a State Implementation Plan (SIP) that demonstrates how the state will attain the national ambient air quality standards.

Major amendments to the Clean Air Act were signed into law in 1990, prescribing new planning requirements and attainment deadlines for areas that do not attain ambient air quality standards. Procedures and guidelines for conforming to these amendments are continually being prepared and updated by the EPA. The 1990 amendments also directed the

EPA to set standards for air toxics and require certain industries to significantly reduce emissions of controlled toxic pollutants. This information is presented in Title 40 of the Code of Federal Regulations (40 CFR).

The California Air Resources Board (CARB) coordinates and oversees the activities of California's many single-county and multi-county unified Air Pollution Control Districts and Air Quality Management Districts. CARB and the various Air Quality Districts operate numerous air quality monitoring stations throughout the state. Data collected at those stations are used to classify areas and air basins as "attainment" or "nonattainment" for each criteria air pollutant based on whether the ambient air quality standards have been achieved. The EPA designates all areas of the United States as having air quality better than the NAAQS ("attainment"), worse than the NAAQS ("non-attainment"), or "unclassified" in areas where insufficient data exists. A non-attainment designation means that a primary NAAQS has been exceeded more than three discontinuous times in 3 years in a given area. Pollutants in an area are often designated as unclassified when there is a lack of data for the EPA to form a basis of attainment status determination. CARB is responsible for incorporating local nonattainment plans into the SIP. CARB also regulates the amount of pollutants that can be emitted by motor vehicles in California.

Figure 8-8: Location of Industrial and Major Commercial Uses

Do to the size of this image; Figure 8-8 has been created as a separate file

Figure 8-9: Mountain Counties Air Basin

Do to the size of this image; Figure 8-9 has been created as a separate file

Table 8-7: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	Federal Standards	
			Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m3)	0.12 ppm (235 µg/m3)	Same as Primary Standard
	8 Hour	---	0.08 ppm (157 µg/m3)	---
Respirable Particulate Matter (PM_{10})	Annual Geometric Mean	30 µg/m3	---	Same as Primary Standard
	24 Hour	50 µg/m3	150 µg/m3	---
	Annual Arithmetic Mean	---	50 µg/m3	---
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard	65 µg/m3	Same as Primary Standard
	Annual Arithmetic Mean	---	15 µg/m3	---
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m3)	9.0 ppm (10 mg/m3)	---
	1 Hour	20 ppm (23 mg/m3)	35 ppm (40 mg/m3)	---
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m3)	---	---
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	---	0.053 ppm(100 µg/m3)	Same as Primary Standard
	1 Hour	0.25 ppm (470 µg/m3)	---	---
Lead	30 Day Average	1.5 µg/m3	---	---
	Calendar Quarter	---	1.5 µg/m3	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	---	0.030 ppm (80 µg/m3)	---
	24 Hour	0.04 ppm (105 µg/m3)	0.14 ppm (365 µg/m3)	---
	3 Hour	---	---	0.5 ppm (1300 µg/m3)
	1 Hour	0.25 ppm (655 µg/m3)	---	---

ppm=parts per million
mg/m^3=milligrams per cubic meter
$\mu g/m^3$=micrograms per cubic meter

Source: California Air Resources Board, 199**9**

CARB has established state ambient air quality standards, many of which are more stringent than the corresponding national ambient air quality standards. In addition to the six criteria pollutants regulated by the Federal Clean Air Act, CARB has also established state standards for hydrogen sulfide, sulfates, and visibility reducing particulates as shown in Table 8-8.

Table 8-8: State Ambient Air Quality Standards with No Federal Counterpart

Pollutant	Averaging Time	California Standards
Sulfates	24 Hour	25 µg/m3
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)
Visibility Reducing Particulates	8 Hour (10 a.m. to 6 p.m., PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer—visibility of ten miles or more due to particles when the relative humidity is less than 70 percent.

ppm=parts per million
mg/m^3=milligrams per cubic meter
$\mu g/m^3$=micrograms per cubic meter

Source: California Air Resources Board, 1999

An area is designated to be in nonattainment for a certain pollutant if violations of the applicable standard have occurred in each of the last three years. One violation per year contributes to state designation as nonattainment; federal designation occurs with two or more violations per year. A complete listing of the attainment status by pollutant for Mariposa County is shown on Table 8-9.

The California legislature, when it passed the California Clean Air Act, recognized that attainment of the PM_{10} standard is not easily accomplished, and therefore set requirements that were are stricter than for other pollutants. The California Clean Air Act did require CARB to produce a report regarding the prospect of achieving the state ambient air quality standard for PM_{10}. CARB recommended that certain actions be taken, but did not impose a planning process to require attainment by a certain date.

EFFECTS OF NON-ATTAINMENT

Ozone is considered to be the main constituent of smog. Complex photochemical reactions between reactive organic gases and nitrogen oxides in the presence of sunlight produce ozone. The major sources of reactive organic gases and nitrogen oxides in Mariposa County are motor vehicles and stationary source combustion processes. The direct effects of ozone include aggravation of respiratory diseases, eye irritation, visibility reduction, and vegetation damage.

Particulate matter of all sizes may be made up of several types of particles including dust, smoke, ash, mist, and fumes. Sources of particulate matter include combustion of fuels, agricultural practices (such as tilling and burning), construction activities, road dust, industrial processes, and natural sources such as wind-blown dust. The majority of airborne particulate matter generated in the County is caused by the re-entrainment of road dust by motor vehicle tires, and wind blown dust. Extended exposure to particulates can cause and aggravate respiratory diseases and severely limit visibility.

Table 8-9: Mariposa County Attainment Status by Pollutant

Pollutant	Averaging Time	California Standards	Federal Standards[1]
Ozone (O_3)	1 Hour	Non-attainment	Unclassified Attainment
	8 Hour	No State Standard	Unclassified Attainment
Respirable Particulate Matter (PM_{10})	Annual Geometric Mean	Unclassified	No Federal Standard
	24 Hour	Non-attainment	Unclassified Attainment
	Annual Arithmetic Mean	No State Standard	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No State Standard	Unclassified Attainment
	Annual Arithmetic Mean	No State Standard	Unclassified Attainment
Carbon Monoxide (CO)	8 Hour	Unclassified	Unclassified Attainment
	1 Hour	Unclassified	Unclassified Attainment
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	No State Standard	Unclassified Attainment
	1 Hour	Attainment	No Federal Standard
Lead	30 Day Average	Attainment	No Federal Standard
	Calendar Quarter	No State Standard	Unclassified Attainment
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	No State Standard	Unclassified Attainment
	24 Hour	Attainment	Unclassified Attainment
	1 Hour	Attainment	No Federal Standard
Sulfates	24 Hour	Attainment	No Federal Standard
Hydrogen Sulfide	1 Hour	Unclassified	No Federal Standard
Visibility Reducing Particulates	8 Hour (10 a.m. to 6 p.m., PST)	Unclassified	No Federal Standard

[1]Only Primary NAAQS are used for classification purposes. As such, no classification has been designated for the 3-hour SO_2 Standard.

Source: CARB, 1999

Carbon monoxide is a product of the incomplete combustion. The largest source of carbon monoxide in Mariposa County is motor vehicles. Motor vehicle emission rates are highest when the vehicles are idling or traveling at slow speeds. Other CO sources are utility and industrial fossil fuel combustion, forest fires, and open burning. Exposure to high levels of CO can cause headaches and dizziness and can aggravate cardiovascular disease.

8.5.02 FACTORS AFFECTING LOCAL AIR QUALITY

The primary factors that affect local air quality are the location of the air pollutant sources and the amount of pollutants emitted. Topographical and meteorological conditions are also important in determining the location and degree of pollutant concentrations. Atmospheric conditions such as wind speed, wind direction and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The effects of these factors as they occur in Mariposa County are discussed in the following sections.

TOPOGRAPHY

Mariposa County consists of rolling to mountainous terrain interspersed with deep canyons, streams, and rivers. The relief of the western portion of the County is relatively gentle, with rolling hills that gradually increase in height toward the east. Moving eastward, the hills become more pronounced and the elevation quickly rises to mountains interspersed with

valleys. Elevations begin around 300 feet in the west and rise to nearly 11,000 feet in the east.

TEMPERATURE

Since the terrain in Mariposa County varies dramatically, temperatures also vary in different portions of the County, depending on the topography. The lower elevations in the west have mild, wet winters and warm, dry summers. As in areas in the nearby Central Valley, temperatures in the western portion of the County can fall below freezing on occasion and can rise to 100 degrees in the summer months. The mountainous eastern portions of the County receive abundant winter snowfall above the 3,000-foot level, and enjoy mild, dry summers. Maximum July temperatures average around 95 during the day to 60 degrees at night at lower elevations, but only average around 90 to 40 degrees respectively above the 5,000 foot level. In January, the temperature ranges between 35 and 55 degrees at lower elevations and between 20 and 45 degrees above the 5,000 foot level. Higher elevations are subject to freezing approximately 265 days of the year, while lower elevations are subject to freezing only 115 days of the year on average. Temperature differences play an active role in local air quality levels. Temperature variations lead to changes in the movement of air pollution. Temperature inversions cause pollutants to concentrate in the lower atmospheric layers near the Earth's surface. Stable inversions can trap pollutants near the surface of the earth for extended periods. Since the temperature levels vary dramatically within different portions of the County, atmospheric instability is likely to occur and the tendency to concentrate pollutants decreases.

PRECIPITATION

Precipitation varies between the lower elevations in the western and southern portions of the County and the higher elevations in the eastern and northern portions of the County. On average, precipitation ranges from approximately 15 inches annually in the lower elevations to approximately 50 inches in the higher elevations. According the 1983 Mariposa County General Plan, 85 to 90 percent of annual precipitation falls between November and late April. In addition, thunderstorms are nearly seven times more common in higher elevation than lower elevations.

WIND

Northwest winds predominate in Mariposa County, with secondary southeast winds experienced in the western part of the County on occasion. However, local topography strongly affects wind direction, direct winds up and down the valleys and canyons in the mountainous areas. Wind speeds are primarily light or moderate. Strong winds are infrequent but do occur in localized areas as a result of thunderstorms. Occasionally, winter low-pressure systems may cause strong winds, as do high and low pressure area occurrences located in the Sierra and eastward. Wind speeds may reach 45 to 50 miles per hour once every two years, and up to 80 miles per hour once every 50 years in moderately exposed areas of the County.

8.5.03 EXISTING AIR QUALITY

CARB compiles ambient air quality data from monitoring stations in the state. There are three monitoring stations in Mariposa County operated on a regular basis. The Turtleback Dome Station in Yosemite National Park and the Jerseydale Station, located east of Midpines,

monitor O_3. The Yosemite Village Visitor Center Station monitors PM_{10}. As stated above, the EPA and CARB have set ambient air quality standards for criteria air pollutants. Of these, only O_3 and PM_{10} are monitored on a regular basis in Mariposa County. No monitoring data are available for CO after 1992 , for NO_x since 1981, and SO_2 has not been monitored for more than 20 years, reflecting the absence of any perceived problem for those air pollutants in the County. Mariposa County monitoring data for these pollutants as compiled by CARB are presented in Table 8-10.

Summarized measurement data for Mariposa County as a whole, show that air quality has varied over the past five years. No recent clear air quality trend is indicated from the data. Review of data from 1987 to 2000 likewise reveals no clear trend for O_3 concentrations, but does indicate an overall long-term decline in PM_{10} concentrations in the County.

The major point sources of PM_{10} in Mariposa County are Mariposa Aggregates and Outback Materials. These facilities are located near Highway 49, southwest of the town of Mariposa. According to the California Air Resources Board, Mariposa Aggregates emitted approximately 7.95 tons per year while Outback Materials emitted approximately 1.65 tons per year in 1996. Their combined emission of less than 10 tons per year is relatively low, and does not indicate that these point sources are major polluters.

Table 8-10: Project Area Air Pollution Summary, 1996-2000[a]

Pollutant	1996	1997	1998	1999	2000
Ozone (O_3)					
Highest 1-hr average, ppm [c]	0.11	0.12	0.11	0.16	0.12
Number of days federal standard exceeded [d]	0	0	0	1	0
Number of days state standard exceeded [d]	28	7	13	16	10
Particulate Matter-10 Micron (PM_{10})					
Highest 24-hr average, $\mu g/m^3$ [c]	106	62	40	10	98
Number of days state standard exceeded [d]	18	6	0	12	15

a. Data from CARB compiled for Mariposa County monitoring stations.
b. State standard, not to be exceeded.
c. Ppm - parts per million; µg/m - micrograms per cubic meter.
d. Refers to the number of days in a year during which at least one exceedance of the standard was recorded.

Source: CARB, *ARB Almanac 2002*, June 18, 2002

The combined impact of motor vehicles within Mariposa County, and emissions from neighboring counties, has caused the County to exceed standards for PM_{10} in Yosemite Valley. Although steps have been taken to provide alternative methods of transportation for days when private vehicle load exceeds parking capacity in Yosemite Valley, private vehicles are still the predominant mode of transportation outside of Yosemite. While the PM_{10} levels may fall in Yosemite Valley, the overall O_3 and PM_{10} air quality in the County will likely continue at current levels. In addition, the large-scale growth occurring in the surrounding Central Valley counties is likely to continue. Wind-blown emissions from these growing neighboring counties will therefore continue to be transported into Mariposa County, further impacting air quality. Thus, the data show that air quality is both a local concern (as in Yosemite Valley), and a regional issue where pollutants travel from other parts of the Mountain Counties Air Basin and the Central Valley to affect the County's residents.

8.5.04 PROGRAMS AFFECTING AIR QUALITY

Residential burning is a permissible practice in Mariposa County. Residential burning is the use of an outdoor fire to dispose of vegetation, untreated wood, clean paper, and clean cardboard and may only occur on the property in which the material originated. In addition, residential burning may only occur on permitted burn days that are established by the Mariposa County Air District. Burn days are established based on the season and corresponding air quality in the area. There are strict rules to limit what can and cannot be burned. Items that may not be burned include household garbage, treated wood, plywood, particleboard, OSB, roofing materials, construction/demolition debris, furniture, clothing, diapers, plastics, tires, rubber, tar paper, insulation, paint, waste oil, electrical wire, glass, or animal carcasses or wastes.

Smoke from residential burning can adversely affect those nearby the burning activity and can add to a cumulative air quality problem. Burning illegal material can cause burning and itchy eyes, shortness of breath, and asthma attacks. Long-term exposure can lead to respiratory disease, lung damage, cancer, and premature death. Those able to practice residential burning are encouraged to follow simple burn guidelines to ensure proper burning. Those who are caught burning illegal materials or burning on no-burn days are fined.

PLANS TO REACH ATTAINMENT

As shown in Table 8-9, Mariposa County has been assigned either attainment on unclassified status for all federal air quality standards. Therefore, Mariposa County Air Pollution Control District has not prepared an attainment plan (Dave Conway, County Dept. of Health, January 18, 2001).

8.6 WATER RIGHTS

8.6.01 WATER RIGHTS IN CALIFORNIA

A water right is a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use. Water rights are property rights, but their holders do not own the water itself – they possess the right to use it. The exercise of most water rights in the State of California requires a permit or license from the State Water Resources Control Board.

There are two basic types of water rights in California: riparian and appropriative. A riparian right entitles the landowner to use a correlative share (that is, a share relative to the amount of property owned along the waterway in question) of the water flowing past his or her property. Riparian rights do not require permits, licenses, or government approval, but they apply only to the water that would naturally flow in the stream. Riparian rights do not entitle a water user to divert water to storage in a reservoir for use in the dry season or to use water on land outside of the watershed.

During the California gold rush, the miners developed a system of "posting notice" which signaled the birth of today's appropriative right system. The notice allowed others to divert available water from the same river or stream, but their rights existed within a hierarchy of priorities. This "first in time, first in right" principal became an important feature of modern water rights law in California.

One of the first actions taken by lawmakers after California entered the Union in 1850 was to adopt the common law of riparian rights. One year later, the Legislature recognized the appropriative right system as having the force of law. The appropriative right system continued to increase in use as agriculture and population centers blossomed and ownership of land was transferred into private hands.

The conflicting nature of California's dual water right system prompted numerous legal disputes. Unlike appropriative users, riparian right holders were not required to put water to reasonable and beneficial use. This clash of rights eventually resulted in a constitutional amendment (Article X, Section 2 of the California Constitution) that requires all use of water to be "reasonable and beneficial". These "beneficial uses" have commonly included municipal and industrial uses, irrigation, hydroelectric generation, and livestock watering. More recently, the concept has been broadened to include recreational use, fish and wildlife protection, and enhancement and aesthetic enjoyment.

Up to the early 1900's appropriators – most of them miners and non-riparian farmers – had simply taken the amount of water they needed. Sometimes notice was filed with the county recorder, but no formal permission was required from any administrative or judicial body.

The Water Commission Act of 1914 established today's permit process. The Act created the agency that eventually evolved into the State Water Resources Control Board and granted it the authority to administer permits and licenses for California's surface water. The act was the predecessor to today's water Code provisions governing appropriation.

These post-1914 appropriative rights are governed by the aforementioned hierarchy of priorities developed by the gold miners. In times of shortage, the most recent ("junior") right holder must be the first to discontinue such use; each right's priority dates to the time the permit application was filed with the State Board. Although pre- and post-1914 appropriative rights are similar, post-1914 rights are subject to a much greater degree of scrutiny and regulation by the Board.

8.6.02 APPROPRIATIVE RIGHTS IN MARIPOSA COUNTY

MERCED RIVER

Historically the Merced Irrigation District (MID) has been the primary appropriator of Merced River water in Mariposa County, with applications dating back to the early 1920's. In 1960, MID submitted applications to the State Board to appropriate 605,000 acre-feet annually from the Merced River.. Mariposa County initially opposed this appropriation, but an agreement was reached between the two entities. The most important part of the agreement states:

1. The District and the County will jointly request the State Water Rights Board to grant and issue permits to the District under said Applications No. 16186 and 16187 subject to conditions to be set forth or incorporated by reference substantially as follows:

> The permits and all rights acquired or to be acquired thereunder are and shall remain subject to depletion of stream flow in the quantities set forth in sub-paragraphs (a), (b) and (c) by future appropriations of water for reasonable beneficial use within Mariposa County; provided such appropriations shall be initiated and consummated pursuant to law.

> (a) From the South Fork of the Merced River a maximum of 500 cubic feet per second of water not to exceed a total of 112,000 acre-feet annually by direct diversion to beneficial use and/or by diversion to storage to be later applied to beneficial use; provided that such future appropriations shall not be made in whole or in part within the payout period of the bonds by which permittee shall finance the project under these permits, but not to exceed a period of 55 years beyond the date of the beginning of construction of the projects of permittee as allowed under the permits or extensions thereunder, unless the person or agency making such future appropriation shall compensate the permittee for the loss of power revenue resulting during said period from said appropriation.

In return for the County's support of this appropriation, MID agreed to pay the County: the sum of $5,000,000 in annual installments of not less than $100,000, with the first payment to be made one year from the date on which MID received the first payment for power developed by the project; or the sum of $2,148,000 in one payment at any time prior to the date for beginning of installment payments.

MID also agreed, upon issue of the permits in their requested form, not to protest or to oppose any application for permit or license which might be filed by the County in the future for the appropriation of water as set forth in item 1 of the contract (see above).

In 1990, the County required an additional supply of surface water to support development in the Mariposa Public Utility District's service area. MID agreed to divert 5,000 acre-feet per year of its Merced River appropriation to this use in exchange for the County relinquishing a portion of the rights reserved to it in the 1960 agreement. Thus, the amount of water provided for in item 1(a) of the 1960 agreement was reduced from 112,000 acre-feet to 70,000 acre-feet annually. Additionally, the County agreed to compensate MID for loss of power revenue resulting from this diversion.

In 1990, two sections of the Merced River were designated a "Wild and Scenic River": the main stem of the Merced River from its sources to a point 300 feet upstream of the confluence with Bear Creek; and the south fork of the river from its source to the confluence with the main stem of the river. As a result of these designations, these two sections of the Merced River are now declared as fully appropriated stream systems by the State Water Resource Control Board (Order WR-98-08).

Should Mariposa County determine that additional water resources are required in the future from the fully appropriated sections of the Merced River, the following means could be used:

- A petition for assignment of State Filings could be filed. The State of California in Application No. 17124 and 17125 appropriated 112,000 acre-feet of water from the South Fork of the Merced River that could, in principle, be assigned to Mariposa County; or
- An applications seeking area-of-origin protection could be filed; i.e., since the Merced River originates in Mariposa County, the County is entitled to the benefit of area-of-origin principles.

OTHER COUNTY STREAM SYSTEMS

The water rights for several other stream systems in Mariposa County have been fully appropriated at least during some portion of the year. These include:

- Oliver Creek - fully apportioned between April 1 and November 30 from the confluence of Oliver Creek and the East Fork Chowchilla River upstream, including all tributaries where hydraulic continuity exists;
- South Fork Dry Creek – fully apportioned between April 1 and October 31 from 600 feet below the confluence of South Fork Dry Creek and Dry Creek upstream;
- Carter Creek – fully apportioned between June 1 and June 30) from the confluence of Miami Creek and the Fresno River upstream, including all tributaries where hydraulic continuity exists;
- Chowchilla River – fully apportioned between January 1 and December 31 from the confluence with the San Joaquin River and Chowchilla River upstream, including all tributaries where hydraulic continuity exists; and
- Fresno River – fully apportioned between May 1 and November 30 from Hidden Dam and the Fresno River upstream, including all tributaries where hydraulic continuity exists.