



**BIG SUR RIVER  
PROTECTED WATERWAY  
MANAGEMENT PLAN**

**LOCAL COASTAL PROGRAM  
MONTEREY COUNTY, CALIFORNIA**

***BIG SUR  
RIVER PROTECTED WATERWAY MANAGEMENT PLAN***

***County of Monterey  
Planning Department***

***State of California  
Resources Agency***

***Department of Fish and Game  
Protected Waters Program***

***California Coastal Commission  
Big Sur Coast Local Coastal Program***

***Adopted by the Monterey County Planning Commission  
October 26, 1983***

***Adopted by the Monterey County Board of Supervisors  
November 5, 1985***

***Certification Acknowledged by the California Coastal Commission  
April 9, 1986***

***This document was prepared with financial assistance from the California Resources Agency and the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration under the provisions of the Federal Coastal Zone Management Act of 1972 as amended, and from the California Coastal Commission, under the provisions of the California Coastal Act of 1976.***

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*The preparation of this plan was made possible by a \$5,000 grant from the California State Department of Fish and Game and by a grant from the California Coastal Commission that supported development of the Local Coastal Program for the Big Sur Coast. Forrest Reynolds, Supervisor of the Department's Waterway Management Program visited the area and gave many helpful suggestions as to approaches for the resolution of management concerns and the organization of this support.*

*The Monterey County Planning Department coordinated the planning effort and made available volumes of background material on the Big Sur area assembled as part of the coastal planning effort. Bill Farrel, Coordinator of the Local Coastal Program for Monterey County, provided the initial assesment of concerns, supervised the preparation of this plan ensuring its integration with the Local Coastal Program for the Big Sur Coast and provided general editing.*

*The Monterey Office of the California State Department of Fish and Game provided background information and insight into management alternatives. Fishery biologist, Randal Benthin, assembled and coordinated a special task force of interagency personnel which assessed the potential for mitigating existing barriers to fish migration.*

*The California State Department of Parks and Recreation, recognizing that the majority of the lower river passes through State Park property, made available numerous pertinent reports on the immediate area and interacted throughout the planning process in an effort to achieve a workable plan. Ken Jones and Jack Sutton of Pfeiffer-Big Sur and Andrew Molera State Parks extended their hospitality on numerous occasions to the planners and managers who surveyed the area.*

*Many others from County departments and State and Federal agencies provided background data for this plan and helped to ensure its conformance with their management policies and objectives. Thankful recognition is intended for everyone listed in Appendix 10 and an apology is extended to any who may not have been mentioned.*

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# *INTRODUCTION*

The California Protected Waterways Plan (Initial Elements), prepared in 1971 pursuant to the Protected Waterways Act of 1968, recognized the Big Sur River as an important steelhead and trout stream. In this report, the 17 acre lagoon at the river mouth was evaluated as an important wildlife waterway. In addition, the 2.5 mile reach from the Highway 1 bridge at Pfeiffer-Big Sur State Park to Big Sur was considered to be a Class II waterway suitable for experienced open canoers during a portion of the year.

In 1973, the State Legislature, with the support of the Monterey County Board of Supervisors, designated the Big Sur River a protected waterway. The resolution which incorporated the Big Sur River into the Protected Waterways Program requested that the Resources Agency and affected local agencies prepare a detailed waterway management plan for the Big Sur River. Furthermore, this resolution specified that his plan “shall include provisions for water conservation, recreation, fish and wildlife preservation and enhancement, water quality protection and enhancement, streamflow augmentation, and free-flowing and wild status.”\*

In 1979, the California State Department of Fish and Game and the Monterey County Board of Supervisors entered into an agreement to prepare a detailed protected waterway plan for the Big Sur River with the County’s funding commitment represented by work completed as part of the Local Coastal Planning effort for the Big Sur Coast.

Recently the U.S. Forest Service completed an environmental assessment for the Ventana Wilderness. This planning process will culminate in the preparation of a management plan for the entire wilderness. Since the entire Upper Big Sur River Basin is within the wilderness boundary and under the management of Los Padres National Forest, it seems reasonable that this wilderness management plan should also be looked upon as the plan for the protection and management of the Upper Big Sur River.

This protected waterway plan addresses pertinent issues and concerns in the Lower Big Sur River Basin. The lower river and its watershed, while a part of a larger ecosystem (the overall Big Sur River Watershed) is treated separately since it is the only part of the watershed subject to influence or use. The upper basin is generally inaccessible and remains in a natural state. As such, this plan considers only the waters which flow through the Big Sur Gorge from the upper to the lower basin. The resulting policies and recommendations are an attempt to develop an integrated program of land and resource management which will adequately protect both local and statewide interests in the Lower Big Sur River, its resources and its environs.

\*See Appendix 1 for Assembly Concurrent Resolution No. 32.

FIGURE 2 GOES HERE

The plan has been developed in response to the California Protected Waterways Act and also as a management program intended to assist in implementing the Big Sur Coast Local Coastal Program Land Use Plan. Accordingly, the plan is both a local and a state document to be adopted jointly by the County of Monterey, the State Resources Agency and the California Coastal Commission. As a state plan it will serve as a guide to all affected state agencies in the performance of their management responsibilities in the Lower Big Sur River Basin and will further be a basis for the agencies to anticipate future operational and funding needs. Through its coastal permit authority, the County will require conformance to this plan by both state agencies and private individuals during the consideration of development applications.

# ***STUDY AREA***

## ***Geography***

The area covered by this plan encompasses the entire Lower Big Sur River Basin; approximately eight thousand acres on the west slope of the Santa Lucia Mountain Range. The Big Sur River enters its lower basin through the Big Sur Gorge at the eastern boundary of Pfeiffer-Big Sur State Park, and thereafter flows in a northerly direction through the Big Sur Valley parallel to State Highway One to the mouth in Andrew Molera State Park, a distance of approximately 7.6 miles. Pfeiffer Ridge, averaging six to seven hundred feet in elevation, separates the Big Sur Valley from Sycamore Canyon and the ocean to the west. The common ridge of Post Summit (3,455 feet) and Manuel Peak (3,379 feet) divides the Lower Big Sur from the south fork of the Little Sur River to the east. Major tributaries from the eastern (west-facing) slope include Pfeiffer-Redwood Creek, Juan Higuera Creek, and Pheneger Creek. The Post Creek drainage defines the southern limit of the basin which is bounded on the east by Pine Ridge. At the north end of the valley, the Big Sur River again turns west across an extensive floodplain as it nears its mouth. The mouth of the river forms a lagoon as it nears its mouth. The mouth of the river forms a lagoon that changes in size and shape as the sandbar between the river and the ocean changes with the seasons.

## ***Geology***

The *Guide To the Geology of Pfeiffer Big Sur State Park* published by the California Division of Mines (Oakeshott, 1951) describes the rock formations which comprise the Lower Big Sur Basin and summarizes the geologic history of the Big Sur area. More detailed information and maps of the geology of both Andrew Molera and Pfeiffer-Big Sur State Parks are contained in the resource inventories housed in the library of Pfeiffer-Big Sur State Park headquarters.

The following abstract quoted from Oakeshott (1951) suffices as a very brief overview of the geology of the Lower Big Sur River Basin.

“Pfeiffer-Big Sur State Park includes an irregularly shaped area of about 1 square mile in the lower valley of the Big Sur River which rises in the Santa Lucia Mountains and empties into the ocean a short distance south of Point Sur. The Park is crossed by Highway 1 about 27 miles south of Carmel in Monterey County.

The Santa Lucia Mountains reach a maximum elevation of about 3500 feet in the vicinity of the Park. The mountains have a broad summit area of subdued mature relief, but drop off very abruptly to form steep cliffs at the margin of the sea. The Big Sur River has cut a steep-sided narrow gorge in the higher eastern part of the Park and flows over a gentle grade in a broader valley along the Sur fault zone through the camp area. Repeated uplift in late geologic time has caused the river to leave a series of gravel covered benches or terraces at several levels near its course.

The central part of the range is made up of the very old crystalline rocks of the Sur series which have been intruded by later Santa Lucia granite. This group of rocks has been thrust southwestward and upward over Franciscan sandstone and shale along the Sur-Sur Hill fault zone.

The Sur fault and Sur Hill fault in the State park are separated by a sliver of Santa Margarita sandstone a few hundred feet across. Movement along this major thrust fault zone probably began as early as upper Miocene time and ceased by late Pleistocene time.

Present topography is the result of repeated near-vertical uplift and erosion in late Quaternary time.”

### *Precipitation*

Average annual precipitation for the Big Sur Watershed is estimated at 43 inches (Black & Veatch, 1980). The greatest annual rainfall recorded at the rain gauge in Pfeiffer-Big Sur State Park was 77.53 inches in 1940-41; the least was 18.87 inches in 1923-24. The average annual rainfall over a period of sixty years (1914-15 through 1973-74) for this location is 39.83 inches. Precipitation increases with altitude in the Big Sur area and average annual precipitation is over 50 inches in the higher elevations of the watershed.

### *Hydrology*

The drainage area of the entire Big Sur River has been calculated to be 60.78 square miles (California Department of Water Resources, 1971) and 58.53 square miles (Black & Veatch, 1980). Water from the upper basin is funneled through the Big Sur Gorge in the eastern portion of Pfeiffer-Big Sur State Park. The Lower Big Sur River Basin is approximately 12.5 square miles in area.

A USGS stream gauge is located on the Big Sur River just below the gorge (next to the abandoned bridge abutment in Weyland Camp - 0.4 miles upstream from the mouth of Post Creek) in Pfeiffer-Big Sur State Park. Prior to October 1, 1951, the gauge was located 0.9 miles downstream at a different datum.

The average annual runoff of the Big Sur River for the twenty-seven year period between 1950 and 1977 is 64,900 acre feet based on USGS stream gauge records (Vita, 1980). The greatest mean runoff occurs in January when it is more than 240 cubic feet per second. The maximum recorded stream discharge was 7,100 cfs recorded on April 2, 1958 (California Coastal Commission, 1977). The normal seasonal range of Big Sur River discharges is shown in Appendix 6.

Mr. Roy Trotter measured the stream flow on the major tributaries to the Lower Big Sur River during the dry period of the year (August and September) in the unusually dry years of 1976 and 1977. These drought year measurements are the lowest recorded flows for these tributary creeks.

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*Table 1*

|                        | <i>Date<br/>Measured</i> | <i>GPM</i> | <i>CFS</i> | <i>Square<br/>Miles</i> | <i>GPM/<br/>Sq. Mi.</i> |
|------------------------|--------------------------|------------|------------|-------------------------|-------------------------|
| Pheneger Creek         | 8-22-76                  | 0          | 0          | .81                     | 0                       |
|                        | 9-17-77                  | 0          | 0          | --                      | 0                       |
| Juan Higuera Creek     | 8-30-76                  | 367.1      | .818       | 1.83                    | 200.6                   |
|                        | 9-17-77                  | 185.0      | .413       | --                      | 101.1                   |
| Pfeiffer-Redwood Creek | 9-20-76                  | 56.9       | .130       | 1.02                    | 55.8                    |
| Pfeiffer Creek         | 8-22-76                  | 0          | 0          | .13                     | 0                       |
|                        | 9-17-77                  | 0          | 0          | --                      | 0                       |
| Post Creek             | 9-20-76                  | 12.1       | .027       | 1.36                    | 8.9                     |
|                        | 11-7-76                  | 3.6        | .008       | --                      | 2.6                     |

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The minimum discharge rate recorded at the USGS gauge during the summer of 1976 was 2510 gallons per minute (gpm) or 5.6 cfs for a gpm square mill ratio of 50.3. This was the third lowest discharge rate in the past 25 years according to USGS records. The river's flow in October was about one-third the normal of 20 cfs.

### *Water Resources Development*

The history of water resources development in the Lower Big Sur River Basin is characterized by the creation of individual and small community water systems at numerous points along the valley floor and tributary streams. These water systems serve the residences and employee housing in the Big Sur Valley, the restaurants, motels, and stores along Highway 1 and the campgrounds along the Big Sur River.

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\* It was concluded that the minimum stream flows estimated by a "desktop" method cannot be used with confidence due to the magnitude and degree of hydrologic unknowns.

The only development of water for agricultural purposes is near the mouth of the Big Sur River. The largest single water system serves Pfeiffer-Big Sur State Park. Four mutual water companies transport and supply water out of the Lower Big Sur River Basin to supply properties on the west slope of Pfeiffer Ridge. Most of the isolated homesites in the Big Sur Valley have their own wells and/or springs.

The vast majority of the water systems (two or more connections) are one of two types: a) relatively shallow wells sunk in the alluvium alongside the Big Sur River; b) stream diversions on the mid and upper portions of the major tributary creeks. Appendices 4A and 4B summarize information on the water systems in the Lower Basin. The locations of wells and points of diversion are shown on the map of water resources (Figure 5).

### ***Biotic Communities***

A well-developed riparian community occupies the banks and portions of the alluvial flats along the entire length of the Lower Big Sur River. The white alders, sycamores, bit leaf maples, and California bays give way to black cottonwoods and willow thickets near the river mouth. Characteristic understory vegetation lines the river banks beneath the forest. A small patch of freshwater marsh occurs in the lagoon area near the river mouth.

Many of the slopes in the valley are occupied by a mixed evergreen forest with coast live oak, California bay, tanbark oak, and madrone predominating. Much of the area is covered by redwood forest with the more dense stands of trees located in the canyons and along the alluvial plains of the river. Several major redwood groves occur on the alluvial floodplains of the Lower Big Sur River. Chaparral species (coyote brush, chamise, ceanothus, manzanitas, toyon) cover the steeper slopes.

Previously cleared and grazed areas occur primarily on slopes and floodplain areas in Andrew Molera State Park. These “grazing meadows” have been referred to as grassland and coastal prairie but are best considered as pastureland capable of reverting to the native plant communities depending on the physical conditions of the site.

The biotic community of the river itself has an abundant fauna of invertebrates, especially insect larvae. Numerous fish reside here year round and the stream gravels are the spawning grounds of the anadromous steelhead trout.

### ***Flora and Fauna***

More than 367 species of native and non-native vascular plants are known to occur in the Lower Big Sur River Basin. Annotated plant lists for the two state parks in the basin have been compiled by the Department of Parks and Recreation (see Bibliography). A wide variety of wildlife species occur in the mosaic of biotic communities in and along the river and in its watershed. Eight species of fish, six amphibians, eight reptiles, one hundred and forty-eight species of birds and twenty-seven different kinds of mammals are known to occur in the area. (See Appendix 7). Many of these animals are directly dependent upon the river and the habitats its supports.

Several rare and endangered wildlife species are known to occur in the Lower Big Sur River Basin. The Brown Peoican frequents the river mouth area on a year round basis, while the Peregrine Falcon which forages along the coast has been sighted in this area. The Clapper Rail call has been heard in the river mouth area, but there have been no confirmed sightings according to the Department of Parks and Recreation Resource Inventory for Andrew Molera State Park.

Present information does not indicate the presence of any state or federally listed rare, threatened, or endangered plant species in the Lower Big Sur River Basin.

FIGURE 3 GOES HERE

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# ***ISSUES AND CONCERNS***

## ***Water Resources***

### ***Stream Diversions***

During the recent drought no surface water flowed out of Pheneger Creek, nor from Post Creek into the Big Sur River. These conditions were recorded in the late summer of 1977 (personal communication, Ray Trotter and Frank Ramistella).

Only the Coastland Mutual Water Company has obtained a license to appropriate water from Post Creek, which presently serves twenty-five dwellings west of the watershed. Seven other separate points of diversion occur in the upper Post Creek drainage which are or have been relied on to meet the water needs of some 700 people during the peak demand season. This watershed has a history of water supply problems.

Licenses for the appropriation of 137,583 gallons per day from Pheneger Creek have been issued by the California State Division of Water Rights.

The concern is that these creeks may become oversubscribed to the detriment of any downstream diversions and will not maintain sufficient flow for juvenile steelhead in the lower river and Post Creek.

### ***Water Supply***

Estimated yearly runoff from the entire Big Sur River watershed (both upper and lower basins) is 64,900 acre feet (Vita, 1980). The vast majority of this runoff occurs between November and May. Being that there is no means of storing any significant amount of this runoff, water resources development is limited by available water flow in the dry summer months when the base flow in the river averages 8,785 gpm or 12,650,400 GPD. More significant are the flows available to satisfy peak demand months such as August in which the average stream flow is 6,690 GPM or 9,633,600 GPD. Whenever possible, water systems must be designed with drought year flows in mind. The lowest flow measured in 1976 at the USGS Gauge of 2,510 GPM, or 3,619,326 GPD, should be used as a base reference in establishing limiting factors on potential water development.

Most of the water systems in the Lower Big Sur River Basin are supplied by water pumped from shallow wells at or near the river bank. Little is known about the underground hydrologic basin in the Big Sur Valley. The shallow depth of these wells, however, would lead one to assume that the underground water supply is dependent upon the amount of water flowing in the river. The maximum combined low flows of both the river and its tributaries are estimated at 4,242,324 gallons per day (gpd). Water available for those systems dependent on surface flows from creeks in the lower basin is

in addition to these figures since the gauge on the Big Sur River is located upstream from these tributaries.

Present water usage in the Lower Big Sur River Basin has been calculated at 191,233 gpd (California Coastal Commission, 1977) based on demand from existing facilities. The accompanying water resources map shows the locations of wells and stream diversions which supply the existing water systems. There are others which supply the existing water systems. There are others which supply individual homes. No single management agency has kept thorough tabulations on water resources development in the Lower Big Sur River Basin. Moreover, “at the present time, there are no effective regulations, controls, guidelines, or a policing agency with the responsibility to manage and protect the water resources in the Big Sur coastal study area” (Trotter and Vita, 1980). The potential for additional water usage for both residential and recreational development is uncertain in light of the inadequate information about water availability, present water usage, and its effects on the river ecosystem. Trotter, (1980) has proposed certain measures for resolving this situation.

### ***Water Transport***

Presently more than 65 homes outside the Lower Big Sur River Basin are supplied by water from the basin. Coastlands Mutual Water Company diverts its water from the headwaters of Post Creek, and the Dani Pfeiffer Ridge Mutual Water Company, Pfeiffer Ridge Mutual Water Company and Rancho Chaparral Mutual Water Company pump from wells on the Big Sur River bank and floodplain. Additionally, wells near the mouth of the Big Sur River supply the Point Sur Naval Station north of the watershed boundary and provide irrigation water for the pasturelands of the El Sur Ranch. Some of the irrigation water finds its way back into the lagoon via the perched water table.

Concern has been expressed about the impact of the transport of additional water out of the Lower Big Sur River Basin to support development in water deficient areas, but it is recognized that a small number of mutual water companies and private owners are and have been withdrawing small quantities of water from the Big Sur River basin to serve properties located partially or wholly outside the Big Sur River watershed. Presently such transport is minimal but is felt that measures should be considered to limit future use if it is conclusively shown that such use will result in a degradation of the quantity below a determined minimum quantity necessary to maintain the existing stream habitat said quantity being determined by a hydrologist after the appropriate hydrological study. The County should encourage water resource development within watersheds other than the Big Sur.

## ***Fire and Flood***

### ***Fire Hazard***

A wildfire started by illegal campers on August 1, 1972, in Molera State Park swept northeastward to the crest of the main ridge above Big Sur and southward along the east side of the Big Sur Canyon. The Molera Fire burned 4,300 acres of chaparral, grass and timber with a containment cost of \$850,000. There have been numerous fires in the northern Santa Lucia Mountains since the U.S. Forest Service began keeping fire history records for the area in 1911. The most recent and noteworthy fire was the 1977 Marble Cone Fire which burned 28,000 acres of the 30,000 acres in the Upper Big Sur River Basin. Although this fire did not enter the Lower Basin, the loss of virtually all of the vegetation in the watershed in a single event raised great concern over potential impacts of predicted flooding and sedimentation in the Lower Basin (Cleveland, 1977; County of Monterey, 1977). In 1924, a large fire in the Ventana burned most of the same area which was later burned by the 1972 Molera Fire. This fire also burned much of Pfeiffer-Big Sur State Park and the east-facing slope of Pfeiffer Ridge (U.S. Forest Service, ud.). An unmapped 1907 forest fire also burned the vegetation in the Pheneger, Juan Higuera, and Pfeiffer-Redwood Creek drainage basins (Jackson, 1977).\*

The potential for fires with disastrous consequences in the Big Sur Valley has been increased through the exclusion of fire. Many of the steep chaparral and wooded slopes have not burned for almost sixty years. Tree ring analysis has revealed an average fire frequency of 29 years prior to the effective suppression of most fires beginning around 1911 (personal communication, Gene Onken). Mature chaparral stands actually create a set of conditions more conducive to fire.

The State Parks and Recreation Department discs the borders of the meadow areas in Andrew Molera State Park to serve as a fire break and for fire access. No fire prevention methods can be expected to exclude fire out indefinitely since the plant communities in the area are designed by nature to burn. The impact of future wildfires on the land and structures in the Big Sur area is constantly on the minds of local land managers and residents.

### ***Flood Hazard***

After the 1977 Marble Cone Fire burned over virtually all of the Upper Big Sur River Basin, the State Department of Parks and Recreation and the Monterey County Flood Control and Water Conservation District became very concerned over the potential of a severe flood along the Lower Big Sur River resulting from rainfall collected in the 46 square mile upper basin.

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\* Written communication to L. Jackson, Jr. from L. R. Helm, 1973.

The Department of Parks and Recreation relocated the bridge to the campground side of the river, constructed rock gabbions to slow surging and reduce velocity downstream from Pfeiffer-Big Sur State Park and built protective dikes around structures in both Pfeiffer-Big Sur and Andrew Molera State Parks.

The Monterey County Flood Control and Water Conservation District coordinated a \$60,000 State Department of Water Resources grant in which workers from the California Conservation Corps under the supervision of the Monterey County Public Works Department, spent several weeks clearing the river channel of logs and debris which might impede flood waters and accelerate bank erosion. Studies commissioned by the Flood Control District anticipated greatly increased sedimentation and flooding in the event of a severe storm in the exposed upper watershed (Koretsky, 1977).

Although the anticipated flood waters fortunately did not materialize at this time, major floods will periodically inundate the floodplain areas in the lower river basin. Structures within the floodplain may be in jeopardy in the future. In the past, flood waters have deposited significant quantities of sediment in riverside campgrounds (personal communication, Hugh Rideout).

## ***Mudflows***

The 1972 Molera Fire burned through four drainage basins tributary to and northeast of the Lower Big Sur River - Pfeiffer-Redwood Creek, Juan Higuera Creek, Pheneger Creek, and an unnamed creek a mile northwest of Big Sur Village. The loss of vegetation and changes in the structure of the soil brought on by the intense heat of the Molera Fire set the stage for the subsequent mud and debris flows.

Major storms in October and November of the same year caused flooding in these drainages and intense, short duration rainfall triggered mudflows from these steep watersheds on October 12 and 15 and November 15 (Cleveland, 1972). Mudflows jumped the bed of Pfeiffer-Redwood Creek crossing Highway One to the river and repeatedly closed the highway. Blocks of rock up to eight feet in diameter and trees four feet in diameter were carried along in a major debris flow which struck Big Sur Village on November 15 destroying several structures and vehicles.

Logs and debris jams were deposited in the main channel of the Big Sur River at the mouth of Pheneger and Juan Higuera Creeks by the 1972 mudflows. In order to prevent future flooding, these 10 and 20 foot deep piles of mud, gravel, and log jam debris were cleared by private contractors and the Ecology Corps under the direction of the Monterey County Flood Control and Water Conservation District. A \$60,000 grant from the California Department of Water Resources was made to the County to assist in this work.

This was not the first mudflow to descend upon Big Sur Village. Following a 1907 forest fire which burned the vegetation in all three basins (Pheneger, Juan Higuera, and Pfeiffer-Redwood) (Jackson, 1977), mudflows occurred during the winters of 1908, 1909, and 1910. Dendrochronological studies and carbon dating of prehistoric mudflows have revealed that at least three mudflow events occurred along Pfeiffer-Redwood Creek between about 1370 and 1860 (Jackson, 1977).

Thus, mudflows have been periodic natural phenomena in the Big Sur area for at least the last 600 years and probably for as long as there have been heavy and intense rainfall and steep slopes mantled by chaparral vegetation. Mudflow deposits in terraces along the lower course of Pfeiffer-Redwood Creek indicate that these conditions have prevailed for many thousands of years.

Management of fuel loading to prevent large “conflagration type” fires in the tributary watersheds surrounding Big Sur and the disastrous mudflows which could again result from a similar series of storms is paramount in everyone’s minds.

## ***Water Quality***

### ***Creek Water Quality***

Each water system of two or more connections is tested by the Monterey County Environmental Health Department for coliform bacteria one to two times each year by analyzing samples taken from one of the service connections. Chemical tests of water quality are made only when expansions of water systems are contemplated.

No problems have been recorded for water samples taken from those systems supplied by wells in the area. Fecal coliform contamination has been observed in some of the systems drawing water directly from tributary creeks. These systems presently lack chlorinators because of sediment clogging problems associated with chlorinating devices and periodic maintenance and chlorination of water storage tanks is periodically necessary. Water obtained from Pheneger Creek by the River Village Water Association consistently fails to meet State requirements. These systems presently lack chlorinators. Due to this condition, all but one of the members of the Association have converted to well water and the remaining member presently has a well permit and plans to install a well in the immediate future.

### ***Ground Water Quality***

The primary means of human waste disposal in the Lower Big Sur River Basin is through the use of septic tanks. A majority of the leach fields serving the recreation and visitor-serving facilities in the Big Sur Valley are in quaternary alluvium; gravels and sands which form the floodplain on either side of the river. This could present problems during actual flooding. The leach field for the sewerage treatment plant which serves Pfeiffer-Big Sur State Park is also in a floodplain meadow between Highway One and the river.

Many of these same visitor-serving facilities as well as local residences draw their water from shallow wells (less than 35 feet deep) which are sunk in the river gravels. Since both wells and leach fields are scattered along the river corridor, there is concern that this underground water source could become contaminated especially during extremely dry periods or flooding and in the area of concentrated development between Pfeiffer-Big Sur and Andrew Molera State Parks.

### ***River Water Quality***

The quality of water in the Lower Big Sur River is monitored on a monthly basis by the Monterey County Environmental Health Department. Water samples taken at a series of 16 stations\* between the Big Sur Gorge and the river mouth are analyzed for total coliform and fecal bacteria. No determinations are made of the quality of water entering the Lower Big Sur River from its tributary creeks. Nor is there any available information the numerous other water quality parameters\*\* which typically are used to characterize river systems and analyze watershed influences.

Campsites in the Upper Big Sur River Basin (Ventana Wilderness) are by necessity on the steep terrain situated along the river terraces within the floodplain. There are presently only a limited number of pit-toilets at the established campsite locations within the Wilderness.\*\*\* Elsewhere wilderness visitors are directed to deposit their feces in shallow holes covered by a layer of soil. High total and fecal coliform bacteria levels recorded just below the Big Sur Gorge during the summer months of recent drought years (1976 and 1977) necessitated the closure of the lower river for body contact sports by the Monterey County Environmental Health Department. Under the assumption that inadequate human waste disposal at the heavily used campsites along the Upper Big Sur River was the cause of this contamination, the Forest Service is contemplating constructing pit-toilets at the wilderness campsites along the Upper Big Sur River (USDA Forest Service, 1980).

Generally the water quality of the Lower Big Sur River is well within the acceptable standard for body contact sports. Concerns have been expressed however, that the many septic systems in the flood plain along the lower river which handle the wastes of large numbers of seasonal recreational visitors could cause significant adverse affects on the recreational water quality of the river. Old and inadequately maintained septic systems within the watershed could also adversely affect the river water quality.

The leach field for the sewage treatment plant at Pfeiffer-Big Sur State Park, which at times processes a peak capacity of 100,000 gallons per day, is in the river floodplain upstream from many water systems in the Big Sur Valley. Fortunately, water samples from above and below this location show no reduction in river water quality at the present time.

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\* See Water Resources Map for locations of water quality monitoring stations.

\*\* See list in recommendation section.

\*\*\* Most previous primitive toilets were either removed in conformance with prior wilderness management policies or burned by the Marble Cone Fire.

## ***FISH AND WILDLIFE***

### ***Fire Suppression***

Both vegetation and wildlife in the coastal mountains of California are adapted to and benefit from periodic fires. The suppression of both naturally occurring and man-caused fires since the beginning of this century has reduced upland wildlife habitat values in certain portions of the Lower Big Sur River watershed. The nutritive value and palatability of young chaparral growth is greater than that of mature chaparral which cannot support as large or as diverse an animal population. Dense old growth vegetation hinders wildlife movement and has increased the potential for catastrophic losses of wildlife and wildlife habitat due to conflagration-type wildfires.

### ***Fish Migration Barrier***

Large boulders and a log jam at two locations in the narrow Big Sur Gorge in Pfeiffer-Big Sur State Park present an impassable barrier to anadromous fish migration. Thus, at present, steelhead trout spawning is restricted to the seven mile river channel below the gorge. There are many miles of potential habitat above these “falls” (State of California Resources Agency, 1965).

This barrier to the apparently historic movement of steelhead into the upper basin has existed since the 1930's. Blasting operations were carried out on three separate occasions between 1947 and 1957 in efforts to remove the barrier.

The California State Department of Fish and Game in conjunction with the California State Department of Parks and Recreation, the U.S. Forest Service, the State Department of Water Resources, and the U.S. Army Corps of Engineers, is currently studying the feasibility, benefits, costs, and potential impacts of modifying this barrier to allow fish passage. Concerns have been voiced that the use of explosives to create a negotiable channel could trigger a landslide further blocking the gorge or that the modified channel would be less appealing to park visitors who swim, sunbathe, picnic, fish, and explore in the river gorge.

The Upper Big Sur River Basin has more than 50 miles of excellent steelhead habitat and cool, shaded pools for summer juvenile trout rearing (personal communication, Randy Benthin). Comparison of the productivity of lower and upper basin habitat in the Carmel River drainage indicates that access to the Upper Big Sur River Basin could result in a one thousand percent increase in the steelhead population. Such an increase in the steelhead population could greatly enhance the recreational fishery in the Lower Basin below Pfeiffer-Big Sur State Park. This vast increase in available habitat would also reduce the significance of past and future impacts from water resources development in the Lower Basin. However, such an increase in steelhead population may also have an impact on other biotic communities and should be addressed accordingly.

## *Instream Flow Requirements*

Young steelhead trout must spend their entire first summer in the river or its tributary creeks before migrating to the ocean the next winter. Because of the significant reduction in flow observed during recent drought years, concerns have been expressed over the long-range cumulative impact of water diversions in the Lower Big Sur River Basin on juvenile steelhead trout populations. Shallow streambank wells may have a similar effect of reducing the availability of suitable summer steelhead trout habitat.

Although riparian habitat is believed to be adequately maintained with the presence of some surface flow, juvenile steelhead trout require additional flows for the maintenance of suitable habitat. Greatly reduced summer flows are shown to result in the natural encroachment of riparian vegetation on the normal flow channel and a die-back along the outer edges. Thus, in addition to loss of streambank vegetation, high winter flows can be impeded by encroaching vegetation with concurrent higher flood levels. These are natural occurrences in stream behavior that appear to be in conflict with needs of juvenile steelhead habitat. While it is the desire of the State Department of Fish and Game to facilitate increases of steelhead population there is concern that measures to facilitate such increases could effect natural stream behavior. Until such time as these matters can be fully assessed, streambank modification must be held to a minimum.

Detailed field investigations of stream cross-sections and measurement of stream flow are required for the accurate determination of instream flow needs for maintenance of the anadromous fishery (See Appendix 5 Data and Criteria Necessary for the Determination of Instream Flow Requirements in the Lower Big Sur River Basin). Until such time as the necessary field measurements and subsequent calculations can be made, it will be necessary to rely upon less precise estimates of stream flows required for maintaining optimum fishery habitat conditions.

It appears that the most critical stage in the life cycle of the steelhead trout in the Lower Big Sur River is the juvenile fish during the period of lowest flow and highest water temperature - the late summer. This is the same time when demands for water for domestic, recreational, and agricultural uses are at their peak. Thus, this is the critical period when water diversion and pumping from shallow wells have their greatest impact on the water budget of the river and its future steelhead population.

The Department of Fish and Game suggests that a minimum flow equal to the mean of the six month flows (May-October) over the past twenty years be used as an interim guideline for determining whether any additional water is available for human use (personal communication, Michael Johnson).

Black & Veatch (1980) has determined an average flow of 8,785 gpm for the five summer months (May being excluded because of its disproportionately greater runoff than the other summer months) from the Department of Water Resources records maintained over the past 24 years. The average stream flows (mean runoff) for each of the summer months over the past 24 years as measured at the USGS hydrograph\* are: June 33.1 cfs (14862 gpm), July 20.8 cfs (9339 gpm), August 14.9 cfs (6698 gpm), September 13 cfs (5837 gpm), and October 14.8 cfs (6645 gpm) (personal communication, Glenn Vita).

Adherence to the interim guideline suggested by the Department of Fish and Game for the minimum flow which should remain in the river at all times means that no additional water is available for diversion during the late summer and early fall. However, residential building rate has been less than two dwellings per year in the lower basin. Total buildout is expected to use less than percent of the available water during the lowest recorded flow. Future studies may show additional water to be available for domestic use. Conservation measures could be employed to help mitigate the concerns of the Department of Fish and Game.

### *Stream Clearance*

Major channel clearance programs in the Lower Big Sur River have been implemented following both 1972 mudflows and the 1977 Marble Cone Fire. The 1977 channel clearance project included the removal of both dead and some live standing trees which leaned over the river.

Striking a reasonable balance between maintaining an open free-flowing river channel capable of handling flood flows and retaining both live and dead trees on the river bank is critical in order to maintain nesting and perching habitat for riparian birds and suitable stream conditions for fish and aquatic life. Woodpeckers and other cavity-nesting birds construct their homes in the dead snags along the river. This essential habitat has been diminished significantly throughout the State. Live trees leaning over the river provide shaded pools which serve as refuges for fish and help to keep the water temperature within the habitat requirements (below 25 degree C, 78 degrees F) of juvenile trout (optimum water temperature is 58 degrees F).

Numerous log and debris jams occur on the steeper tributary creeks (e.g., Juan Higuera Creek). These log jams serve to trap sediment keeping it from entering the main channel where it might otherwise silt up spawning gravels.

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\* Figures have been adjusted for suspected erroneous readings from recording gauge.

## ***Campground Impacts***

The campgrounds in the Lower Big Sur River Basin are situated along either the main river channel or the tributary creeks, or both. All but one of the campgrounds are situated within the floodplain. Some receive significant contributions of sediment during peak flood flows.

Many of the campsites are located close to the river or creeks. Extreme cases exist in which picnic tables, fireplaces, and tent sites are within only a few feet of the water's edge.

Frequent direct access from campsites to the water and the concentration of recreational interest and activity on the river banks and in the water, has resulted in some impoverished riparian areas along the river and creeks immediately adjacent to the campgrounds. Safety clearing and pruning which has probably occurred in the past and constant and often destructive firewood collection has served to worsen this problem. In general, campsites are closer to the water's edge and to each other in the private campgrounds than at the State Park campgrounds.

Constant foot trampling of understory vegetation within the campground areas, and soil disruption caused by poorly defined constraints on vehicular access - some private campgrounds lack paved roads or parking areas - have exposed large areas of loose soil to erosion from raindrops and runoff. With little or no buffer of riparian vegetation to slow and filter runoff water, sediment from the campgrounds is washed into the creeks and river.

## ***Camping Experience***

Campgrounds in the Lower Big Sur Basin impart the feeling of being crowded. (Comparisons of campground densities with preferred density standards are in Appendix 8). Most of the campgrounds are situated on the floodplains along the Lower Big Sur River, this being the only level land suitable for campsite construction. Due to summer demand a maximum number of campsites have been squeezed into these developable areas. There is only a few feet between sites and, fully occupied campgrounds seem all the more crowded because of general lack of screening vegetation between campsites. In spite of seemingly crowded conditions the campgrounds have a high rate of repeat visitation.

The high density of campsites results in a high ratio of land devoted to roadways and parking and seems excessive in many of the campgrounds. There is generally poor definition of parking spots. The predominance of cars and mobile homes reduces the opportunity of visitors to get away from the noise, exhaust, and clutter of an urban environment.

## ***Carrying Capacity***

The two State parks and the four private campgrounds in the Lower Big Sur River Basin have a total of 567 campsites capable of accommodating 2,574 campers at full capacity. An additional 549 visitors may choose to stay in the 153 motel units and cabins at the eight resorts in the Big Sur Valley.

Numerous additional permanent residential units are required to house the public and private employees who operate the parks, concessions, campgrounds, restaurants, grocery stores, gas stations, etc. There are an estimated 200 permanent residents in the basin and another 150 residents in adjacent areas which are supplied by water from the Lower Big Sur River Basin. The number of summer residents is probably far greater.

Not only is there very little undeveloped space suitable for additional recreational and visitor-serving facilities and employee housing, but questions arise as to the availability of resources, especially water, to support increased seasonal employee and tourist populations since the greatest demand for these resources is during the summer months when they are in the shortest supply.

A determination of the overall recreational carrying capacity of the Lower Big Sur River Basin should be made and should include some qualitative measure of the effects of increased, or possibly even decreased, numbers of visitors on the types and duration of recreational experiences desired.

### ***Trail System***

Networks of hiking and riding trails have been constructed in both Pfeiffer-Big Sur and Andrew Molera State Parks. Besides trails leading to internal points of interest, the major trail access to the Upper Basin (Ventana Wilderness), the Pine Ridge Trail and the less popular Mt. Manuel Trail, are on State Park property. The Big Sur River mouth is accessible by several trails within Andrew Molera State Park.

Although there are trails along the Big Sur River in both Pfeiffer-Big Sur State Park and Andrew Molera State Park, there is no trail interconnecting these parks with each other or with the private campgrounds along the river. Trails have not yet been developed in the newly acquired lands of Andrew Molera State Park east of Highway One; however, a trail corridor has been recommended connecting the park with the Mt. Manuel Trail thereby providing another alternate access route into the Ventana Wilderness (County of Monterey, 1980).

In heavily used areas, the trails are frequently maintained and have a good walking surface. Several of the trails in Andrew Molera State Park are merely disced firebreaks which double as trail routes creating difficult walking during portions of each year.

### ***Transportation***

At the present time, the Monterey Peninsula Transit District provides public transportation to and from Big Sur twice each day during the summer months only. Coastlines, a private carrier, provides two round trips daily on Highway One between the cities of Monterey and San Luis Obispo. The combined operation of these two carriers represent an increase in public transportation to Big Sur over past years.

Access between both public and private recreation and visitor-serving facilities is totally inadequate. The lack of frequent inexpensive public transit within the Big Sur Valley compounds both the existing

traffic and parking problems and the attitudinal problems associated with those individuals without cars who hitchhike from one facility to the other.

### ***Trout Fishing***

Numerous summer visitors staying at Pfeiffer-Big Sur State Park and the private campgrounds in Big Sur fish for trout along the Lower Big Sur River. Campers commonly complain to campground managers about poor fishing success (personal communication, Hugh Rideout).

Rainbow trout used to be planted in the river weekly by the California Department of Fish and Game from the opening day of trout fishing season in May through Labor Day weekend. Anywhere from two or three hundred to a thousand or more catchable-size trout were planted each week. Creel censuses from inside Pfeiffer-Big Sur State Park downstream to the River Inn indicated that there was considerable angler use but that the majority of the fish taken were small.

The Department of Fish and Game stopped planting the Lower Big Sur River with rainbow trout in the summer of 1976 following the adoption of State Fish and Game Commission policy prohibiting the planting of catchable trout in native steelhead waters. The primary reason for this policy is to reduce competition between “exotic” rainbow trout and the native steelhead.

Recreational opportunities cannot be evaluated merely in terms of the number of people served but also require a consideration of the quality of experience attainable. The summer fishery would have to be considered poor but the potential for a winter steelhead fishery which is sought after by typically more experienced fishermen has increased.

The continued fishing pressure in the summer months may be significantly decreasing the juvenile steelhead trout population which must spend their first summer in the Lower Big Sur River. Probably most of the trout caught in the summer months are juvenile steelhead which are almost always mistaken by the novice for rainbow trout.

### ***User Group Conflicts***

Upon occasion, user group conflicts arise between the car campers in the Pfeiffer-Big Sur State Park campground and hikers/backpackers entering and returning from the Ventana Wilderness. This is a result of the close proximity of the wilderness trail and the State Park campground and a lack of overnight facilities for wilderness travelers at the roadhead.

The trailhead for entering the wilderness along the Big Sur River, located at the Los Padres National Forest Ranger Station on Highway 1 (next to the Caltrans Highway Maintenance Station), is undeveloped except for the parking lot and vault toilets. Wilderness travelers wishing to spend the night near the trailhead either before or after their wilderness outing, must utilize the private or State Park campgrounds. The least expensive and available location is the undeveloped walk-in campground at Andrew Molera State Park.

The trail entering the Wilderness parallels the Pfeiffer-Big Sur State Park Campground just a few hundred feet upslope. At one point, it is an easy walk of a couple of hundred feet downstream along Post Creek to the campground, its store, showers, and the Big Sur River. Returning backpackers often leave the trail and enter the State Park campground to use the showers and walk back to Highway 1 along the river via the campground entrance road.

The resolution of conflicts between State Park and National Forest users will require the cooperation of both agencies. The Forest Service Ranger Station is presently situated on State Park property. Since the federal government presently owns no land at this principal trailhead to the Ventana Wilderness, the success of any plan to provide additional facilities for backpackers and reduce user conflicts will depend on the involvement and commitment of the California State Department of Parks and Recreation towards this end.

Addressing this problem will become more critical. Probable implementation of daily wilderness permit quotas in the foreseeable future, and possible restrictions on the hours during which backpackers can enter the wilderness in order to ensure that they reach their planned destination, will result in an increased demand for roadhead campsites.

## ***SCENIC RESOURCES***

### ***Plant Succession***

The pastoral open setting of the north end of the Big Sur Valley is, to a significant degree, the result of the historic clearing and grazing of the land. The grassland, more properly referred to as pastureland, which predominates in Andrew Molera State Park and on the slopes of east Highway 1 has been maintained through continual cattle grazing.

State Park policy would typically require the cessation of commercial livestock grazing on the newly acquired park lands at Andrew Molera. If cattle are removed from these open slopes, the area will be invaded within a score of years by chaparral plants resulting in a corresponding change in the familiar character of the land.

Cattle have been excluded for several years from the “coastal prairie” floodplain on the southwest side of the Lower Big Sur River within Andrew Molera State Park. This area may eventually revert to riparian forest.

Evaluations of the significance of predictable changes in vegetation types due to plant succession will be difficult. The merits of allowing the development of more natural (i.e., native plant-animal) communities must be weighed against the aesthetic values in retaining the present (albeit man-induced and to a degree non-native) agricultural pastureland areas.

### ***Deteriorated Landscape***

In general, the limited flood control improvements which exist along the Lower Big Sur River are unobtrusive. Even the berms constructed of river gravel to protect park buildings are relatively obscured by invading and surrounding vegetation. There are only a few places where unnatural, manmade materials, such as wire gabions used for bank stabilization or concrete fire places, detract from the natural character of the river banks.

There has been some disruption of streambank vegetation due to channel clearance, foot trampling, and the development of streamside recreation and visitor-serving facilities. This has resulted in some reduction of greenery, shade, wildlife, and natural environmental qualities along a few sections of the river banks.

## ***SUMMARY OF MANAGMENT CONCERNS***

1. Availability of water during drought year low flows to support substantial increases of visitation or recreational development in the Lower Big Sur River basin.
2. Potential transfer of water to supply future development in adjacent or other watersheds.
3. Potential loss of structures and life from flooding.
4. Potential loss of structures and life from mudflows.
5. Potential loss of vegetation cover due to wildfires.
6. Potential loss of structures and life from wildfires.
7. Increased fire hazard due to fire suppression.
8. Quality of untreated surface water sources.
9. Effect of septic tank effluent on ground water quality.
10. Effect of septic tank effluent on stream and river water quality.
11. Impact of wilderness camping on river water quality.
12. Cumulative effects of water diversions (including streambank wells) on minimum (drought year) instream flow necessary for juvenile steelhead trout habitat.
13. Impact of summer recreational trout fishing on the anadromous fishery.
14. Impact of trout planting on juvenile steelhead trout population.
15. Inaccessibility of high quality steelhead trout spawning and summer habitat due to barriers to migration presented by falls in gorge.
16. Impact of steelhead trout migration into the Upper Big Sur River on Brown trout and other biotic communities.
17. Siltation of stream gravels from accelerated erosion after conflagration-type fires.
18. Siltation of stream gravels from campground erosion.
19. Reduction in suitable habitat for cavity-nesting birds due to stream clearance.

20. Potential increases of water temperature that could result from future removal of shade trees.
21. Loss of riparian vegetation due to streambank and floodplain recreational development and use.
22. Disruption of riparian habitat caused by firewood collection.
23. Reduction in wildlife habitat values due to fire suppression.
24. Visitor disappointment over the poor summer recreational fishery due to discontinuance of catchable trout-stocking program.
25. Inadequate development of Andrew Molera State Park parking lot and walk-in campground.
26. Inadequate development of recreational hiking and riding trails interconnecting state park and national forest units.
27. Quality of recreational camping experience.
28. Conflicts between state parks and national forest user groups.
29. Inadequate public transportation between recreation and visitor-serving facilities.
30. Insufficient development of trailhead parking and camping facilities to meet future demands for wilderness recreation.
31. Inadequate condition of hiking trails.
32. Change in familiar “natural” landscapes due to plant succession following cessation of historic grazing use.
33. Potential visual impacts of future development in the Highway 1 viewshed.
34. Potential aesthetic impact of future development in the Big Sur River viewshed.
35. Streambank erosion and/or landscape deterioration that could result from utilization of unnatural bank stabilization techniques and/or materials.

# ***GOALS & OBJECTIVES***

## ***BACKGROUND LEGISLATIVE MANDATE***

The goals and objectives for the management of the Lower Big Sur River follow from the California Protected Waterways Act, the California Protected Waterways Plan (Initial Elements), Assembly Concurrent Resolution No. 32, and from the mandates and adopted policies of federal, state, regional, and local agencies responsible for flood control, water quality control, water resources development, wildlife and wildlife habitat protection, resource conservation, recreation management and land use planning. In addition, the goals and objectives have been developed in context with the preparation of the Local Coastal Program (LCP) for the Big Sur Coast which involved considerable public input during the planning process. As such, they represent a recognition of the special environmental and social conditions found on the Lower Big Sur River and within its watershed.

The California Protected Waterways Plan (Initial Elements) specifies that the objective of each detailed management plan should be consistent with the policy of the Protected Waterways Act:

“To provide for the conservation of those waterways of the state possessed of extraordinary scenic, fishery, wildlife, or outdoor recreation values.”

The California Protected Waterways Plan (Initial Elements) also provides for the classification of waterways or waterway segments into three possible categories as a basis for further refining planning and management objectives. The three possible classifications are; natural waterways, pastoral waterways, and developed waterways.

The Lower Big Sur River fits well within the State’s description of pastoral waterways as distinguished from the more wild and pristine “natural waterways” and the more urban and intensively used “developed waterways.” (Refer to Appendix 9 for a list of the characteristics of pastoral waterways).

While all three categories “are designed to conserve to varying degrees, and in several ways, the extraordinary scenic, fishery, wildlife and outdoor recreational values of our waterways,” the following additional guidance is provided in the state plan concerning the management standards generally suitable for pastoral waterways:

1. Motorized vehicles allowed on the land area, few restrictions on watercraft and aircraft.
2. No unharmonious improvements and few habitations permitted, except in small communities; limited modern screened public use facilities permitted, such as campgrounds, visitor centers, including new construction for unobtrusive marinas, campground and community development. Industrial development screened.

3. Unobtrusive fences, gauging stations, and water management facilities permitted if they have no significant adverse effect on the rural character of the area.
4. A wide range of agriculture, forestry, and other resources uses permitted on adjacent lands.

Of particular importance is the Big Sur Local Coastal Program, the County's principal land use plan document for the area, which also governs the actions of state agencies in the area. It provides both a broad policy framework for the entire Big Sur area, including the Lower Big Sur River, as well as numerous specific land use and resource protection policies and standards. Accordingly, this plan has been fully coordinated with the LCP to achieve consistency in intent and policy direction. The policies and recommendations that follow have been developed to provide the additional management guidance for the Lower Big Sur River necessary to resolve the issues and concerns set forth in the preceding section.

## ***BASIC GOAL***

The basic goal of the Lower Big Sur River Protected Waterway Management Plan shall be:

To maintain and enhance the value of the Lower Big Sur River and its watershed as a domestic water supply, fish and wildlife habitat, and recreational and scenic resource and to mitigate adverse effects of activities and facilities on these resources.

## ***OBJECTIVES***

In order to carry out the basic goal and as a guide to specific policies and recommendations, seven objectives are presented as follows:

1. Manage existing and future water supplies in the Lower Big Sur River Basin consistent with basin capacity, satisfaction of instream flow needs, and protection of water-dependent resources and values.
2. Minimize threats to the lives and property of residents and visitors from natural hazards, including flooding, land-sliding, and fire, through watershed management, floodplain management and other nonstructural measures.
3. Maintain and protect the water quality of the Lower Big Sur River, its tributaries and ground water basin for domestic use, for maintenance and enhancement of fisheries and aquatic environments and for scenic and recreational enjoyment.
4. Maximize stream habitat values and optimize productivity for the anadromous fishery, resident fishes and other aquatic organisms, and terrestrial wildlife by preventing and mitigating adverse impacts to the aquatic ecosystem and by restoring degraded or damaged areas.

5. Preserve and restore riparian woodland vegetation along the streambanks and on the floodplain of the Lower Big Sur River and its tributaries. Protect its values as a breeding and migratory bird habitat, wildlife migration corridor, buffer for maintaining water quality, canopy for controlling water temperature, nutrient source for the aquatic food web, stabilizer of streambanks, and an aesthetic, scenic, educational, and recreational resource.
6. Guide the proper development and management of appropriate river-oriented recreational opportunities for local residents and visitors consistent with the maintenance and protection of the recreational resource, the natural environment, and the social values in the Big Sur Valley.
7. Conserve the prevailing natural scenic values which dominate the Lower Big Sur River Basin. Maintain the traditional pastoral landscapes of the Big Sur Valley, preserve and where possible enhance the scenic character of the river environs and provide opportunities for the appreciation and enjoyment of scenic vistas, areas, and features.

# ***MANAGEMENT STRATEGIES***

## ***MANAGEMENT APPROACH***

Numerous management tools and procedures are available for protecting and restoring the sensitive and essential environments in the Lower Big Sur River Basin and ensuring the continued utilization of these resources upon which development and activity are dependent. Resource management agencies and professionals are familiar with the application of the appropriate management options. Often a combination of approaches employed by several agencies in consort is required in order to achieve the desired results. Difficult policy decisions also arise when the application of a specific management option may help achieve the desired results for one management concern but will simultaneously hinder the potential for resolution of another seemingly more important, and, therefore, overriding concern. A major challenge will be to resolve conflicts between seemingly mutually exclusive applications.

## ***MANAGEMENT OPTIONS***

1. bank stabilization (structural)
2. buffer zone
3. campground management plan
4. channelization (dikes)
5. erosion control ordinance
6. facilities development and improvement
7. fire/fuel breaks
8. fire prevention
9. fish planting (catchable trout)
10. fish planting (steelhead fry)
11. floodplain management
12. flood-proofing
13. flood warning system
14. forest fire control
15. grading permit
16. ground water quality monitoring
17. habitat restoration
18. land acquisition
19. land use zoning
20. log jam removal (main channel)
21. log jam removal (tributaries)
22. mass transit
23. natural plant succession
24. pit toilets
25. precipitation monitoring stations
26. prescribed burning

27. range management
28. removal of stream barriers
29. reservation of in-stream flow needs
30. riparian corridor protection ordinance
31. scenic easements
32. septic system maintenance program
33. septic tank ordinance
34. sewer plant maintenance
35. stream alteration permit
36. streambank revegetation
37. stream clearance
38. stream gauge monitoring
39. stream water quality monitoring
40. timber harvest ordinance
41. trail construction and maintenance
42. vegetation manipulation
43. viewshed protection
44. water appropriation permit
45. water conservation
46. water development moratorium
47. water master or other appropriate agency
48. water storage (offstream)
49. water system monitoring
50. water treatment (chlorination)
51. well drilling permit
52. wilderness permit quota system
53. hydrology study of effects on stream
54. groundwater resource evaluation

# ***POLICIES & RECOMMENDATIONS***

## ***WATER CONSERVATION***

1. The California State Division of Water Rights should recognize the wells drawing water from the gravels and sands adjacent to the Lower Big Sur River as riparian uses and should grant each existing user a permit for the current established level of withdrawal of water. Existing mutual water companies and private systems which have been appropriating water from the Big Sur River prior to 1976 shall be permitted to supply water from existing wells to remaining existing lots within the presently defined service area of such mutual water companies, and to private parcels presently of record or hereafter approved, provided that such approved parcel consists of 40 or more acres. New development in such mutual water company service areas will be subject to the interbasin transfer of water policy contained in the certified Big Sur Coast Land Use Plan.
2. The County should initiate a hydrologic study to be done by the California Department of Water Resources, the U.S. Geological Survey or a qualified consultant, to determine the existing quality and quantity of the water resources and the present and projected consumptive use of water in the Lower Big Sur River Basin. This study will establish a base for future reference, to determine whether a degradation or diminishment of the water resources has occurred. Included in the study should be recommendations as to the need for type and location of additional monitoring. If the hydrological study indicates significant groundwater other than in alluvial aquifers, the County shall encourage its use, if practical.
3. All available streamflow, water quality and other data should be reviewed periodically by the appropriate agencies. At the end of five year intervals, the appropriate agencies should determine whether a degradation or diminishment of the water resources has occurred. If it is determined that degradation or diminishment has occurred, either during, or at the end of the five year review periods, a recommendation should be made to the Board of Supervisors that land use restrictions, such as a moratorium on development, or other measures that may be deemed necessary, should be imposed until solutions to the problem can be found. However, there shall be an annual report to the Board of Supervisors on the status and results of on-going monitoring.
4. If a severe and long term water quality or quantity condition develops that cannot be mitigated through existing local agency management measures, an appropriate agency responsive to both local needs and statewide interests should be formed to monitor and manage surface and groundwater in the Lower Big Sur Basin, except that, consistent with the River's designation as a Protected Waterway, no dam or dams shall be constructed on the river.
5. Monterey County should require that all applicants for additional development appropriating water from the Lower Big Sur Basin have an approved permit to appropriate the water from the California State Division of Water Rights prior to receiving project approval.

6. The California State Division of Water Rights should approve only those requests for water appropriation from the Big Sur River Basin, its tributaries, the river gravels, and the groundwater basin, which are consistent with maintaining required instream flow needs as determined by the California State Department of Fish and Game.
7. The U.S. Geological Survey should install and maintain an additional stream gauge on the Big Sur River near the river mouth.
8. The U.S. Forest Service, Department of Parks and Recreation, private landowners, and the managers of water systems should take advantage of opportunities for controlling plant succession following prescribed burn programs in order to optimize water yields in the surface water supply drainage basins.
9. The County Flood Control and Water Conservation District should be the repository for the data from various agencies and should be the lead agency for hydrologic studies.

## ***FLOOD CONTROL AND FIRE CONTROL***

10. Monterey County should continue to operate a flood warning system for residential, commercial, and recreation areas along the Lower Big Sur River and should support the necessity of retaining the required meteorological monitoring equipment within the wilderness area.
11. Monterey County should make flood hazard boundary maps available to property owners in the Lower Big Sur River Basin.
12. Notice of location in a flood hazard area will be recorded with the County Recorder on the deeds for all new parcels within the 100-year floodplain to warn prospective buyers of this hazard.
13. Monterey County should restrict development and use incompatible with the periodic flooding that will take place within the 100-year floodplain.
14. No new fill or new residential or commercial buildings which displace flood waters or inhibit the flow of water shall be allowed within the 100-year floodplain.
15. The California Department of Transportation should dispose of rock/earth debris from highway maintenance outside of the 100-year floodplain upstream from Andrew Molera State Park and should utilize predetermined dumpsites agreed upon by the joint agencies involved.
16. Streambank vegetation should be protected in order to prevent bank erosion and denuded banks should be revegetated provided that it is determined by a qualified hydrologist

knowledgeable in stream behavior that such revegetation will not cause streambank erosion in other places.

17. An on-going stream clearance program for the main channel of the Lower Big Sur River should be coordinated by the Monterey County Flood Control and Water Conservation District or other funding source. Log jams and debris obstructing the free passage of flood waters should be removed. There should be only limited removal of standing trees (dead or alive) on the river banks depending and/or park and campground visitors. Removal of material should be effected by the least disturbing means available.
18. The use of gabions, riprap, and other bank stabilization materials should remain minimal along the Lower Big Sur River.
19. The California State Department of Parks and Recreation should remove the remnants of the wire basket gabions which were placed in the river in Pfeiffer-Big Sur State Park.
20. The California State Department of Parks and Recreation should consider retaining the dikes around structures in Pfeiffer-Big Sur and Andrew Molera State Parks.
21. The California State Department of Parks and Recreation should continue to maintain mechanized “mineral soil” firebreaks around the lowland meadow areas (grasslands) in Andrew Molera State Park. Trail routes currently using firebreaks should be relocated.
22. The California State Department of Parks and Recreation and U.S. Forest Service in conjunction with the California Department of Forestry and private landowners should develop a program for the periodic prescribed burning of chaparral, forested, and possibly some grassland areas to achieve a systematic reduction of fuel loads in high fire hazard areas of the Lower Big Sur River Basin.
23. Mechanized firebreaks which result in exposing bare earth in areas susceptible to erosion should not be constructed on steep slopes in the watershed. Less severe measures should be used for fuel reduction along the borders of burn units.

## ***WATER QUALITY PROTECTION AND ENHANCEMENT***

24. The water quality monitoring program along the Lower Big Sur River conducted by the Monterey County Environmental Health Department should be expanded to include:
  - weekly samples for coliform tests during the months of May through September.
  - coliform test samples from each of the major tributary creeks.
25. The bacteriological quality of the Lower Big Sur River should be maintained within acceptable health standards for body contact sports. (No more than 20 percent of a minimum of five fecal

coliform samples taken within a 30 day period should exceed 200 colonies per 100 milliliters of sample).

26. The Monterey County Environmental Health Department should support the decision of the U.S. Forest Service to install primitive (Wallowa type) pit toilets at campsites along the Big Sur River in the Ventana Wilderness.
27. Monterey County should enforce the following provisions of the Septic Tank Ordinance, Zoning Ordinance, and Building Code for controlling the construction of new septic tanks and leach fields in the Lower Big Sur River Basin:
  - new septic systems should not be allowed within 100 feet of the river or any perennial tributary.
  - septic systems for new development should be prohibited on slopes greater than 30 percent and on landslides.
  - septic systems should be prohibited in areas with groundwater within 10 feet of the bottom of the proposed leaching device.
  - required watertable determinations and percolation tests shall be conducted only during the wet weather months.
  - a minimum parcel size of one acre should be required for all new development requiring septic systems.
28. Monterey County should enact an ordinance to require the inspection of septic systems by a licensed septic tank contractor before permitting the sale of existing developed properties.
29. Monterey County should seek funding for a study of the potential impact of septic systems along the Lower Big Sur River on groundwater quality in the Lower Basin.
30. Water systems drawing water from the Lower Big Sur River Basin should be tested by the Monterey County Environmental Health Department at least twice a year.
31. Water systems which collect surface water from springs and/or tributaries in the Lower Big Sur River Basin should received adequate treatment for the protection of public health.
32. Water should not be released from swimming pools until the chlorine has dissipated and the flow in the river has increased in the late fall in order to protect fish.
33. Adequate waterflows should be maintained to continue to flush the lower river of pollutants during the summer recreation period.
34. The U.S. Forest Service (Los Padres National Forest) should cooperate with the establishment of a water quality monitoring program including a station above the Big Sur River Gorge but below the first established campsite areas.

## ***FISH AND WILDLIFE PRESERVATION & ENHANCEMENT***

35. The California State Department of Fish and Game or another appropriate agency should make a series of cross-sectional measurements of stream width, depth, velocity, and substrate composition along the Lower Big Sur River and suitable tributary creeks. A sufficient number of measurements should be made at various water flows during both summer and winter months to enable determinations of instream flow needs for maintaining the anadromous fishery.
36. The California State Department of Fish and Game should request that the U.S. Fish and Wildlife Service Division of Ecological Services assist with determinations of instream flow needs for the Lower Big Sur River and its tributaries by applying cross-sectional transect data to their computer model.
37. Monterey County should consider protesting all applications for significant withdrawals of additional water from the Lower Big Sur River and its tributaries for future subdivisions and public water systems (excepting lots of record) until a more thorough analysis of the present level of water consumption has been made and the Department of Fish and Game or another appropriate agency has made a determination of instream flow needs to maintain the anadromous fishery.
38. Based on favorable determination that there will be no overriding significant adverse impacts on biological, geological, or recreational values, the California State Department of Fish and Game should remove the barriers in the Big Sur Gorge to allow for the migration of steelhead trout into the Upper Big Sur River Basin.
39. The California Department of Fish and Game should remove the large log jam at the south side of the upper falls in the Big Sur River Gorge thus enabling a thorough assessment of the geological impacts which might occur from alteration of the rockfall to permit fish migration upstream.
40. The California State Department of Fish and Game should adhere to its present policy of not stocking the Lower Big Sur River with catchable trout.
41. The California State Department of Fish and Game should conduct periodic detailed stream surveys of habitat conditions along the Lower Big Sur River.
42. The California State Department of Fish and Game should conduct annual creel census of steelhead fisherman along the Lower Big Sur River.
43. The Soil Conservation Service should obtain funding to provide advice to private campgrounds on measures which should be employed to reduce soil erosion.
44. The California Department of Fish and Game should conduct a census of cavity-nesting birds along the Lower Big Sur River and evaluate habitat improvement needs.

45. The California State Department of Fish and Game, the U.S. Forest Service, the California Department of Forestry, and the California State Department of Parks and Recreation should take advantage of opportunities to enhance wildlife habitat values in the Lower Big Sur River Basin as part of a prescribed burning program
46. The California State Department of Parks and Recreation should evaluate the merits of designating the lagoon at the mouth of the Big Sur River in Andrew Molera State Park a Natural Preserve in recognition of its wildlife values.

### ***PROTECTION & RESTORATION OF STREAMBANK VEGETATION***

47. Monterey County should adopt a Riparian Corridor Protection Ordinance. The County should ask the California State Department of Fish and Game and/or the Hydrology/Geology Department of the University of California and/or the U.S. Geological Survey to recommend a model ordinance for adoption. This ordinance should apply to all year-round tributary creeks as well as the Lower Big Sur River.
48. Standing dead snags and live trees on the banks of the Lower Big Sur River should be retained during the course of channel maintenance (stream clearance) and park management programs, except when they are determined to constitute a hazard to public safety or downstream structures.\*<sup>1</sup>
49. The California State Department of Parks and Recreation should allow the floodplain on the south side of the Big Sur River in Andrew Molera State Park to continue to undergo natural plant succession which should eventually lead to the restoration of a riparian forest.
50. The California State Department of Parks and Recreation should establish a buffer zone between the Andrew Molera State Park Walk-In Campground and the Lower Big Sur River. No firewood collection should be allowed along this stretch of the river.
51. The California State Department of Parks and Recreation should attempt to minimize trail construction and use within 10 feet of the river bank.
52. Monterey County in cooperation with the California State Department of Parks and Recreation and the U.S. Forest Service shall require new campsites to be set back at least 150 feet from stream or river edges. The County shall encourage existing public and private sites to be relocated, where feasible. Such uses may be located as close as 25 feet to a stream or river when the reduction in setback is found compatible with sensitive habitat protection.

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<sup>1</sup>The Department of Parks and Recreation has a legal responsibility to inspect and remove, if necessary trees determined to be dangerous.

53. The U.S. Soil Conservation Service should assist the managers of private campgrounds I the Lower Big Sur River Basin with the preparation of campground management plans. These management plans should include provisions for the restoration of a strip of riparian vegetation along the river bank screening between campsites.

## ***RECREATION MANAGEMENT***

54. The U.S. Forest Service should implement a wilderness permit quota system at the Big Sur-Ventana Wilderness trailhead in order to keep camping along the Upper Big Sur River within established carrying capacities.
55. The California State Department of Parks and Recreation should accept an active role in assisting the U.S. Forest Service in meeting the front-country camping and access needs of wilderness visitors while they are in the Big Sur Valley in resolving potential recreation user group conflicts.
56. The U.S. Forest Service and the California State Department of Parks and Recreation should establish a joint task force responsible for developing plans for providing trailhead overnight camping facilities for backpackers visiting the Ventana Wilderness via Big Sur. This task force should also evaluate the need and potential for re-routing the Ventana Wilderness access trail and changing the trailhead location in order to reduce user conflicts.
57. The U.S. Forest Service and California State Department of Parks and Recreation should consider creating an additional access trail into the National Forest directly from Andrew Molera State Park.
58. The California State Department of Parks and Recreation should construct a permanent trailhead for the trail corridor along the Big Sur River in Andrew Molera State Park.
59. The California State Department of Parks and Recreation should either improve the present parking lot at Andrew Molera State Park or design and construct a new parking area. In either case, the parking area for walk-in campground should be planned so as to control erosion and afford adequate protection of parked vehicles.
60. The California State Department of Parks and Recreation should establish a fixed carrying capacity for the Andrew Molera State Park Campground.
61. The California State Department of Parks and Recreation should build improved restroom facilities at Andrew Molera State Park Walk-In Campground.
62. Careful evaluations of the potential impacts of creating a demand for additional employee housing in the Big Sur Valley need to be made in conjunction with any reviews of future proposals for new or expanded recreation and visitor-serving facilities.

63. Governmental employee housing should be sited in areas where it does not preempt the use of lands capable of meeting present and future demands for recreation and visitor-serving facilities.
64. The California State Department of Fish and Game should begin a program educating summer campground visitors in the Lower Big Sur River Basin about the reasons behind the decision not to stock the river with catchable trout through the distribution of informational pamphlets.
65. The California State Department of Parks and Recreation should prepare interpretive plans for both Andrew Molera and Pfeiffer-Big Sur State Parks identifying programs, facilities, and materials for interpreting the Big Sur River and its watershed to the general public.
66. The Monterey Peninsula Transit District, or another carrier should establish shuttle bus service along State Highway 1 between Andrew Molera State Park and Ventana-Big Sur so as to facilitate the movement of residents and visitors between the numerous recreation and visitor-serving facilities in the Big Sur Valley.
67. The Monterey Peninsula Transit District, or another carrier should expand daily bus service to Big Sur and should encourage both residents and visitors to take the bus.

### ***SCENIC RESOURCES PROTECTION AND ENHANCEMENT***

68. The California State Department of Parks and Recreation shall maintain the untrammled appearance of Andrew Molera State Park by keeping any future development out of the Highway 1 viewshed.
69. The California State Department of Parks and Recreation should consider continuing grazing on the eastern portion of Andrew Molera State Park in order to retain the familiar “grassland type” character of the northern entrance to the Big Sur Valley.
70. Monterey County, through its design review process shall restrict improvements visible from the Lower Big Sur River which will decrease the aesthetic quality of the river environs.
71. Campground management plans should include provisions for improving the visual character of the river and stream banks through restoration of native vegetation.
72. The California State Department of Parks and Recreation should replace or camouflage the fireplaces used for bank stabilization in Andrew Molera State Park with a more natural-looking material.

73. To ensure no possible contamination of surface or groundwater resources or soil erosion, no land uses shall be permitted or structures allowed to be constructed within the watershed areas of the Lower Big Sur River which allow, or are reasonably related to, the mining, crushing, processing, transporting, loading or shipping of mining or energy products.

# ***IMPLEMENTING THE MANAGEMENT PLAN***

## ***A COOPERATIVE PROCESS***

A key premise of this plan emanates from the mandating legislation which has established the Big Sur River as a resource of statewide significance. Effective implementation of the plan, thus, is not only of concern to Monterey County but is of vital interest to the State.

Implementing the plan will require considerable cooperation. The plan should serve as a basis for day to day decision-making on matters affecting the river, and should also provide direction for longer range funding and operational planning for many of the state agencies identified in the plan. The County, through its coastal permit authority, will require adherence to the plan as a condition of approval of development proposals affecting the river, either on state or private land. Beyond these mechanisms, however, it will ultimately be the spirit of cooperation and commitment to the purposes of the plan that will make the plan a success.

A second compelling reason for broad cooperation among agencies and the private sector are the present limitations on available funds to support the activities of the public agencies. Consequently, cooperation and coordination among all concerned in the interest of conserving limited agency personnel and funding is an essential underlying theme for plan implementation.

A wide variety of public agencies, private individuals and property owners will be involved over time in the maintenance of environmental and recreational values of the Lower Big Sur River. Chapter 5 assigns specific responsibilities to fifteen different agencies. In addition, certain actions are to be taken by the Monterey County Board of Supervisors. Private landowners, particularly operators of the several campgrounds along the lower river, should undertake various improvements to their operations in order to help maintain the river's resources. For easy reference, Table 2 on the following page provides a complete list of the policies or recommendations assigned to the various agencies and individuals.

## ***KEY AGENCIES***

It is evident that certain agencies have a much larger role than others. The State Resource Agency, and the County of Monterey share major responsibility for coordinating cooperation between the numerous agencies and individuals. The Resources Agency, in particular, must assist in the furtherance of this plan by directing its various agencies which are so vital to the success of the plan, including the Department of Fish and Game, the Department of Parks and Recreation and the Department of Water Resources, to bring their day-to-day management activities into conformance with the plan and to undertake those longer range actions called for in the plan.

Monterey County, as a principal proponent of the plan, has a custodial responsibility to promote its implementation. As a general purpose government, the County has broad powers and responsibilities in the area of land use regulation and the maintenance of health standards. Through the Local Coastal Program authority, the County will require compliance to the plan by state agencies when the agencies are required to obtain coastal development permits from the County. Both the County Planning Commission and the Board of Supervisors will use the plan as a policy guide to land use and environmental matters in the Lower Big Sur Basin, and over time, can ensure that public and private land use decisions are made in concert with the plan.

The U.S. Forest Service has exclusive management jurisdiction in the Upper Big Sur Basin yet has been an interested and cooperative participant in the development of this plan. Many of the activities that will be undertaken by the Forest Service in the areas of wildlife, fuels and recreational management will have direct, measurable impacts to the implementation of the plan. The continued support and cooperation of the Forest Service in this program is indispensable.

## ***FIRST STEPS***

Once the management plan is adopted, the County should begin using it on a day-to-day basis as it considers requests for development permits in the Lower Basin. Since the policies and recommendations call for participation by other agencies in the process of reviewing development permit requests, the County should transmit the adopted plan to each of these agencies with a letter formally requesting their participation, assistance, and compliance to the policies and recommendations of the plan. It may be necessary to prepare formal arrangements in some cases by using Memorandums of Understanding or Joint Powers Agreements. The Board of Supervisors should formally request the Director of the Resources Agency to assist in this coordination effort.

Several actions called for in the plan should be started as soon as possible as they are essential to the long range management of the river and because the plan's policies impose restrictions on public and private land development that should only be removed based on the finding of the studies.

The Department of Fish and Game should immediately begin the studies necessary to determine instream flow requirements needed to maintain the anadromous fishery. The Department of Fish and Game should be requested to provide a schedule to the County indicating the time these instream flow studies will be completed.

The Board of Supervisors should direct the Monterey County Flood Control and Water Conservation District to review the adequacy of existing data on the location of the 100-year floodplain and floodway in the Lower Big Sur River Basin. If necessary, the District should be directed to undertake or commission any additional studies needed to determine the extent of the floodplain and floodway to a level of accuracy sufficient to guide land use and development decisions in the Lower Basin.

## TABLE 2

### SUMMARY OF RESPONSIBILITY FOR ACTION

| <u>Monterey County</u>                   | <u>Policies &amp; Recommendations</u>  |
|--|--|
| Board of Supervisors                     | 1*, 3*, 6*, 13, 29*, 39, 49*, 65, 73*  |
| Flood Control & Water Conservation Dist. | 10*, 11*, 12, 16, 17*, 18*, 50   |
| Environmental Health Department          | 24*, 26*, 27*, 28*, 29, 31*, 32*   |
| Planning Department                      | 6, 13*, 14*, 16, 18, 28, 65*, 66, 73   |
| Building Department                      | 28   |
| Recorder                                 | 12*  |
| <u>Special Districts</u>                 |  |
| Appropriate Agency                       | 3*, 4*, 5*, 25*, 29*   |
| Monterey Peninsula Transit               | 69*, 70*   |
| <u>State of California</u>               |  |
| Department of Water Resources            | 8*   |
| Division of Water Rights                 | 2*, 7*   |
| Department of Parks and Recreation       | 9*, 16*, 17, 19*, 20*, 21*, 22, 32, 35, 47, 48*, 50, 51*, 52*, 53*, 54*, 58*, 59*, 60*, 61*, 62*, 63*, 64*, 66*, 68*, 71*, 72*, 74*, 75* |
| Cal Trans                                | 15, 66   |
| Department of Fish and Game              | 7, 17, 37, 38*, 39, 40*, 41*, 42*, 43*, 44*, 47, 49, 67  |
| Department of Forestry                   | 47   |
| <u>Federal Government</u>                |  |
| Forest Service                           | 9*, 23, 27, 36, 47, 57*, 58, 59*, 60*, 66  |
| Soil Conservation Service                | 45*, 56*   |
| Fish and Wildlife Service                | 38   |
| <u>Private</u>                           |  |
| Property Owners, Private Campgrounds     | 16*, 17, 18, 23, 32, 33, 35, 50, 55*, 56, 74*  |

\* Denotes Major Responsibility

## ***CONTINUED WORK***

After the initial work just described has been completed, the plan should be used on a continuing basis by all of the agencies and individuals concerned as a guide to land use and management decisions affecting the Lower River. The matrix of management options in Chapter 3 will be of value in this process. The state agencies, called upon by the plan to undertake specific activities or studies, should use the plan as a basis for projecting future budget needs. As it reviews and adjusts these funding requests, the state legislature should remain mindful of the commitment made to this program and should allocate sufficient funds to carry needed work forward. It will be particularly incumbent upon the Resources Agency to coordinate funding requests by its various department in the implementation of this plan.

The Department of Parks and Recreation, a principal landlord in the Lower Basin, will in time, prepare master plans for Pfeiffer-Big Sur State Park and Andrew Molera State Park. As these plans are prepared, they must be consistent with the policies and recommendations of this plan.

The U.S. Forest Service is currently preparing a revised plan for the Big Sur Unit of Los Padres National Forest. The revised Forest Service plan should also be consistent with this plan so that integrated management of the entire Big Sur River can be ensured.

Because the plan is intended as a management tool, periodic assessment of the plan's performance should be made. If necessary, the plan should be modified to incorporate improved policies and recommendations. Some modifications in the plan may be necessary following completion of the instream flow studies and review of existing levels of water use.

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## *APPENDICES*

1. Assembly Concurrent Resolution No. 32.
2. Water Quality Sampling Stations on the Big Sur River.
3. Recreation and Visitor-Serving Facilities in the Lower Big Sur River Basin.
- 4A. Water Systems (Wells) in the Lower Big Sur River Basin.
- 4B. Water Systems (Diversions) in the Lower Big Sur River Basin.
5. Data and Criteria Necessary for the Determination of Instream Flow Requirements in the Lower Big Sur River Basin.
6. Big Sur River Hydrographs.
7. Annotated Checklist of Vertebrates of the Lower Big Sur River Basin and River Mouth.
8. Comparison of Campground Densities with Campground Density Standards.
9. Attributes of Pastoral Waterways.
10. Persons Contacted During the Preparation of the Plan.

## RESOLUTION CHAPTER \_\_\_\_\_

### *Assembly Concurrent Resolution No. 32 –Relative to the Little Sur and Big Sur Rivers.*

#### LEGISLATIVE COUNSEL'S DIGEST

ACR 32, Wood. Waterway management plans.

Requests Resources Agency and affected local agencies to prepare detailed waterway management plans, including specified provisions, for the Little Sur and Big Sur Rivers in Monterey County.

WHEREAS, The Legislature passed the California Protected Waterways Act in 1968; and

WHEREAS, This act directed the Resources Agency to develop the California Protected Waterways Plan (a) to identify those waterways of the state possessed of extraordinary scenic, fishery, wildlife, or outdoor recreation values, (b) to identify the public interest in, including potential human demands for, the resources of such waterways and adjacent lands, (c) to identify the activities or conditions which diminish, or threaten to diminish, the resources of such waterways, (d) to propose standards and requirements, and administrative and legislative actions, which would extend effective, long-range protection to the extraordinary scenic, fishery, wildlife, or outdoor recreation values of such waterways and adjacent lands on a basis which would permit the development and management of other natural resources where compatible, including appraisals of estimated costs and alternative means of financing to achieve such protection, and (e) to identify select waterways which merit priority action due to the nature of their resources; and

WHEREAS, The Resources Agency transmitted to the Legislature the initial elements of such a plan in February 1971; and

WHEREAS, The aforementioned report recommended that detailed protected waterway management plans be prepared for certain waterways of the state in accordance with the intent and provisions of the California Protected Waterways Act; and

WHEREAS, Chapter 761 of the Statutes of 1971 declares that it is appropriate that the Resources Agency proceed with the development of detailed waterway management plans as proposed in such report, and that such planning efforts include, but need not be limited to, certain designated waterways; and

WHEREAS, The Little Sur and Big Sur Rivers in Monterey County possess certain unique qualities and values which should be preserved; and

WHEREAS, The Monterey County Board of Supervisors is in support of having prepared detailed protected waterway plans for the Little Sur and Big Sur Rivers in Monterey County; now, therefore, be it

*Resolved by the Assembly of the State of California, the Senate thereof concurring,* That the Resources Agency and affected local agencies are requested to prepare detailed waterway management plans which shall include provisions for water conservation, recreation, fish and wildlife preservation and enhancement, water quality protection and enhancement, streamflow augmentation, and free-flowing and wild status for the Little Sur and Big Sur Rivers; and be it further

*Resolved,* That the Chief Clerk of the Assembly transmit a copy of this resolution to the Secretary of the Resources Agency and to the Board of Supervisors of Monterey County.

## ***APPENDIX 2: WATER QUALITY SAMPLING STATIONS ON THE LOWER BIG SUR RIVER***

| <b><u>NUMBER</u></b> | <b><u>LOCATION</u></b>  |
|----------------------|---|
| 1                    | Approximately 100 yards east of the last campsite in Pfeiffer-Big Sur State Park* |
| 2                    | Opposite campsite #188 in Pfeiffer-Big Sur State Park*                            |
| 3                    | Opposite campsite #106 in Pfeiffer-Big Sur State Park*                            |
| 4                    | Between campsites #79 and *86 in Pfeiffer-Big Sur State Park*                     |
| 5                    | Opposite campsite #54 in Pfeiffer-Big Sur State Park*                             |
| 6                    | Opposite headquarters building in Pfeiffer-Big Sur State Park*                    |
| 7                    | South of leach field for Pfeiffer-Big Sur State Park Sewage System                |
| 8                    | Opposite mid-point of leach field for Pfeiffer-Big Sur State Park Sewage System   |
| 9                    | North of leach field for Pfeiffer-Big Sur State Park Sewage System                |
| 10                   | South of Fernwood Campground  |
| 11                   | South of confluence with Juan Higuera Creek                                       |
| 12                   | At Ripplewood Bridge  |
| 13                   | At stream crossing to Riverside Campground  |
| 14                   | At Big Sur Campground swimming hole   |
| 15                   | At River Inn Bridge   |
| 16                   | Near ranger's residences at Andrew Molera State Park                              |
| 17                   | Opposite walk-in campground at Andrew Molera State Park**                         |
| 18                   | At lagoon near Big Sur River mouth in Andrew Molera State Park**                  |

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\*: Sampling stations may vary slightly within Big Sur State Park during winter months when the campground side of river is closed.

\*\* : No sampling in 1979 and 1980 due to relative inaccessibility.



**APPENDIX 3: RECREATION AND VISITOR-SERVING FACILITIES – LOWER BIG SUR RIVER BASIN**

| <i>NAME</i>                 | <i>UNITS</i> | <i>FULL<br/>OCCUPANCY</i> | <i>COST/NIGHT</i> | <i>PEAK SEASON</i> | <i>OCCUPANCY</i> | <i>OFF<br/>SEASON</i> | <i>OCCUPANCY</i> | <i>OTHER<br/>FACILITIES</i>           |
|-----------------------------|--------------|---------------------------|-------------------|--------------------|------------------|-----------------------|------------------|---------------------------------------|
| Andrew Molera State Park    |              |                           |                   |                    |                  |                       |                  |                                       |
| Walk-In                     | 36           | 200                       | .50/person        | June 15 - Labor    | 70%              | Winter                | 25%              | ---                                   |
| Campground                  |              |                           |                   | Day                |                  |                       |                  |                                       |
| River Inn                   | 18           | 50                        | \$28-\$46/night   | May - August       | Full             | Winter                | Generally Full   | Restaurant/Grocery/Gas                |
| Big Sur Campground          |              |                           |                   |                    |                  |                       |                  |                                       |
| Group Camp                  | 1            | 465                       | \$7/2 people      | August             | 90%              | Winter                | 10 - 25%         | Laundromat                            |
| Campground                  | 93           |                           |                   |                    |                  |                       |                  | Giftshop                              |
| Cabins                      | 3            | 12                        | \$35              | Summer             | Full             | Winter                | 50%              | Grocery                               |
| Riverside Campground        |              |                           |                   |                    |                  |                       |                  |                                       |
| Campground                  | 49           | 260                       | \$7/2 people      | August             | 90%              | Winter                | 10% - 25%        |                                       |
| Cabins                      | 6            | 25                        | \$20 - \$36       | July/August        | Full             | Winter                | 10% - 25%        | Laundromat                            |
| Ripplewood Resort           | 15           | 39                        | \$18 - \$35       | Memorial Day thru  | Weekends Full;   | Winter                | 25% - 50%        | Grocery/Deli/Gas                      |
|                             |              |                           |                   | Labor Day          | 50% Weekdays     |                       |                  |                                       |
| Glen Oaks Motel             | 15           | 45                        | \$25 - \$32       | May - August       | Full             | Winter                | 25% - 50%        |                                       |
| Fernwood                    |              |                           |                   |                    |                  |                       |                  |                                       |
| Campground                  | 65           | 390                       | \$7               | August             | Full             | Winter                | 25% - 50%        | Gas                                   |
| Lodge                       | 11           | 32                        | \$22 - \$27       | August             | Full             | Winter                | 25% - 50%        | Restaurant/Grocery                    |
| Pfeiffer-Big Sur State Park |              |                           |                   |                    |                  |                       |                  |                                       |
| Big Sur Lodge               | 61           | 274                       | \$29 - \$57       | All Year           | Full             | None                  |                  | Restaurant/Laundromat/<br>ry/Giftshop |
| Group Camp*                 | 2            | 50                        | \$10/group        | June 15 - Labor    | 90%              | Closed                | --               |                                       |
| Campground                  | 218          | 654                       | \$4/campsite      | June 15 - Labor    | Full             | Winter                | 25%              |                                       |
| Bicycle Camp                | 3            | 25                        | .50/person        | June 15 - Labor    | 25%              | Winter                | 10%              |                                       |
| Day                         |              |                           |                   | Day                |                  |                       |                  |                                       |
| Ventana Big Sur             |              |                           |                   |                    |                  |                       |                  |                                       |
| Campground                  | 100          | 530                       | \$7               | August             | 90%              | Winter                | 25% - 50%        | Gas/Grocery/Deli                      |
| Lodge**                     | 24           | 72                        | \$72 - \$175      | All Year           | Full             | None                  |                  | Restaurant/Giftshop                   |

**APPENDIX 4A: WATER SYSTEMS (WELLS) IN THE LOWER BIG SUR RIVER BASIN\***

| <b>NO.</b> | <b>OWNERSHIP</b>                                      | <b>WELLS</b>   | <b>STATUS</b>  | <b>DEPTH</b> | <b>YIELD</b> | <b>SERVICE CONNECTIONS<sup>1</sup></b> |
|------------|---|--|----------------|--------------|--------------|--|
| 1          | United States Navy <sup>2</sup>                       | Easement on north side of Big Sur River mouth in Andrew Molera State Park  | ?              | ?            | ?            | ?                                      |
| 2          | El Sur Ranch  | Easement on north side of Big Sur River mouth in Andrew Molera State Park  | in use         | ?            | ?            | ?                                      |
| 3          | United States Navy <sup>2</sup>                       | Easement on north side of Big Sur River mouth in Andrew Molera State Park  | in use         | ?            | ?            | ?                                      |
| 4          | California Department of Parks and Recreation         | North of Big Sur River mouth in Andrew Molera State Park   | not in service | 32'          | 40 gpm       | capped                                 |
| 5          | El Sur Ranch  | North of Big Sur River mouth in Andrew Molera State Park   | not in service | 28'          | 90 gpm       | capped                                 |
| 6          | United States Navy <sup>2</sup>                       | North side of Big Sur River, 98' north of trail leading from campground to river mouth in Andrew Molera State Park | not in service | 28'          | 300 gpm      | capped                                 |
| 7          | El Sur Ranch  | North side of Big Sur River (180' from bank and 140' from trail) in Andrew Molera State Park                       | in use         | 36'          | 1700 gpm     | ?                                      |
| 8          | California Department of Parks and Recreation         | East side of Big Sur River opposite ranch buildings in Andrew Molera State Park                                    | in use         | ?            | ?            | 4+36C                                  |
| 9          | Captain Cooper School                                 | East side of Big Sur River north of River Inn Bridge   | in use         | 35'          | 800 gpm      | S                                      |
| 10         | Dani Pfeiffer Ridge Mutual Water Company <sup>2</sup> | West side of Big Sur River on Lockwood property  | in use         | 150'         | 100+ gpm     | 15+                                    |
| 11         | River Inn   | East side of Big Sur River between bridge and restaurant   | in use         |              | ?            | 4+18M+R+2B                             |
| 12         | Big Sur Campground <sup>3</sup>                       | West side of Big Sur River, 300' south of bridge entering Big Sur Campground                                       | in use         |              | 3 - 5 gpm    | 20+3M+94C+2B+1                         |
| 13         | Riverside Campground                                  | West side of Big Sur River near campground entrance  | in use         | 26'          | ?            | 4+6M+49C+L                             |
| 14         | Ripplewood Resort                                     | East side of Big Sur River west of Highway 1   | in use         | 40'          | 20 gpm       | 2+15M+3B                               |

**APPENDIX 4B: WATER SYSTEMS (DIVERSIONS) IN THE LOWER BIG SUR RIVER BASIN**

| No. | Ownership/Facility              | Source   | Point of Diversion |             | Status             | Applicant  | Amount     |           | Date Filled | Application No. | Service Connecti |
|-----|---------------------------------|--|--------------------|-------------|--------------------|--|------------|-----------|-------------|-----------------|------------------|
|     |                                 |  | Section            | TWP & Range |                    |  | CFS or GPD | Acre Feet |             |                 |                  |
| 1   | Andrew Molera State Park        | Unnamed tributary in Andrew Molera State Park  |                    |             | Back-up not in use | ***  | --         | --        | ?           | --              | --               |
| 2   | River Village Water Association | Phenegar Creek   | NENW24             | 19S1E       | in use             | John I. & Edith Pfeiffer/Jan D. Brewer DBA, Big Sur Associates | 8065G      | .01c      | 123059      | 19154           | 26               |
|     |                                 |  | NENW24             | 19S1E       |                    | The Big Sur Campground Inc.                                    | 400G       | .0006c    | 123059      | 19155           |                  |
|     |                                 |  | NENW24             | 19S1E       |                    | August Warcken et. al.   | 7500G      | .01c      | 123059      | 19156           |                  |
| 3   | August Warcken et. Al           | Phenegar Creek   | NENW24             | 19S1E       | ?                  | August Warcken et. al.   | 15440G     | .02c      | 101359      | 19029           | ?                |
| 4   | Hans Ewoldsen et. al.           | Unnamed spring   | NENW24             | 19S1E       | ?                  | Hans Ewoldsen et. al.  | .05C       |           | 090634      | 8094            | ?                |
| 5   | Jack & LaVonn J. Curtis         | Phenegar Creek   | NESW13             | 19S1E       | ?                  | Jack & LaVonn J. Curtis  | 4500G      | .007c     | 110163      | 21520           | ?                |
|     |                                 |  | NESW13             | 19S1E       |                    | Jack & LaVonn J. Curtis  | 0.05C      |           | 081968      | 23116           |                  |
| 6   | Charles D. & Paula A. Walling   | Phenegar Creek   | NESW13             | 19S1E       | ?                  | Charles D. & Paula A. Walling                                  | 5000G      |           | 111777      | 36674           | ?                |
| 7   | Riverside Campground            | Spring on east facing slope of Pfeiffer Ridge above water tank                       |                    |             | not in use         | ***  | --         | --        | ?           | --              | **               |
| 8   | Ripplewood Resort               | Main branch of Juan Higuera Creek approx. 10' upstream from junction with south fork | NWSE24             | 19S1E       | not in use         | Ripplewood Resort  | 8000G      | .01c      | 081061      | 20347           | **               |



**APPENDIX 5**  
**DATA AND CRITERIA NECESSARY FOR THE DETERMINATION OF IN-STREAM FLOW**  
**REQUIREMENTS IN THE LOWER BIG SUR RIVER BASIN**

It is necessary that field studies be conducted in order to determine the specific flow requirements for steelhead trout in the Lower Big Sur River and its tributary creeks. This will require several sets of cross-sectional transect measurements of stream width, depth, velocity, and substrate composition. These measurements need to be made at several locations along the river and at various flows. The subsequent application of these data to the physiological and environmental requirements of the steelhead trout at various critical stages in its lifecycle will lead to the formulation of optimum\* or minimum flows required for this species. Flow requirements should be determined for nursery habitat, spawning habitat, and the migration of adult fish to spawning areas.

The most critical factors affecting the ability of adult steelhead to migrate to suitable spawning areas are the depth and velocity of water flowing over shallow bar or riffle areas. Minimum criteria to be used for the passage of adult fish are 0.18m (0.6 ft.) minimum water depth and a maximum water velocity of 2.4 meters per second (8.0 fps) (Baracco, 1977). A 10% continuous portion and 25% of the total transect length must meet these minimum criteria for fish migration.

\*Optimum is defined as that flow that provides substantial fish production commensurate with other beneficial uses of the available water. Minimum flow is the amount of water needed for short-term survival of the population.

Spawning habitat requirements for steelhead include a minimum water depth, minimum and maximum water flows and the availability of suitably sized gravel. Criteria to be met for providing steelhead spawning habitat are a minimum water depth of 0.24m (0.8 ft.), water velocities between 0.4 and 0.91 meters per second (1.27 to 3.0 fps) measured 0.15m (0.5 ft.) above the streambed and a gravel composition averaging in size between 12.7 and 101.6mm (0.5 to 4 in.) in diameter. (Baracco, 1977). Determinations need to be made of the amount of suitable spawning habitat available at various flows in the river.

Juvenile steelhead remain in the river for a full year before returning to the ocean. Suitable water temperatures, and adequate food supply, shelter from predators are among the conditions essential for survival. These factors are directly related to water flow. Water flows requisite for suitable nursery habitat average in velocity between 0.15 to 1.07 m/sec (0.5 to 3.5 ft./sec). Minimum required water depth is 0.15m (0.5 ft.). (Baracco, 1977). Application of the cross-sectional transect measurements at several flows to these criteria will lead to a determination of the minimum flows for the survival of juvenile steelhead which become critical during the late summer months.

## APPENDIX 8

### COMPARISON OF CAMPGROUND DENSITIES WITH CAMPGROUND DENSITY STANDARDS

| <u>Campground</u>             | <u>Number of Campsites</u> | <u>Number of Acres of Campground<sup>4</sup></u> | <u>Number of Acres of Parcel</u> | <u>Appropriate Recreation Use Class<sup>2</sup></u> | <u>Recommended Maximum Site Density<sup>3</sup></u> | <u>Recommended Maximum Parcel Density<sup>3</sup></u> | <u>Actual Site Density</u> | <u>Actual Parcel Density</u> |
|-------------------------------|----------------------------|--|----------------------------------|---|---|---|----------------------------|------------------------------|
| Andrew Molera                 | 36                         | 3  | 4800                             | II  | 5 units/1 <sup>5</sup><br>acre                      | 1 unit/10<br>12 units/<br>acres                       | .08 units/<br>10<br>1 acre | acres                        |
| Pfeiffer-Big Sur <sup>1</sup> | 218                        | 60   | 810                              | III   | 10 units/1<br>acre                                  | 1 unit/5<br>acres                                     | 3.6 units/<br>1 acre       | 1.3 units/5<br>acres         |
| Big Sur                       | 93                         | 12   | 12.8                             | V   | 20 units/1<br>acre                                  | 1 unit/1<br>acre                                      | 7.8 units/<br>1 acre       | 7.3 units/1<br>acre          |
| Riverside                     | 49                         | 5.5  | 23                               | V   | 20 units/1<br>acre                                  | 1 unit/1<br>acre                                      | 9 units/1<br>acre          | 2 units/1<br>acre            |
| Fernwood                      | 65                         | --   | --                               | V   | 20 units/1<br>acre                                  | 1 unit/1<br>acre                                      | --                         | --                           |
| Ventana                       | 100                        | 15   | 160                              | V   | 20 units/1<br>acre                                  | 1 unit/1<br>acre                                      | 6.6 units/<br>1 acre       | .6 units/1<br>acre           |

<sup>1</sup> Excluding group campsites and bicyclist camping area.

<sup>2</sup> Recreation use classes are defined in Monterey County 1980, Big Sur Coast, Recreation & Visitor-Serving Facilities Background Report (Table 3).

<sup>3</sup> Recommended maximum campground densities from Monterey County 1980, Big Sur Coast, Recreation & Visitor-Serving Facilities Background Report (Table 8).

<sup>4</sup> All campground acreages are estimates. Figure may need to be adjusted significantly based on an accurate measurement of developable campground area.

<sup>5</sup> California State Department of Parks and Recreation contends that this site density standard is inappropriate for the walk-in campground at Andrew Molera State Park.