Big Sur River Watershed

January 17, 2013 Stakeholder Meeting

Big Sur River Watershed Management Plan Objective

- From State Fish and Wildlife proposal

Create a community-based watershed management plan to address limiting factors to steelhead in the Big Sur River watershed through watershed group coordination, information gathering, resource assessments and technical review and planning.

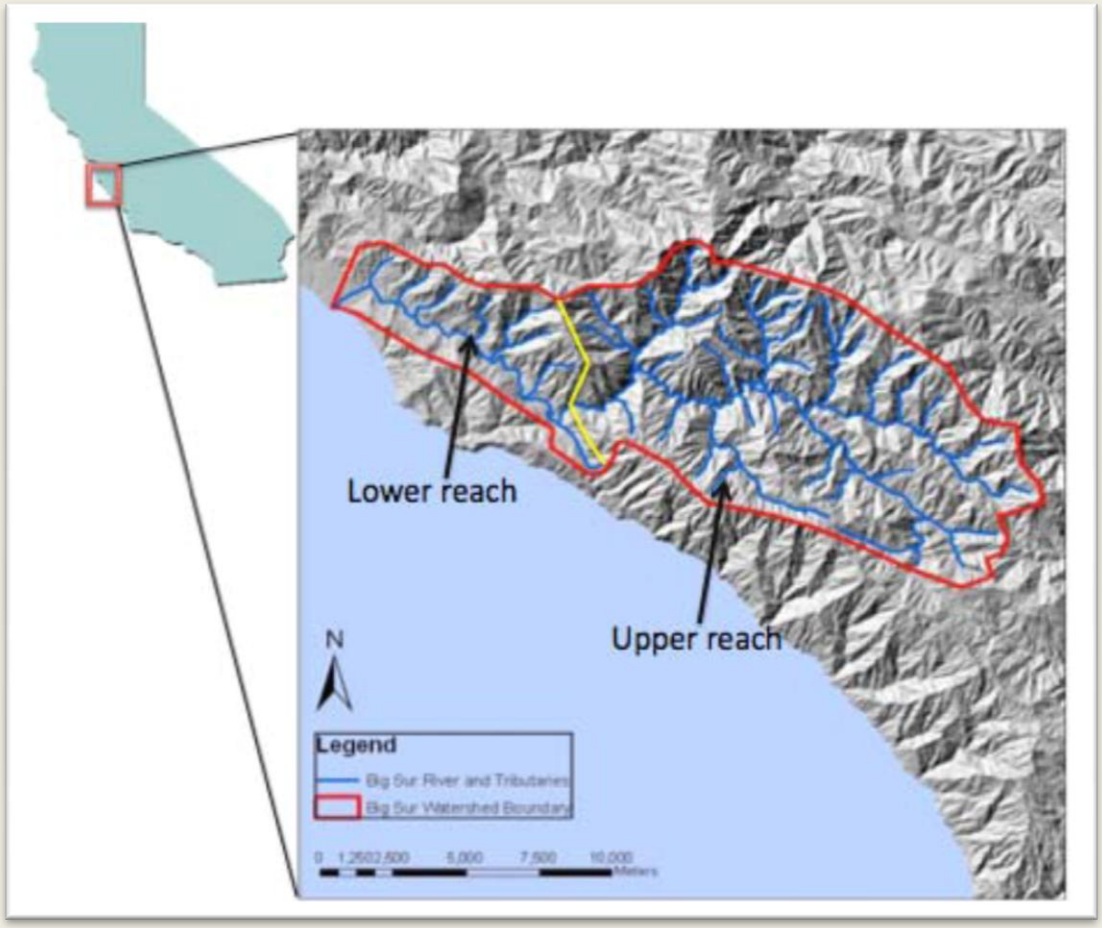
CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

Contracted Outcome

- Develop a strategic watershed management plan consisting of:
- A synthesis of current and past conditions, and reasons for change
- Determination of critical data gaps for further assessment
- Identification of critical management issues through stakeholder consensus
- Development of a project matrix to include management and monitoring actions, improvement and preservation projects, potential partners, funding mechanisms, and habitat conditions, identifying management strategies, and priority in-stream projects.

Synthesis of Watershed Conditions Section of the Plan

- Land Use
- Climate
- Geology, Tectonics and Soils
- Geomorphology
- Surface and groundwater hydrology
- Infrastructure and Channel Modifications
- Water Quality
- Vegetation
- Wildlife
- Wildfire/Fire Regime
- Key Issues Summary



Today's Focus:

- ❑Type of information that is likely to be part of synthesis of past and current watershed conditions
- ❑Seeking guidance from stakeholders on data gaps

Land Use

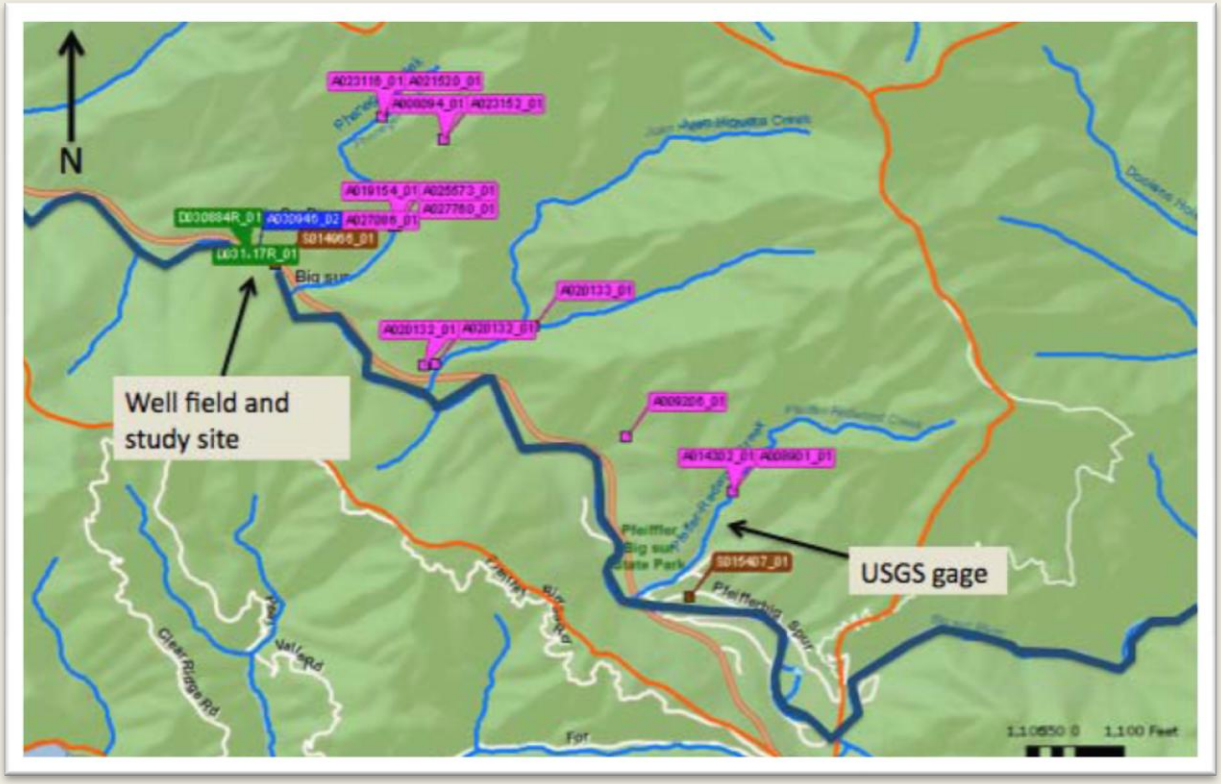
PHYSICAL CHARACTERISTICS						LAND USE			
WATERSHEDS (north to south)	Area (acres)[1]	Area (sq.miles)[1]	Stream Length[2] (miles)	Ave. Ann. Rainfall[3] (inches)	Total Human Population[4]	Public Ownership[4]	Urban Area[5]	Agriculture/ Barren[5]	Open Space[5]
Big Sur River	37,374	58	92	20.8	341	88%	0.7%	< 0.1%	> 99%

Source: NMFS South-Central California Steelhead Recovery Plan Draft October ,2012

Precipitation and Climate

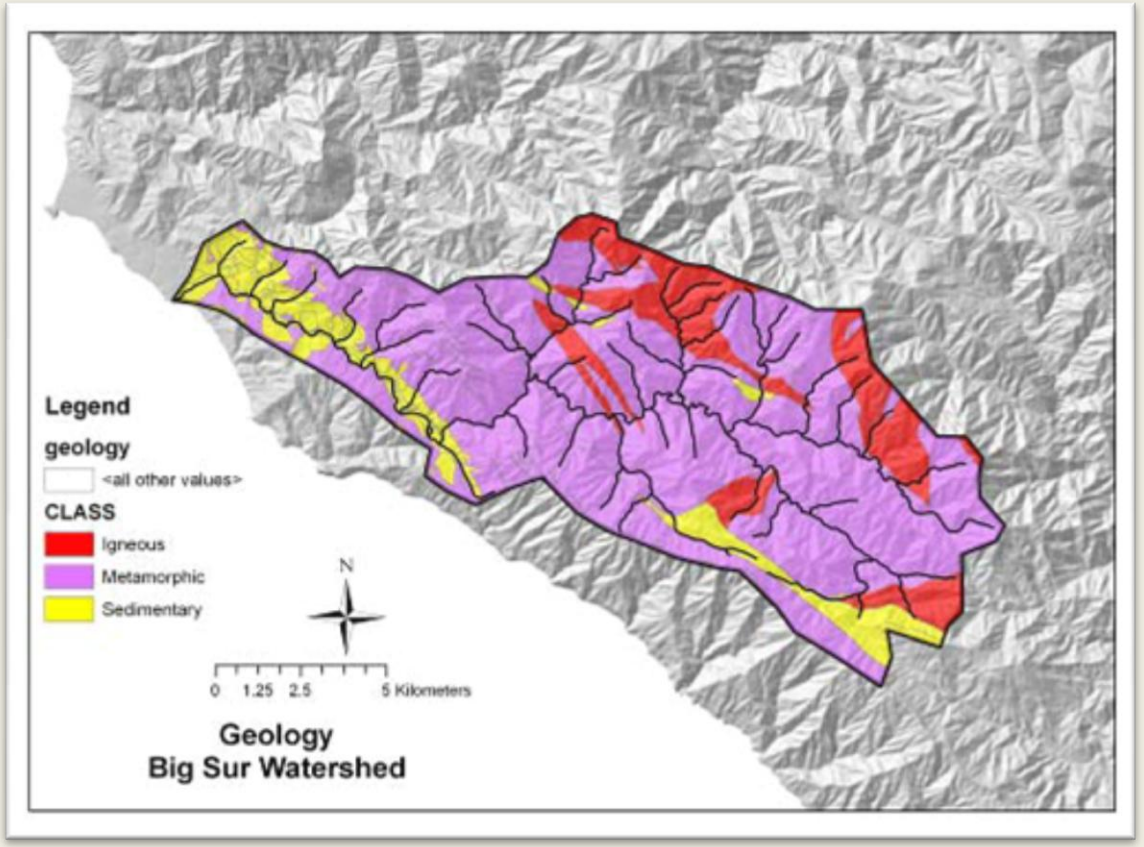
annual mean flow	73 cfs	USGS 2010
lowest recorded flow	6.5 cfs	
base flow August-November	18-42 cfs	
average annual rainfall	43 inches Pfeiffer State Park	
average annual precipitation	50 inches upper reach	Stanley 1983
average rainfall	39.7 inches at the U.S. National Weather service rain gage at PBS (elevation 240'), which has operated since 1913	Duffy 2003
highest recorded rainfall	70 inches in 1941	
greatest annual rainfall	77.53 rain gauge in Pfeiffer-Big Sur State Park 1940-41	
lowest recorded rainfall	18.77 inches in 1923-24	

Groundwater and Wildfires



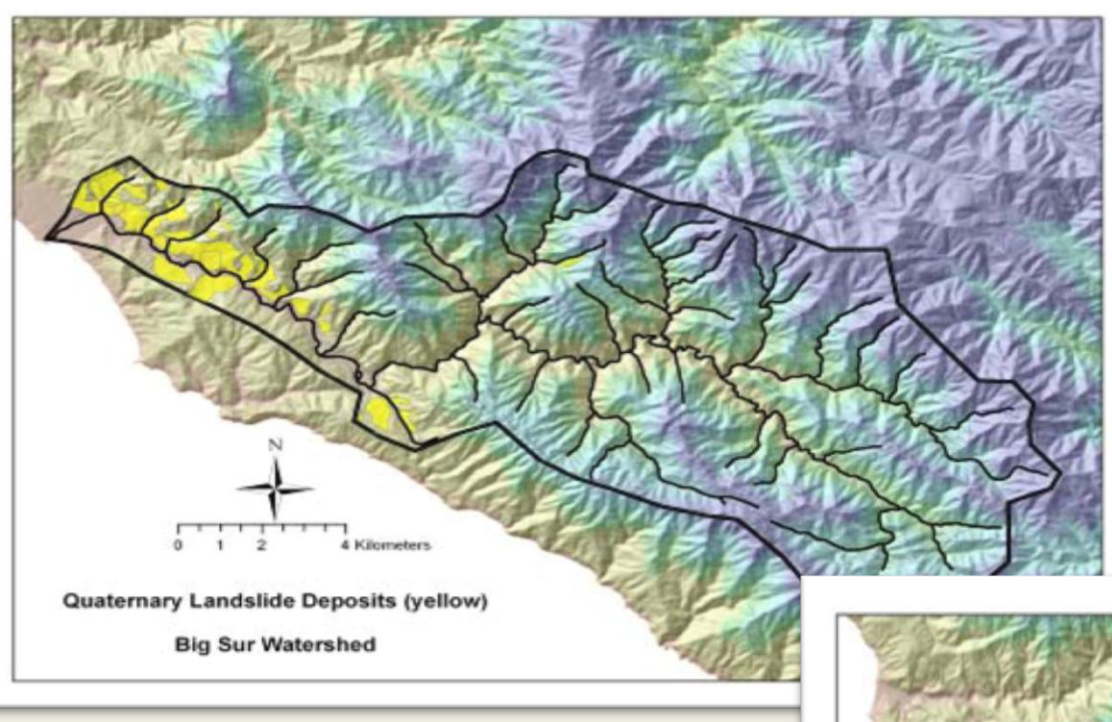
Source: Lanier, Casey. *Potential Impacts of Groundwater Withdrawal and Wildfires along the Big Sur River: An Assessment of Oncorhynchus mykiss Habitat*. Thesis. California State University, Monterey Bay, 2011.

Basic Geology



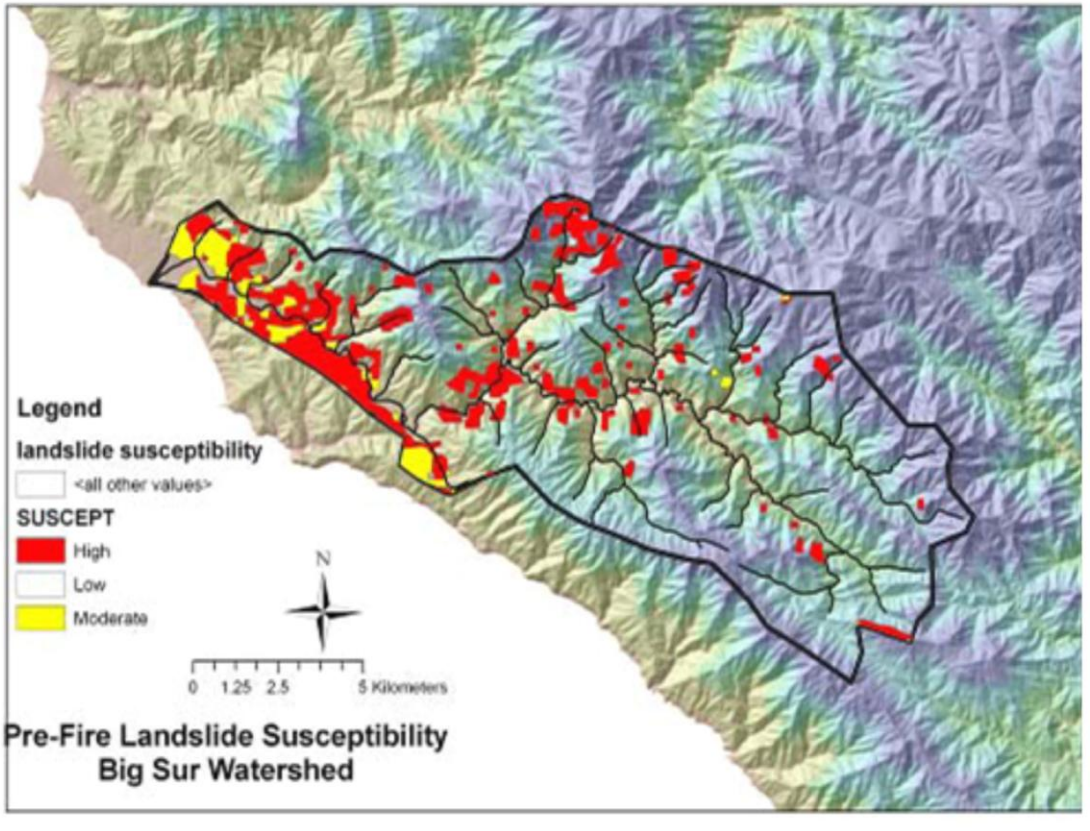
The watershed is underlain by

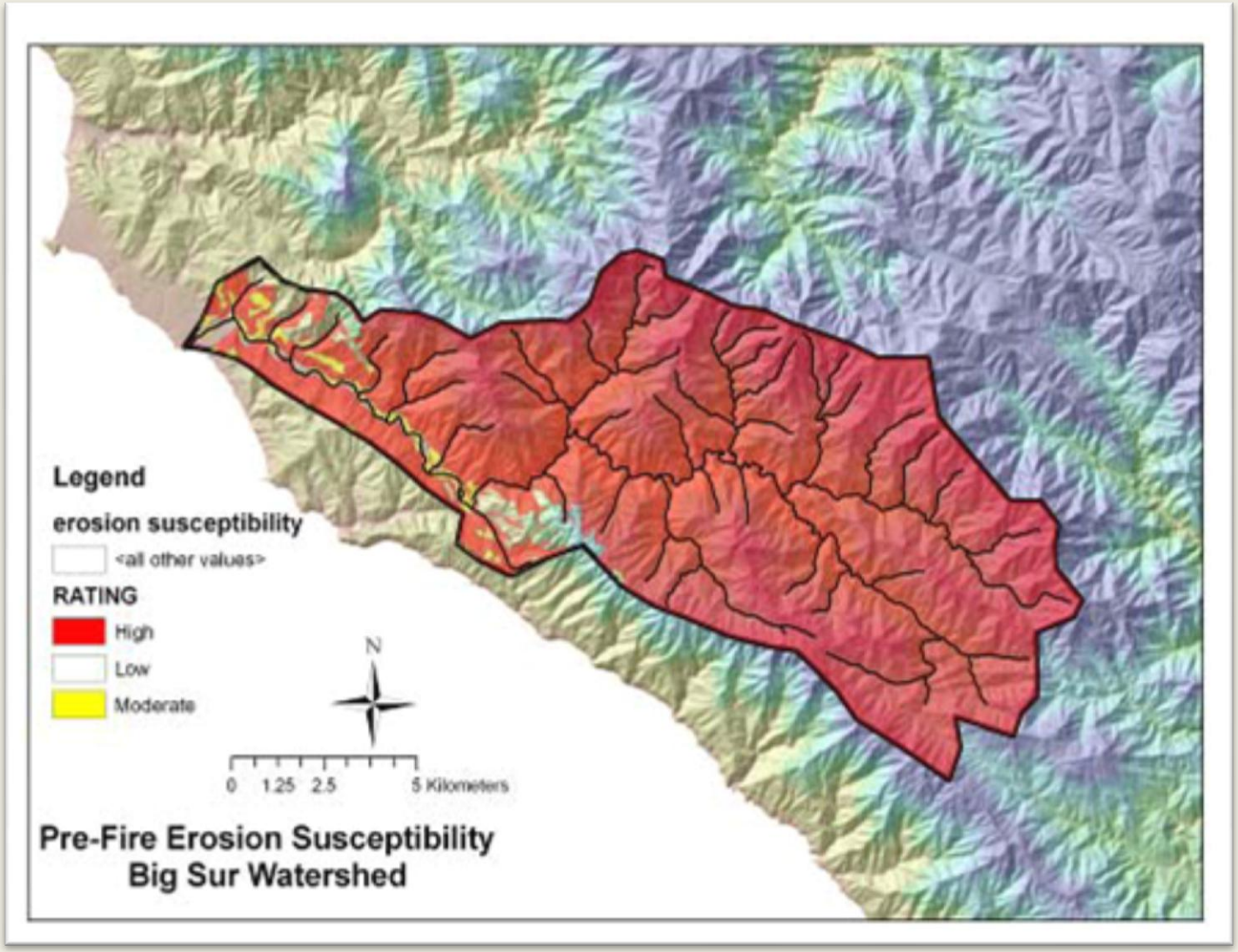
- 85% metamorphic rock,
- 19% igneous rock, and
- 15% sedimentary rock and recent deposits



Five percent of the watershed is covered by existing historic landslides

And there are slopes with high potential for landslides throughout the watershed





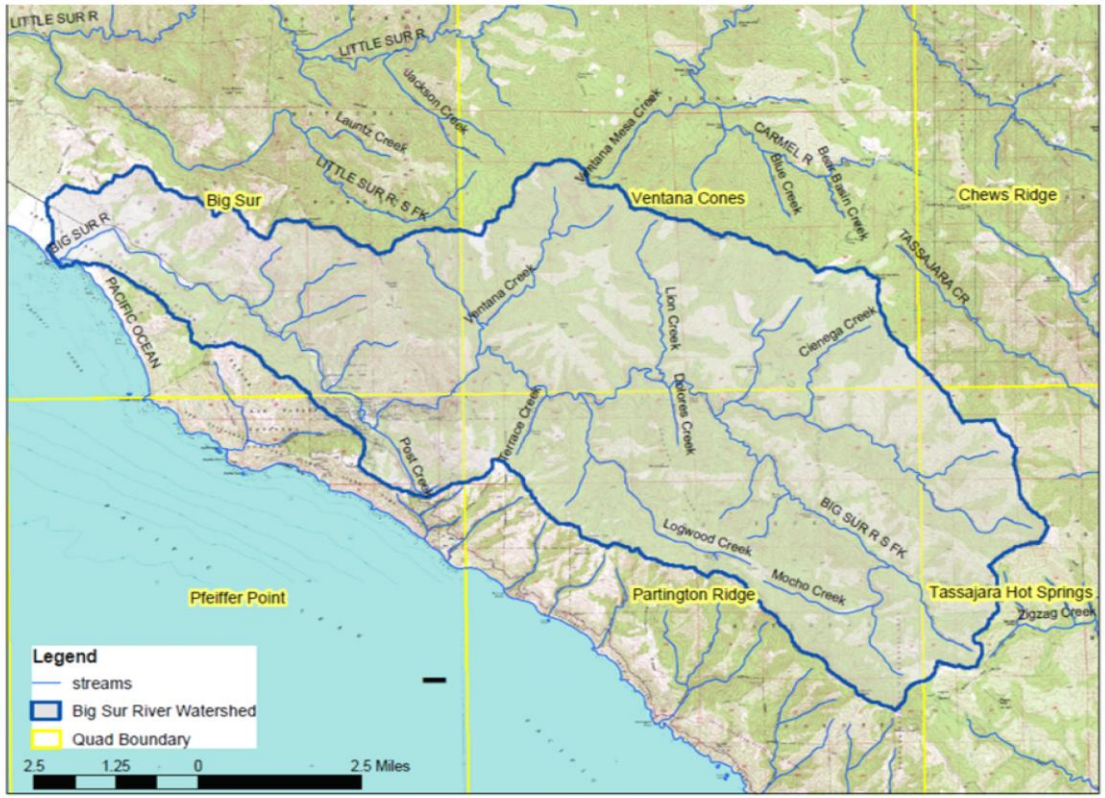
The region has

- steep hill slopes
- bedrock is both deeply weathered and pervasively fractured and faulted, resulting in ubiquitous high erosion potential

Hydrology

Santa Lucia Hydrologic Unit

Drainage area	60.78 square miles	California Department of Water Resources, 1971
Drainage area	58.53 square miles	Black & Veatch, 1980
Average annual runoff	64,900 acre feet 1950-1977 USGS stream gage records	Vita, 1980
Greatest mean runoff	Greater than 240 cfs January	
Maximum recorded stream discharge	**7,100 cfs** recorded on April 2, 1958	California Coastal Commission, 1977



United States Geological Survey
7.5 Minute Topographic Maps: Big Sur, Ventana Cones, Chews Ridge, Pfeiffer Point, Partington Ridge, Tassajara Hot Springs

Water Quality

Beneficial Use	Big Sur River	Big Sur River Estuary
Municipal and Domestic Supply	X	
Agricultural Supply	X	
Groundwater Recharge	X	
Water Contact Recreation	X	X
Non-Contact Water Recreation	X	X
Wildlife Habitat	X	X
Cold Fresh Water Habitat	X	X
Warm Fresh Water Habitat	X	X
Migration of Aquatic Organisms	X	X
Spawning, Reproduction and/or Early Development for Fish	X	X
Preservation of Biological Habitats of Special Significance	X	X
Rare, Threatened, and Endangered Species	X	X
Estuarine Habitat		X
Freshwater Replenishment	X	
Commercial and Sport Fishing	X	X
Shellfish Harvesting		X

Source: RWQCB Basin Plan 2012

Monitoring sites that follow this page

Site number	Name
1	Andrew Molera mouth
2	Andrew Molera parking lot
3	Below Pheneger
4	Pheneger
5	Below Juan Higuera
6	Below leech field
7	Below Post
8	Above gauge

Source: CSUMB Big Sur River Cross Sections 2008

Post Basin-Complex Baseline Monitoring of the Big Sur River (October, 2008)

SITE 5

Site Name	Below Higuera
Date	9/27/2008
Time	10:30
Names	Emily, Cooper
GPS UTM	10S 0607409, 4014152 Center of Cross Section
Description	

South end of Big Sur Campground behind campsite #108. Left bench mark 0.9 m towards river from tree with 2 main stems. Right bench mark 2 m away from river from tree with 4 main trunks.

Nutrients / Water Chemistry	Name: Emily	Hydrolab #: 43
Ph	7.98	Sample Bottle Name
Turbity	0	
Specific Conductence ms/cm	335.3	
DO mg/l	10.15	
DO %	101.1	
Temp C	15.35	Below Higuera 10/1/08
Nitrate + Nitrite (mg N/L)	0.0675	
Ammonium (mg N/L)	-0.00055	
SRP (mg P/L)	0.011	
Urea (mg N/L)	2.9455	

Figure 24: Lower reach, mouth of Big Sur River Lagoon. Time series comparison from November 20th 2008 (left) and December 4th 2008 (right), note kelp deposit.

Stream Gaging

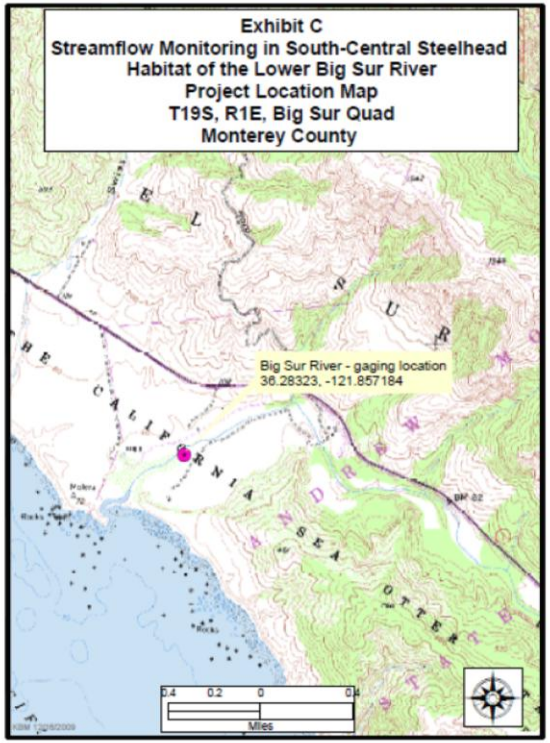
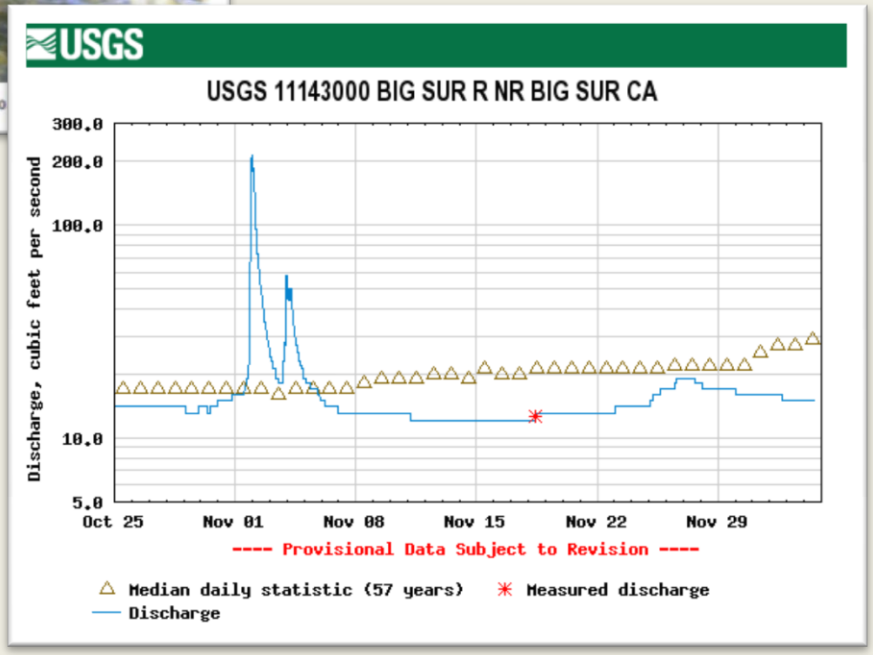



Photo 26: Waypoint 244; USGS Gage No. 11143010



Fish Passage Barriers

Name	Stream	Mile	Type
Big Sur River falls	South Fork Big Sur River, trib to Big Sur River	1.55	Falls
Arizona Crossing on private property	Big Sur River, trib to Pacific Ocean off California	3.78	Culvert
Two culverts	Juan Hiquera Creek, trib to Big Sur River	0.06	Culverts 20 feet in length, perched on a steep boulder riffle
Terrace Creek Waterfall	Terrace Creek, trib to Big Sur River	0.06	high waterfall at the stream mouth, 1981 survey
steep gradient with series of waterfalls over logs	Post Creek, trib to Big Sur River	0.84	Cascades/Gradient/Velocity
Pfeiffer Falls	Big Sur River, trib to Pacific Ocean off California	7.75	Falls; Bedrock gorge with boulders creating a 8 foot jump. Jump pool below approximately 12 feet deep
Pfeiffer Falls	Pfeffer-Redwood Creek, trib to Big Sur River	0.55	large falls 30 to 40 ft high, barrier to all fishlife
NF Big Sur River Waterfall	North Fork Big Sur River, trib to Big Sur River	1.60	20 foot waterfall considered the upstream limit to anadromy
Hwy 1 culvert	Unnamed stream [1218445362879], trib to Big Sur River	0.06	double cmp culvert w/stacked rock headwall.
Hwy 1 culvert	Pheneger Creek, trib to Big Sur River	0.05	75' CMP - 100 ft long slightly sloped culvert

Source: CalFish

El Sur Ranch Reports and Data

Big Sur River Fisherman Survey

Fisherman	Letter= L Interview= I	years on the Big Sur	years fishing on Big Sur	when is the earliest you have seen a adult fish in the river	when are kelts in river	how many fish were caught in the 50's and 60's	how many fish were in Big Sur in early years	how many fish in Big Sur today	what % have numbers dropped since 1958	what % have numbers dropped since 1975	were ther Salmon in the Big Sur	have you caught a Salmon	are there Salmon today in the Big Sur	most steelhead sen in one day
Brian LeNeve	I	68	43	November	all year	250	2,000	100	90 +	NA	yes	no	?	75
Brett Shadwell	L	33	33	September	all year	?	?	?	?	?	yes	yes	?	200
Tom Zobel	L & I	60	59	September	all year	1500	15000	200-300	90 +	NA	yes	yes	yes	300
Bill Neidinger	L & I	49	20	August	all year	200-300	2,000	200-300	NA	85%	yes	yes	yes	50
Frank Emerson	L & I	40	40	September	9 months	NA	?	100-200	90	NA	yes	no	?	200
Harrison Hilbert	L & I	30	13	November	all year	300	2,000	?	NA	80%	yes	no	?	40
Roy Thomas	L & I	39	38	September	all year	?	?	100-200	NA	80%	yes	yes	?	14
Robert Zampatti	L	28	25			NA	?		NA	75+				
Jim Cunningham	L & I	60	41	August	all year	400-500	3,000/4,000	100-200	95	NA	yes	yes	no	200
Ray Wermuth	L & I	71	13	November	all year	?	?	?	?	?	yes	yes	?	200
Michael Anderson	L	12	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Steve Cassas	I	25	25	October	?	300	6,000	?	NA	70%	no	no	no	20
Daryl Bryoun	I	36	30	September	4 months	200	1500	300	NA	80%	yes	yes	?	100
Allen Russell	L & I	52	44	November	all year	?	?	?	?	?	yes	yes	?	150
Chris Arcoleo	L & I	56	56	September	all year	?	?	?	?	?	yes	yes	?	75
Ed Isaac	L & I	43	43	November	all year	500-600	3000-4000	?	NA	90+	yes	yes	yes	300
John Hollo	I	65	10	November	all year	?	?	?	95%	NA	yes	yes	?	150
John Mearns	L & I	48	48	November	all year	NA	?	?	NA	90%	yes	yes	?	80
AVERAGE ALL PARTICIPANTS						437	4,437	192						
AVERAGE ALL PARTICIPANTS EXCLUDING HIGH AND LOW						314	3,166	190						
? = choose not to aanswer														
NA = not applicable														
TOTAL ALL PARTICIPANTS		815	593											

CRSA - 22

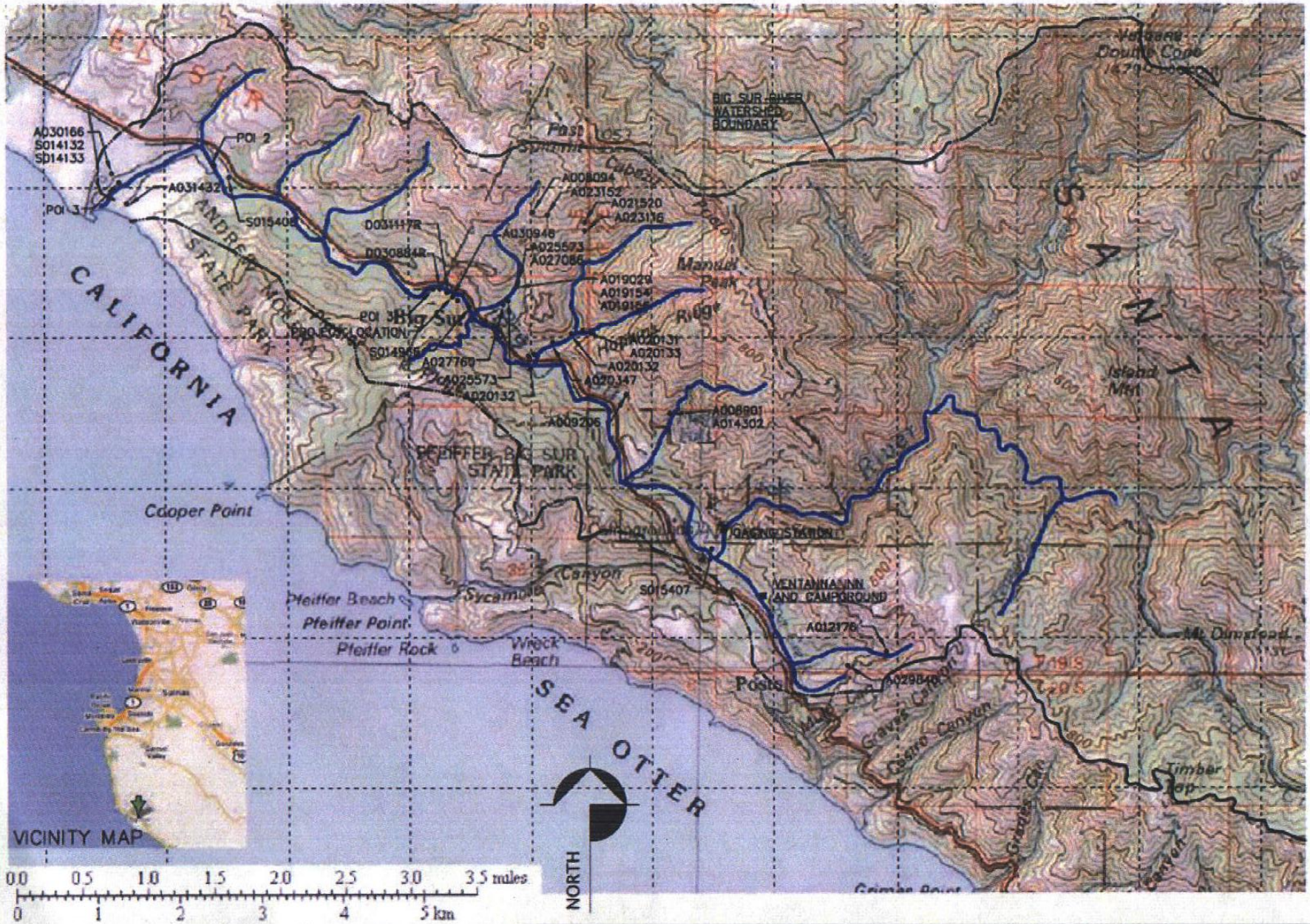


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FIGURE 1.
BIG SUR RIVER WATERSHED
PERMITTED DIVERSION POINTS
AND POINTS OF INTEREST

Figure 1. Big Sur River Watershed Permitted Diversion Points and Points of Interest

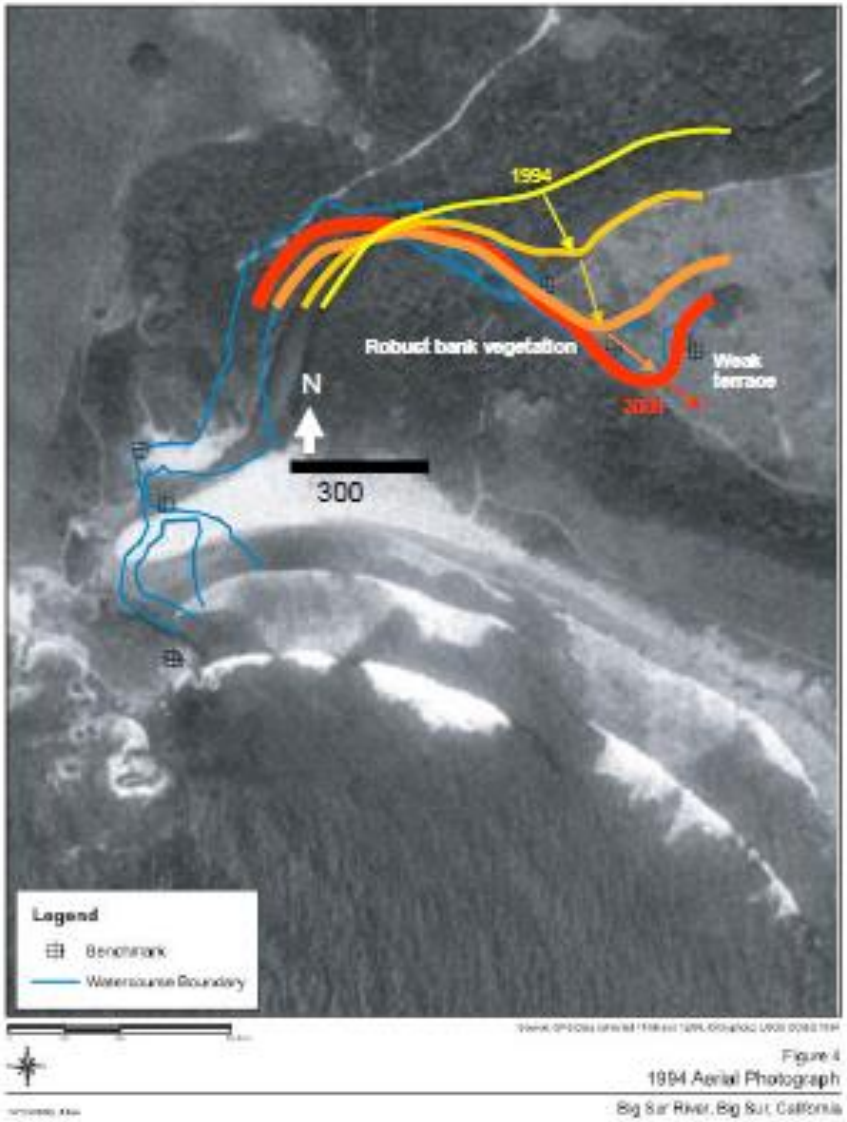


Figure 31: Approximate recent positions of the lagoon channel based upon remnant topography of aerial photographs and recent GPS (Figs 15,, 16, and 17).

Source: CSUMB 2008

Summary of Management Concerns
BSR Protected Waterway Management Plan
Stanley, 1986

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 lost 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.

TABLE 4
Big Sur River Steelhead Enhancement Plan Matrix
Andrew Molera State Park

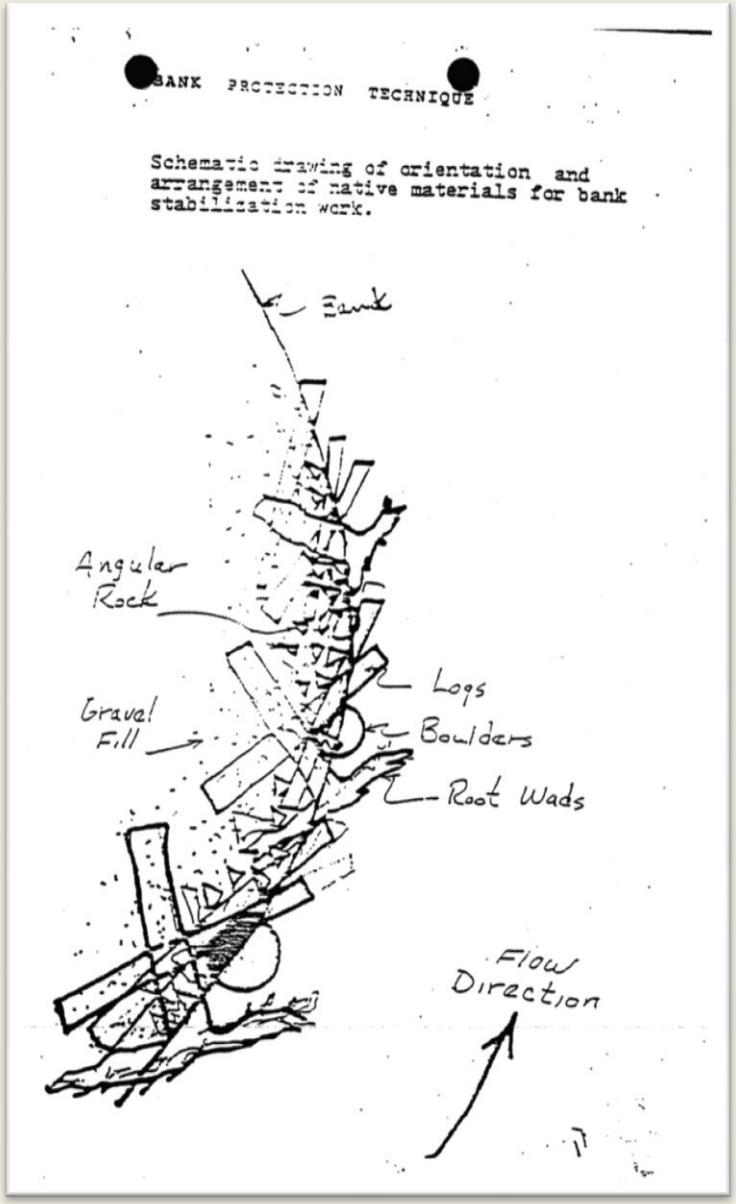
Project Reach:	Noted Impacts:	Suggested Management Measures:	Suggested Capital Projects:
1. Lagoon	• Groundwater withdrawals • Streambank failures • Episodic channel shifts, loss of riparian cover	• Continue Creamery Meadow riparian woodland restoration project (MM-2) • Minimize groundwater use from alluvial wells to limit groundwater depression and seawater intrusion through lagoon substrates (Refer to *El Sur Ranch Water Rights Application EIR* for technical discussion)	• Revegetate trail access-related eroded banks with native willow mattress/brush box revetments (RM 0.9 & RM 0.10) Re-route LB and RB beach access trails away from bank failures (RM 0.9 - RM 0.13). Leave generous riparian woodland buffer (50'-100') if possible (CP-1)
2. Mid Molera Reach	• Episodic channel shifts, loss of riparian canopy and integrity • Trail access and erosion • Rock dams and instream recreational use • At-grade crossings • Streambank failures	• Conduct late spring redd survey (MM-1) • Institute documented spawning reach signage program for minimum of 60 days after spawning survey(s) (MM-1) • Institute trail crossing closures at spawning areas(MM-1) • Continue Creamery Meadow and Creamery Meadow Annex riparian woodland restoration project (MM-2) • Periodically remove rock dams (MM-3)	• Install SH Lifecycle Interpretive Displays at walk-in camp site and at main parking lot-river crossing location(s) (RM 1.09) (CP-2) • Complete design, permit and construct proposed year-round pedestrian bridge near parking lot to minimize instream trampling (RM 1.24) (CP-3) • Construct bioengineered revetment at ranch road bank failure (RM 1.28-1.31) (CP-10)

Los Padres Firescape Monterey Project

1. Big Sur WCF priority watershed:
a. Reconfigure campgrounds along the Big Sur River to increase setback and improve sanitation facilities to improve water quality (2013).
b. Seasonally prohibit wood fires and disperse concentrations of visitors among the campsites and consider visitor quotas to lessen impacts on riparian vegetation and soils (ongoing).
c. Map and inventory invasive weed infestations and organize group eradication events to treat or pull the weeds (ongoing).

Record of Treatments in the Watershed Related to Steelhead Restoration/Enhancement

- Andrew Molera 1990
- Cal Trans Project
- Currently occurring PBS State Park Projects



Recommendations

To be based on

1. Synthesis of Watershed Conditions—Literature Review by CCSE

2. Assessment data sets

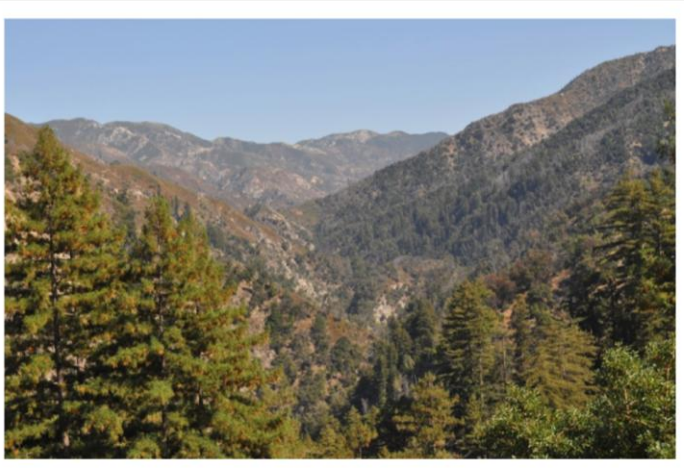
- Limiting Factors Analysis—Stillwater Sciences
- BMI Survey—past surveys by the RWQCB and current assessment by CCSE
- Lagoon Habitat Assessment—Stillwater Sciences
- Noxious Weed Mapping --RCDMC

3. And points of agreement from stakeholders/funder

Recommendations

To be developed on several scales

1. General treatments to support restoration across the watershed as a whole
2. Site specific restoration actions for high-priority sites, set in their watershed process context and;
3. Identification of landscape conservation measures for the long-term protection of habitats.



Example Stakeholder Questions—will inform plan

- *Is NOAA closing all fishing in Central Ca. Streams?*
- *Can you give stakeholders clues how to protect fish all seasons, all stages of growth?*
- *List of predators all life stages in streams/rivers.*
- *Crawdads eat young steelhead?? We have a lot of them.*
- *Two footed predators??*
- *Water depth needed for all life stages?*
- *Water pollution low water months?*
- *Is food available for all life stages?*

Still Seeking/Awaiting

- **Big Sur River Habitat Assessment**, **Kronick, Moskovitz, Tiedemann & Girard, Sacramento, CA. Annika Fain.**
- **Most recent State Department of Fish and Wildlife**
  - **Redd Survey**
  - **Habitat Typing**
  - **E-fishing**

What's Missing?

www.bigsurwatersheds.org