Watershed Characterization

March 2009

NMFS-SWR-HCD

San Lorenzo River Watershed

Area	Hydrologic Units	Calwater Subbasins ---	(Planning Watersheds)
88,763 Acres	18060001	3304120101	Kings Creek (7770 Acres)
35,920 Hectares	4th Field **HUC**	3304120102	Castlerock Falls (7371 Acres)
139 Square Miles		3304120201	Love Creek (6606 Acres)
	3304	3304120202	Lorenzo River (10612 Acres)
Location	4th Field **Calwater**	3304120203	Boulder Creek (7342 Acres)
Santa Cruz County		3304120300	Bear Creek (10379 Acres)
		3304120401	Bean Creek (6661 Acres)
		3304120402	Zayante Creek (10728 Acres)
		3304120501	Branciforte Creek (6276 Acres)
		3304120502	Pasatiempo Creek (514 Acres)
		3304120503	Mouth of San Lorenzo (3755 Acres)
		3304120504	Carbonera Creek (4530 Acres)
		3304120600	Newell Creek (6220 Acres)

Species Potential	Miles of Streams with Species Present
Central California Coast **Steelhead**	Steelhead
Santa Cruz Mountains Diversity Stratum	98
- Independent Population	NOAA Fisheries, Critical Habitat Redesignation, 2005
Central California Coast **Coho**	Coho
Santa Cruz Mountains Diversity Stratum	22
- Independent Population	CDFG, Coho Distribution, May 2007

Critical Habitat

Central California Coast Steelhead	98 Miles of Stream
Central California Coast Coho	All accessible river reaches between Punta Gorda & San Lorenzo River including 2 San Francisco Bay streams: Arroyo Corte Madera del Presidio and Corte Madera Creek (64 FR 24049)

Miles of Waterway[A]	Miles	Number of Dams[C]
Naturally Occurring Waterways		64
Intermittent Stream	73	8 - Impassable
Perennial Stream	194	18 - Not a Barrier
Artificial Path	11	37 - Partial &/or Temporal Barriers
		1 - Unknow Barrier Status

[C]Passage Assessment Database,
Pacific States Marine Fisheries Commission, 2008

[A]USGS National Hydrography Dataset, High Resolution, 2004. 1:24,000

USGS **Gaging Stations**[B]
11160020
San Lorenzo River near Boulder Creek
11160030
San Lorenzo River Trib near
11160036
Kings Creek near Boulder Creek
11160045
San Lorenzo River at Boulder Creek
11160055
Bear Creek near Boulder Creek
11160065
Boulder Creek above Jaminson
11160150
Love Creek at Ben Lomond
11160230
Fall Creek below Bennett Creek
11160250
Fall Creek at Felton
11160300
Zayante Creek at Zayante
11160450
Zayante Creek at Felton
11160500
San Lorenzo River at Big Trees
11161400
Carbonera Creek at Santa Cruz
11161500
Branciforte Creek at Santa Cruz

Number of **Barriers**[C]
397
64 Dams
258 Road Crossings (24 Impassable, 48 Temp. &/or Partially Impassable
65 Natural Barriers (Chutes, Falls, Log Jams, etc. (26 Impassable))

[C]Passage Assessment Database,
Pacific States Marine Fisheries Commission, 2008

EPA Total Maximum Daily Load Classification (**TMDL**)[I]

Nutrients, Pathogens, Sediment

Sources: Nonpoint Sources, Septage Disposal, Urban Runoff/Storm Sewers, Construction/Land Development, Silviculture

[I]State Water Resources Control Board, 2006

Approriated Waterways[J]

San Lorenzo River is Fully appropriated (6/1 to 10/31)

Love Creek is Fully appropriated (7/01 to 10/31)

[J]California State Water Resources Control Board, 1998.

Average Annual **Precipitation**[E]	Average Annual **Precipitation Range**[E]
47.1"	22.5 - 65"

[E]California Mean Annual Precipitation Zones, 1900-1960, CA Department of Forestry, 1990

Roads[A]	Miles
Roads in Watershed	
Primary Road / Highway	9
Secondary and connecting road, state highways	41
Local, neighborhood, and rural road, city street, unseparated	641
Vehicular trail, 4WD	25
Driveway or service road	23
Total Miles	739

Road Density	
Miles of Roads per SqMi of Watershed	5.3
Miles of Roads per SqMi of 100m Riparian Buffer*	6.2

*Buffer is 100 meters on either side of the stream centerline

[A]U.S. Census Bureau - Tiger 2000, 2002. 1:24,000

Slope[D]	Acres	Percent of watershed
Lands of 0-2 percent slope	2,010	2%
Lands of 2-4 percent slope	1,909	2%
Lands of 4-10 percent slope	6,640	7%
Lands of 10-15 percent slope	6,113	7%
Lands of 15-30 percent slope	22,140	25%
Lands of 30-60 percent slope	40,616	46%
Lands of 60-100 percent slope	9,143	10%
Lands of 100-186 percent slope	199	0%
Elevation Range	0 - 3225 ft.	0 - 983 m

[D]Slope derived from USGS 10 meter Digital Elevation Models (DEM's)

Vegetation[G]	Acres	Percent of watershed
Agriculture	551	1%
Annual grassland	1,048	1%
Conifer Forest		
Douglas Fir	768	1%
Montane Hardwood-Conifer	7	0%
Redwood	51,094	58%
Unknown Conifer	2,832	3%
Hardwood Forest		
Montane Hardwood	163	0%
Hardwood Woodland		
Coastal Oak Woodland	7	0%
Shrub	18,254	21%
Urban	13,890	16%
Water	190	0%

[G]Multi-source Land Cover Data (2002 v2), CA Department of Forestry, 2002. 100 meter Grid

Erodability of Watershed[F]	Acres	Percent of watershed
Rank of 7	41,946	47%
Rank of 8	31,722	36%
(Remained unranked)		

[F]Department of Conservation, Division of Mines and Geology; minimum mapping unit: approx. 8000 acres
Watersheds were rated based on slope, precipitation, and lithologic susceptibility to failure. Total erosion potential is based on a combination of the landslide potential, debris slide potential, and the surface erosion potential. Rating 0-10 [**0 = Low slide potential, 10 = High slide potential**]

Land Ownership[H]	Acres	Percent of watershed
Private	79,833	90%
Local (City / County Park)	184	0%
State (Fish & Game)	63	0%
State (Parks & Recreation)	7,737	9%
State (Univ. of CA)	942	1%

[H]Management Landscape, CA Department of Forestry, 2002

Area Under a **Timber Harvest Plan**[A] past **10** years		Area Under a **Timber Harvest Plan**[A] past **13** years	
7,703 Acres	9% of watershed	5,024 Acres	6% of watershed

[A]California Department of Foresty, Timber Harvest Plans for Region 1, 2006 (1994-2006)

Population[I]

Total Population within the watershed -- 84,586 People

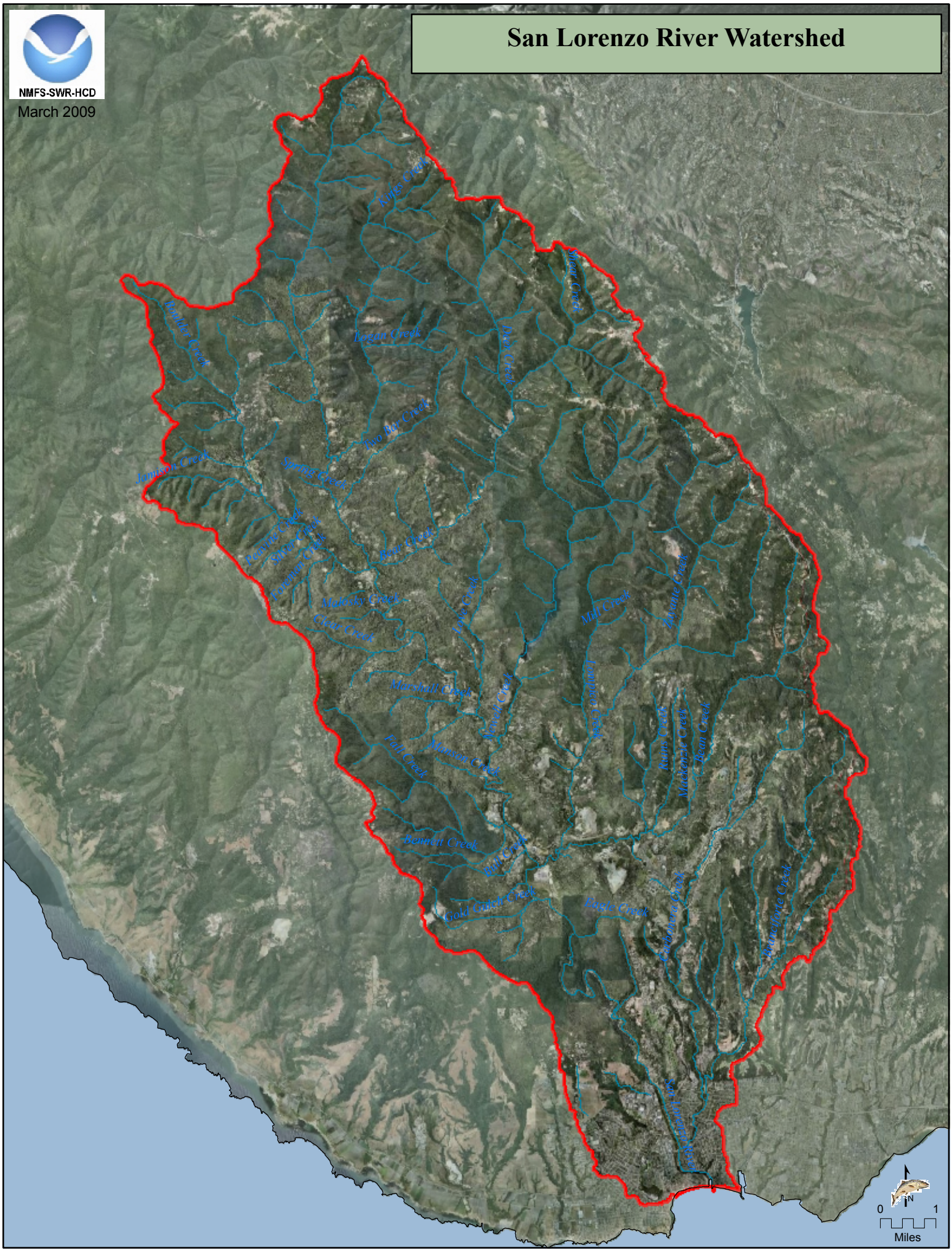
Housing[I]

Total Housing Units within the watershed -- 33,834 Houses

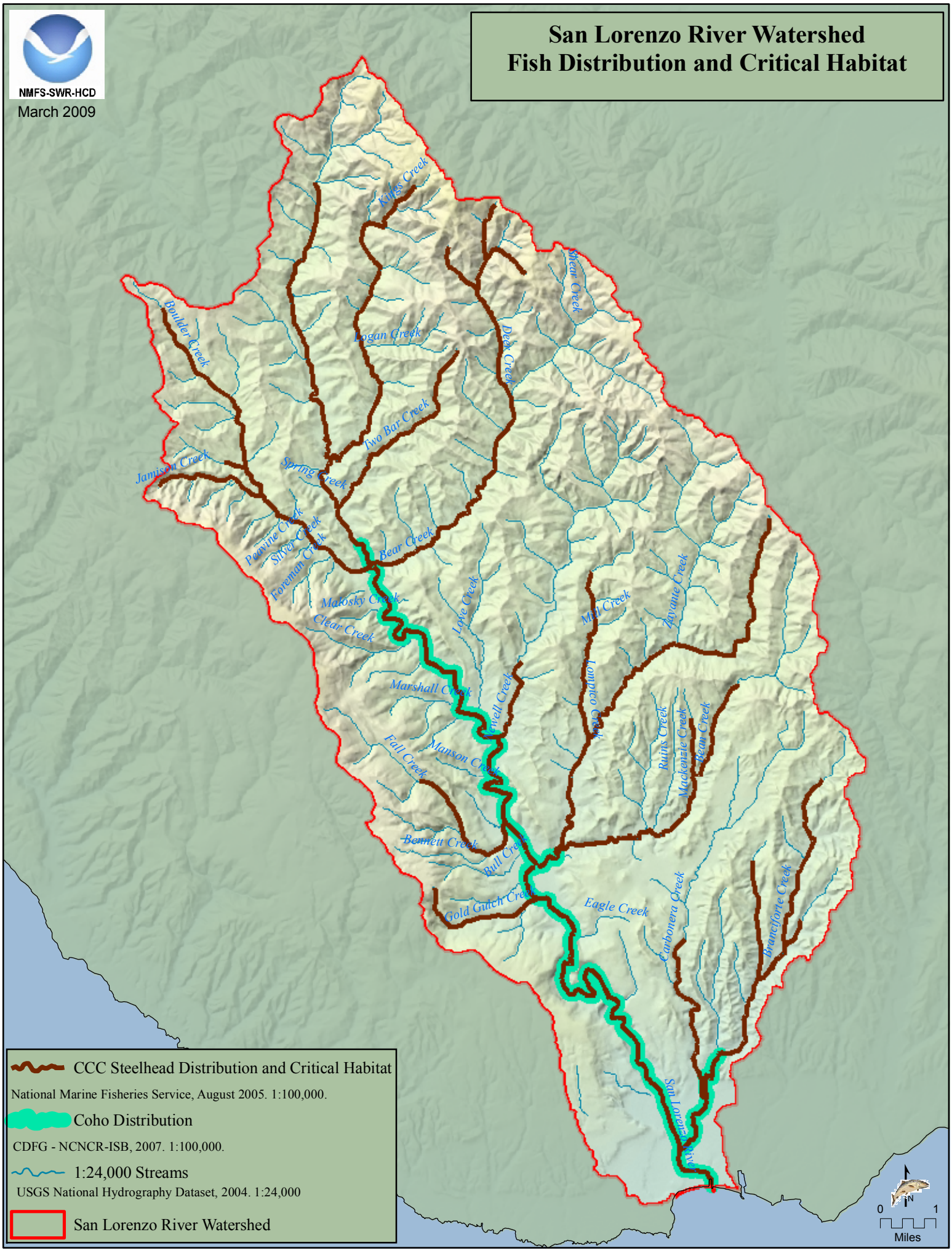
Housing Density	
0 to Less than 1 Housing Unit / 160 Acres	15%
1 Unit / 160 Acres to 1 Unit / 20 Acres	11%
1 Unit / 20 Acres to 1 Unit / 5 Acres	51%
1 Unit / 5 Acres to 2 Units / Acre	19%
2 Units / Acres to Greater than or Equal to 5 Units / Acre	4%

[I]Census 2000 Block Data (Migrated), CA Department of Forestry, 2003

San Lorenzo River Watershed
Half Moon Bay
Palo Alto
San Jose
San Gregorio
Pescadero
SAN MATEO COUNTY
SANTA CRUZ COUNTY
SANTA CLARA COUNTY
Bear Ck Rd
Boulder Creek
Santa Cruz
Aptos
35
17
9
1
Humboldt
Ft. Bragg
Mendocino
Ukiah
Sacramento
Sonoma
Santa Rosa
Marin
San Mateo
Santa Cruz
0
5
Miles
N
NMFS-SWR-HCD
March 2009

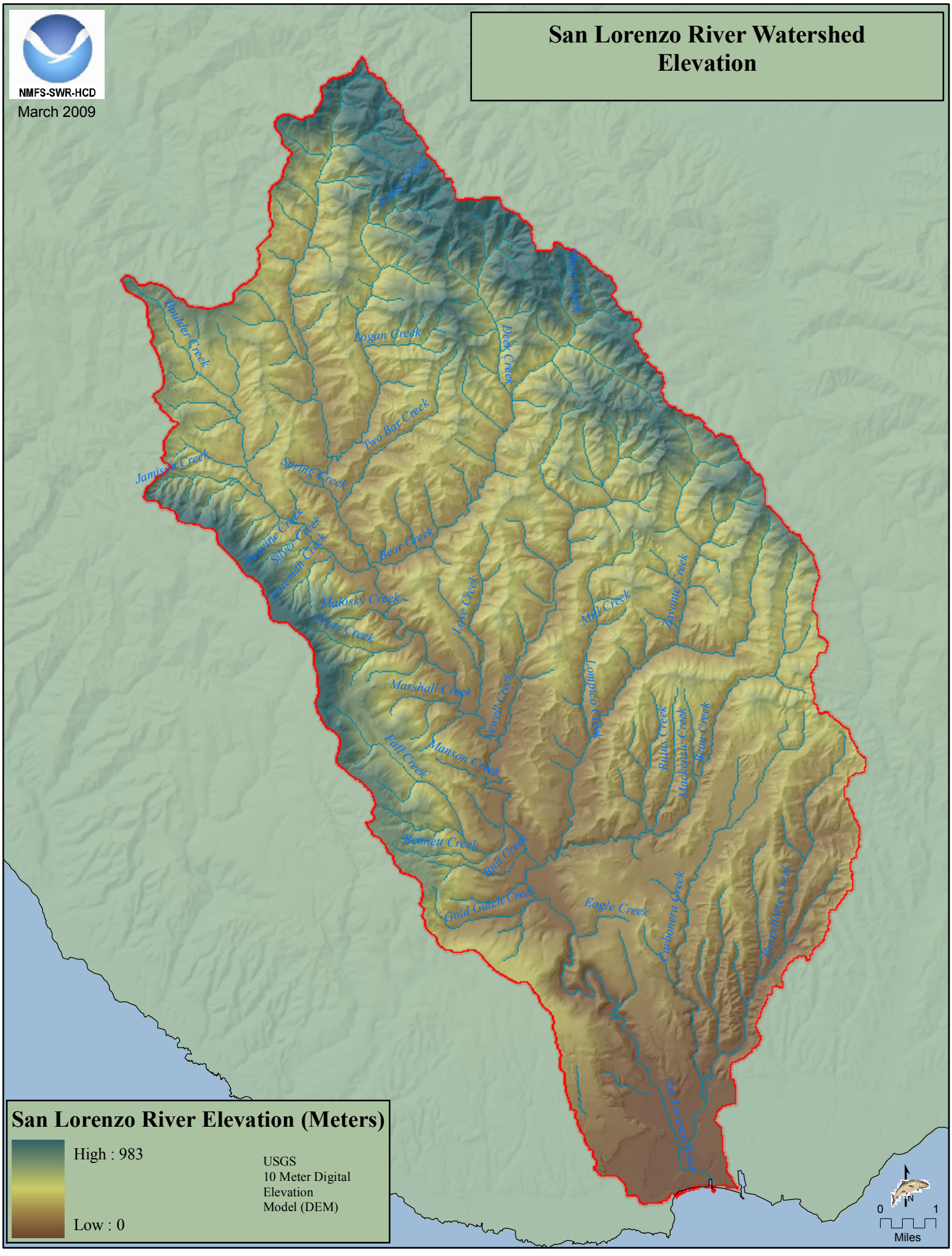

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Kings Creek
Logan Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Bear Creek
Mill Creek
Marshall Creek
Fall Creek
Bennett Creek
Gold Gulch Creek
Bear Creek
Mackenzie Creek
Bean Creek
Bloomfield Creek
Bloomfield Creek
0
1
Miles

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
CalWater Planning Watersheds
Castlerock Falls 7371 Acres
Kings Creek
Kings Creek 7770 Acres
Bear Creek 10379 Acres
Boulder Creek 7342 Acres
Newell Creek 6220 Acres
Zayante Creek 10728 Acres
Love Creek 6606 Acres
Bean Creek 6661 Acres
Carbonera Creek 4530 Acres
Branciforte Creek 6276 Acres
Lorenzo River 10612 Acres
Pasatiempo Creek 514 Acres
Mouth of San Lorenzo 3755 Acres
Boulder Creek
Logan Creek
Deer Creek
Shear Creek
Two Bar Creek
San Lorenzo River
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Love Creek
Malosky Creek
Clear Creek
Marshall Creek
Newell Creek
Fall Creek
Manson Creek
Zayante Creek
Bean Creek
Bennett Creek
Bull Creek
Eagle Creek
Carbonera Creek
0
1
Miles


San Lorenzo River Watershed
Fish Distribution and Critical Habitat
NMFS-SWR-HCD
March 2009
Kings Creek
Boulder Creek
Logan Creek
Shear Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Majosky Creek
Clear Creek
Love Creek
Mill Creek
Laguna Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
CCC Steelhead Distribution and Critical Habitat
National Marine Fisheries Service, August 2005. 1:100,000.
Coho Distribution
CDFG - NCNCR-ISB, 2007. 1:100,000.
1:24,000 Streams
USGS National Hydrography Dataset, 2004. 1:24,000
San Lorenzo River Watershed
N
0
1
Miles

San Lorenzo River Watershed
Steelhead Current vs. Historical
NMFS-SWR-HCD
March 2009
Kings Creek
Boulder Creek
Logan Creek
Deer Creek
Shear Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Majosky Creek
Clear Creek
Love Creek
Mill Creek
Laguna Creek
Marshall Creek
Lompico Creek
Newell Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Current CCC Steelhead Distribution
National Marine Fisheries Service,
August 2005. 1:100,000.
Steelhead Intrinsic Potential
NMFS SWR Fisheries Science Center, 2005.
Potential historical suitable habitat
1:24,000 Streams
USGS National Hydrography Dataset, 2004. 1:24,000
San Lorenzo River Watershed
N
0
1
Miles

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Coho Current vs. Historical
Kings Creek
Shear Creek
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Matosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Current Coho Distribution
CDFG - NCNCR-ISB, 2007. 1:100,000.
Coho Intrinsic Potential
NMFS SWR Fisheries Science Center, 2005.
Potential historical suitable habitat
1:24,000 Streams
USGS National Hydrography Dataset,
2004. 1:24,000
San Lorenzo River Watershed
N
0
1
Miles

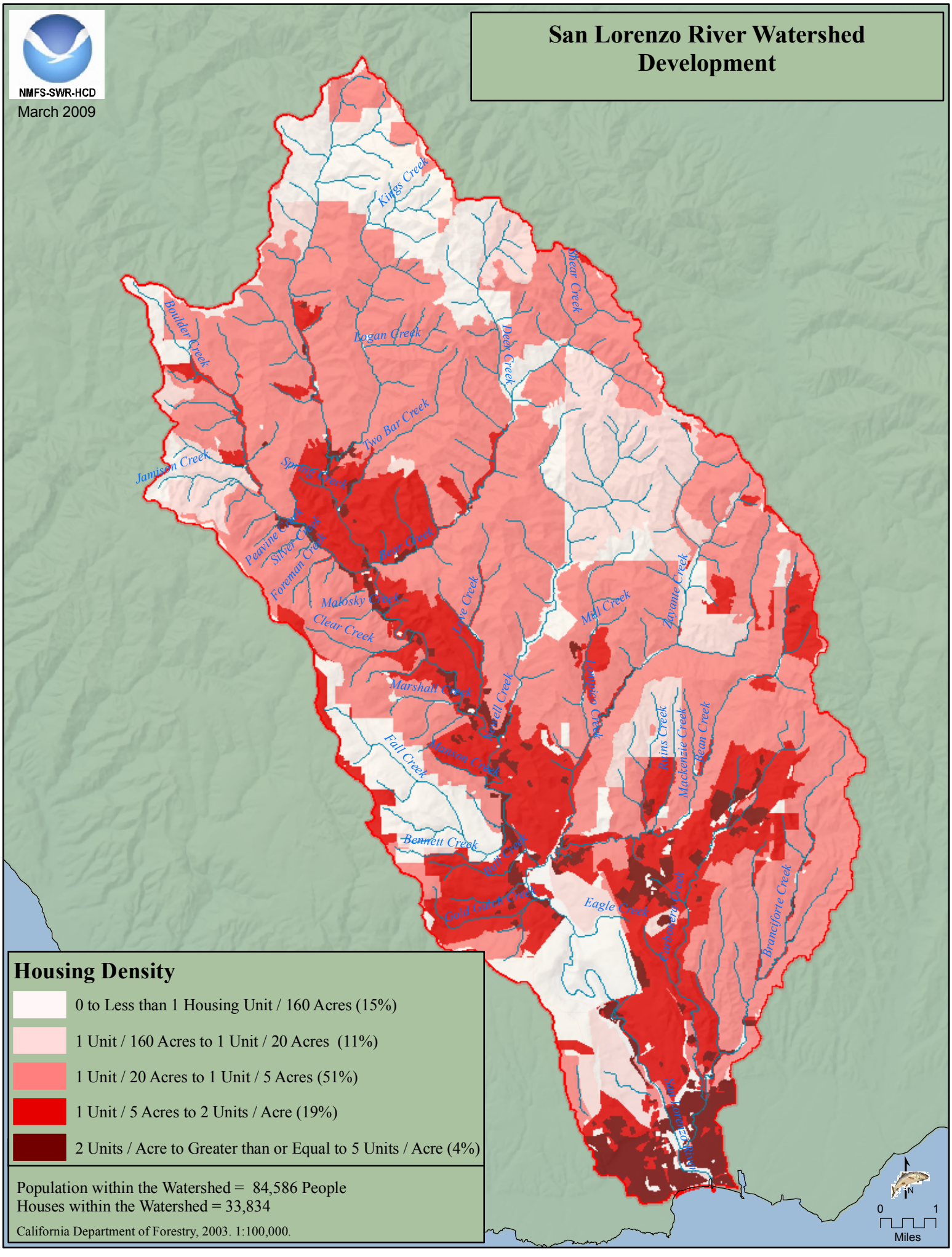


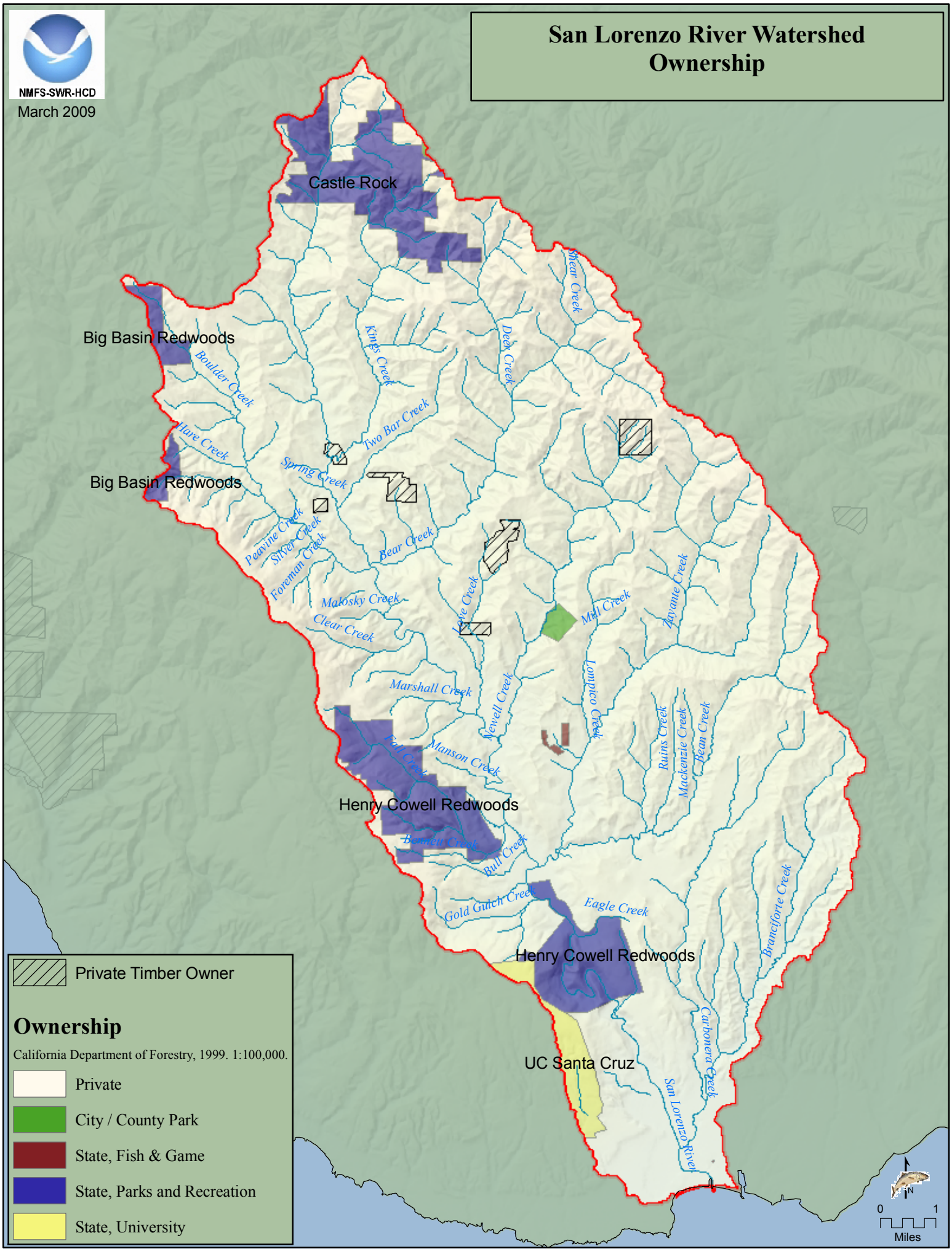
NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Elevation
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Bear Creek
Malosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
San Lorenzo River Elevation (Meters)
High : 983
Low : 0
USGS
10 Meter Digital
Elevation
Model (DEM)
N
0
1
Miles

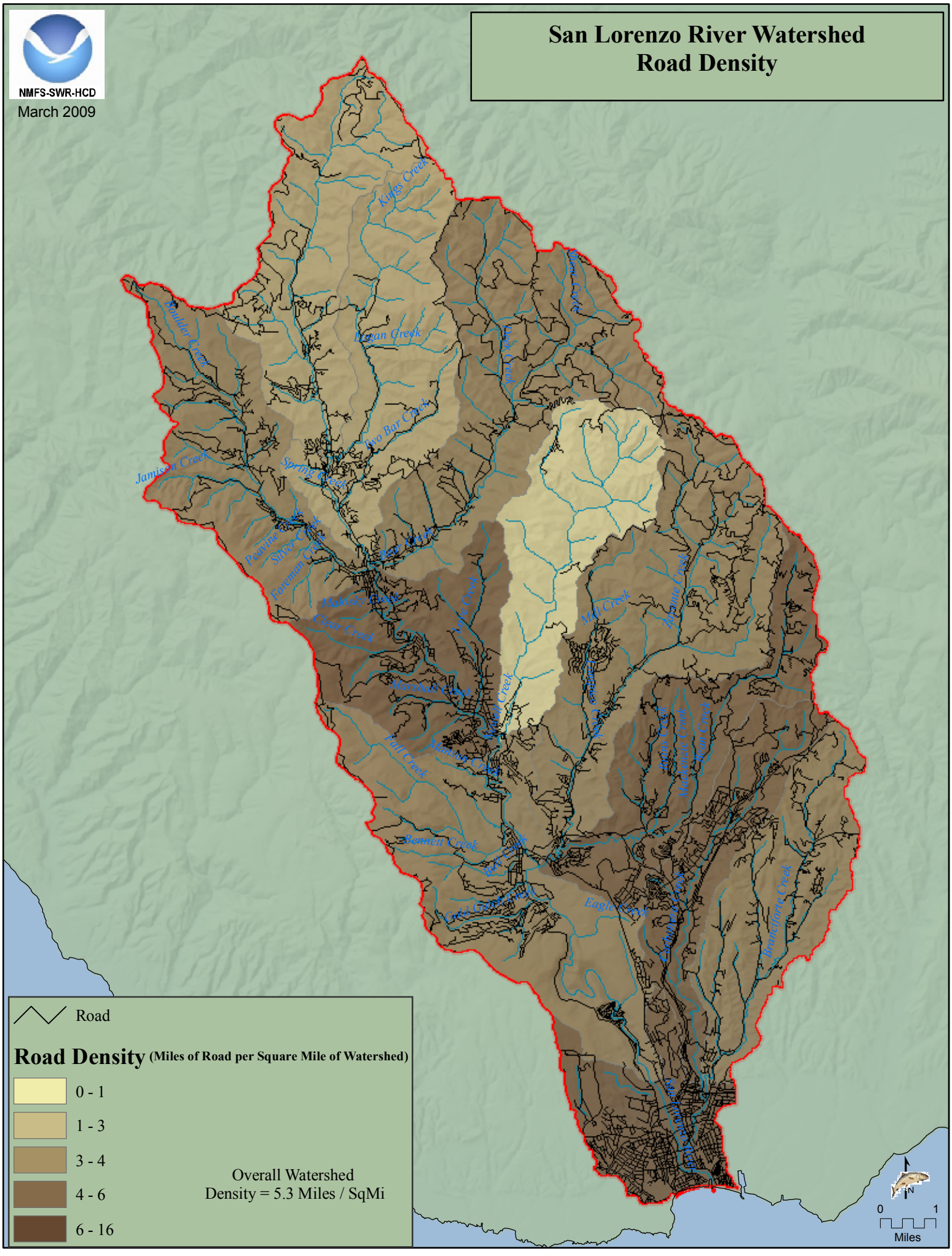
San Lorenzo River Watershed Development

NMFS-SWR-HCD

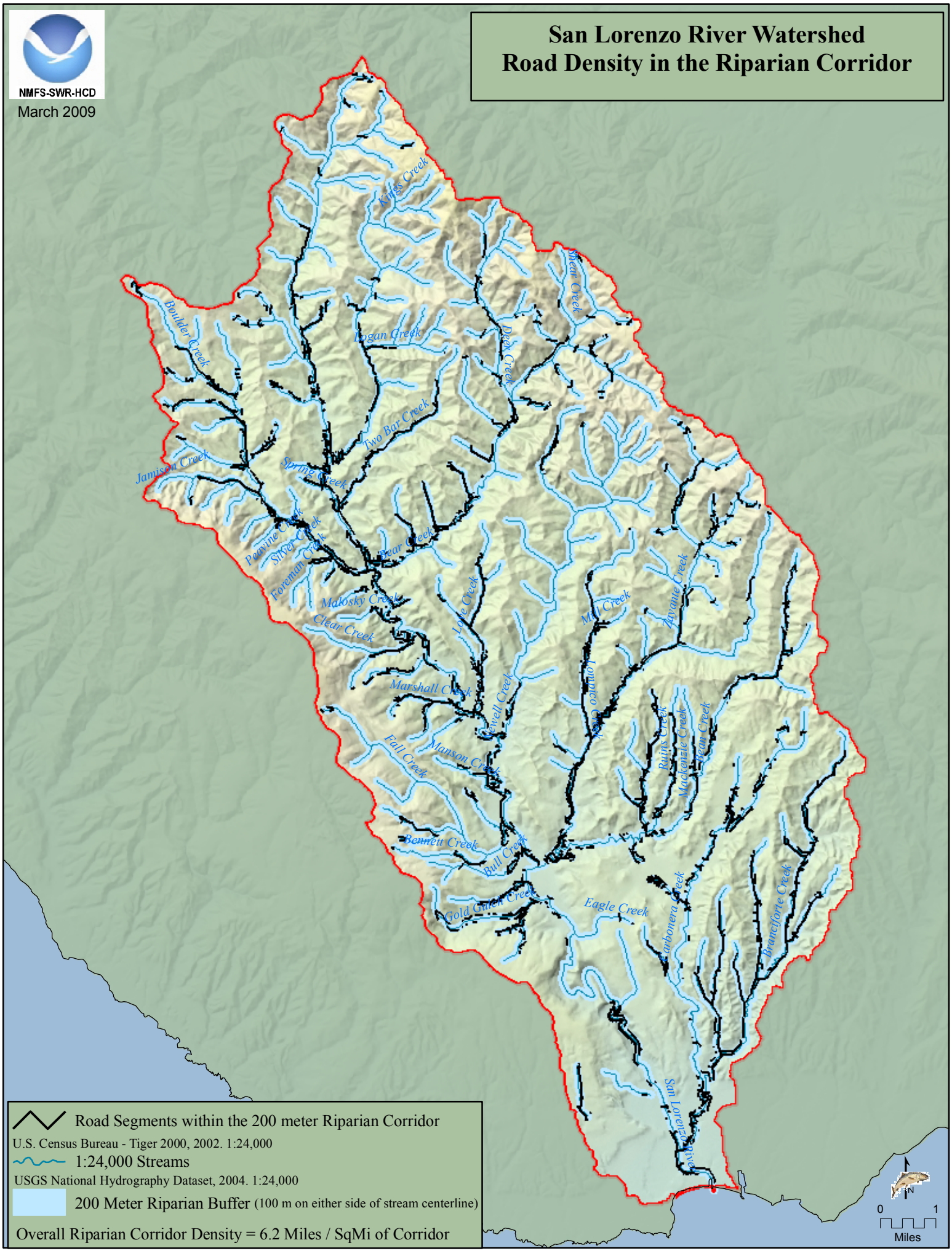
March 2009




San Lorenzo River Watershed
Ownership
NMFS-SWR-HCD
March 2009
Castle Rock
Big Basin Redwoods
Big Basin Redwoods
Henry Cowell Redwoods
Henry Cowell Redwoods
UC Santa Cruz
Boulder Creek
Hare Creek
Kings Creek
Two Bar Creek
Deer Creek
Shear Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Majosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Branciforte Creek
Carbonera Creek
San Lorenzo River
Private Timber Owner
Ownership
California Department of Forestry, 1999. 1:100,000.
Private
City / County Park
State, Fish & Game
State, Parks and Recreation
State, University
N
0
1
Miles



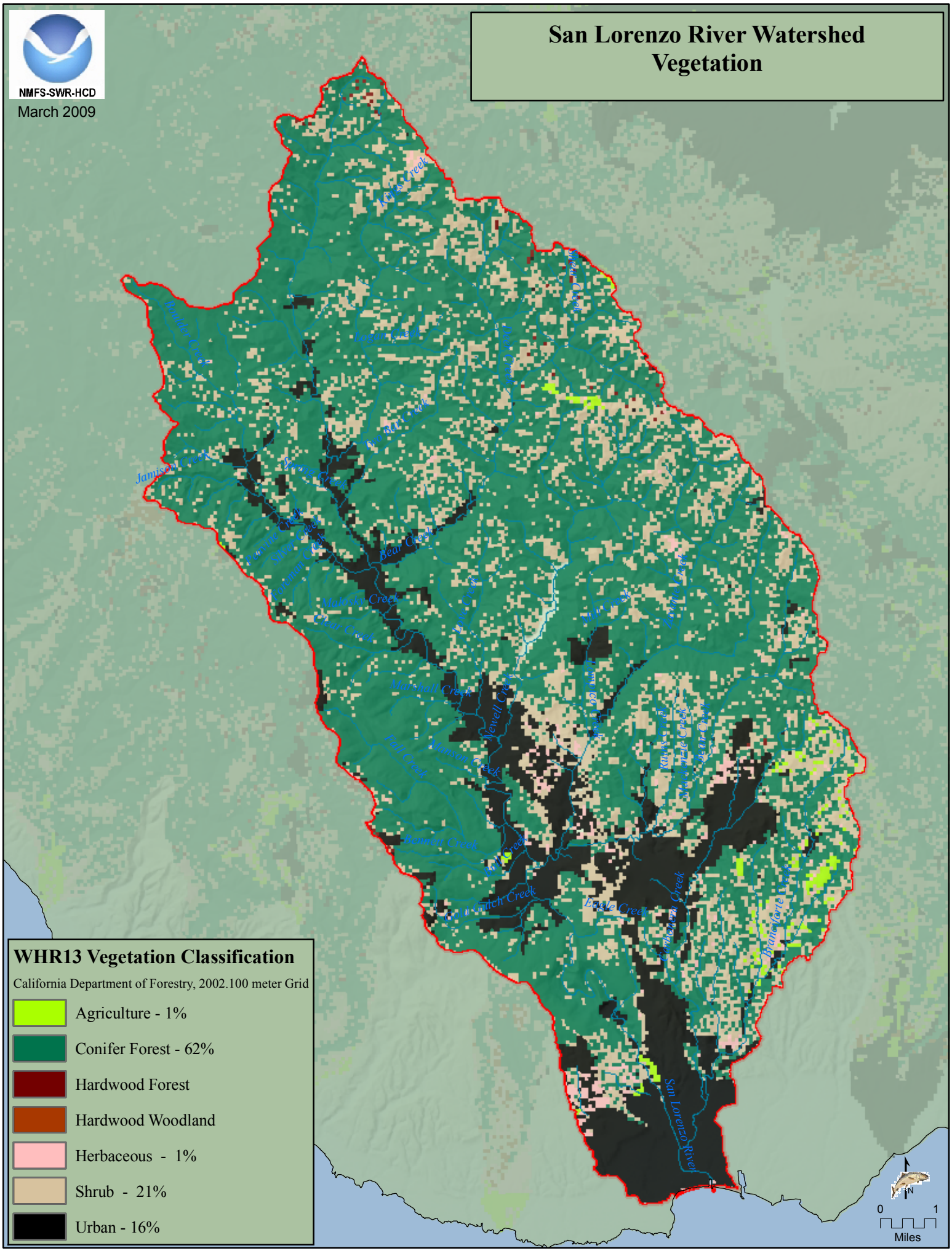
NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Road Density
Kings Creek
Logan Creek
Boulder Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Mill Creek
Zayante Creek
Clear Creek
Fall Creek
Bennett Creek
Eagle Creek
Branciforte Creek
Road
Road Density (Miles of Road per Square Mile of Watershed)
0 - 1
1 - 3
3 - 4
4 - 6
6 - 16
Overall Watershed
Density = 5.3 Miles / SqMi
N
0
1
Miles


NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Road Density in the Riparian Corridor
Kings Creek
Shear Creek
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Malosky Creek
Clear Creek
Lone Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Road Segments within the 200 meter Riparian Corridor
U.S. Census Bureau - Tiger 2000, 2002. 1:24,000
1:24,000 Streams
USGS National Hydrography Dataset, 2004. 1:24,000
200 Meter Riparian Buffer (100 m on either side of stream centerline)
Overall Riparian Corridor Density = 6.2 Miles / SqMi of Corridor
N
0
1
Miles

San Lorenzo River Watershed Vegetation

NMFS-SWR-HCD

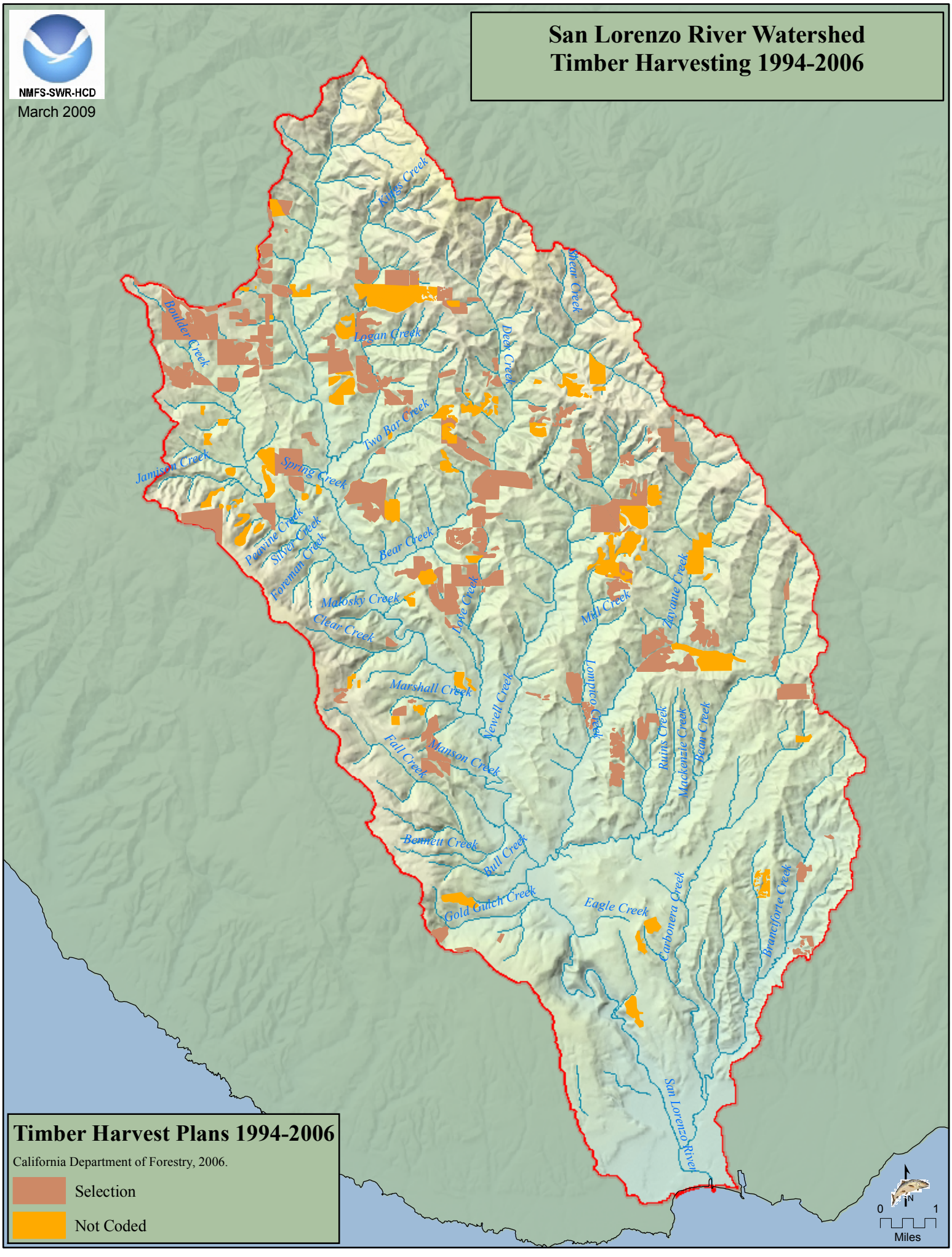
March 2009

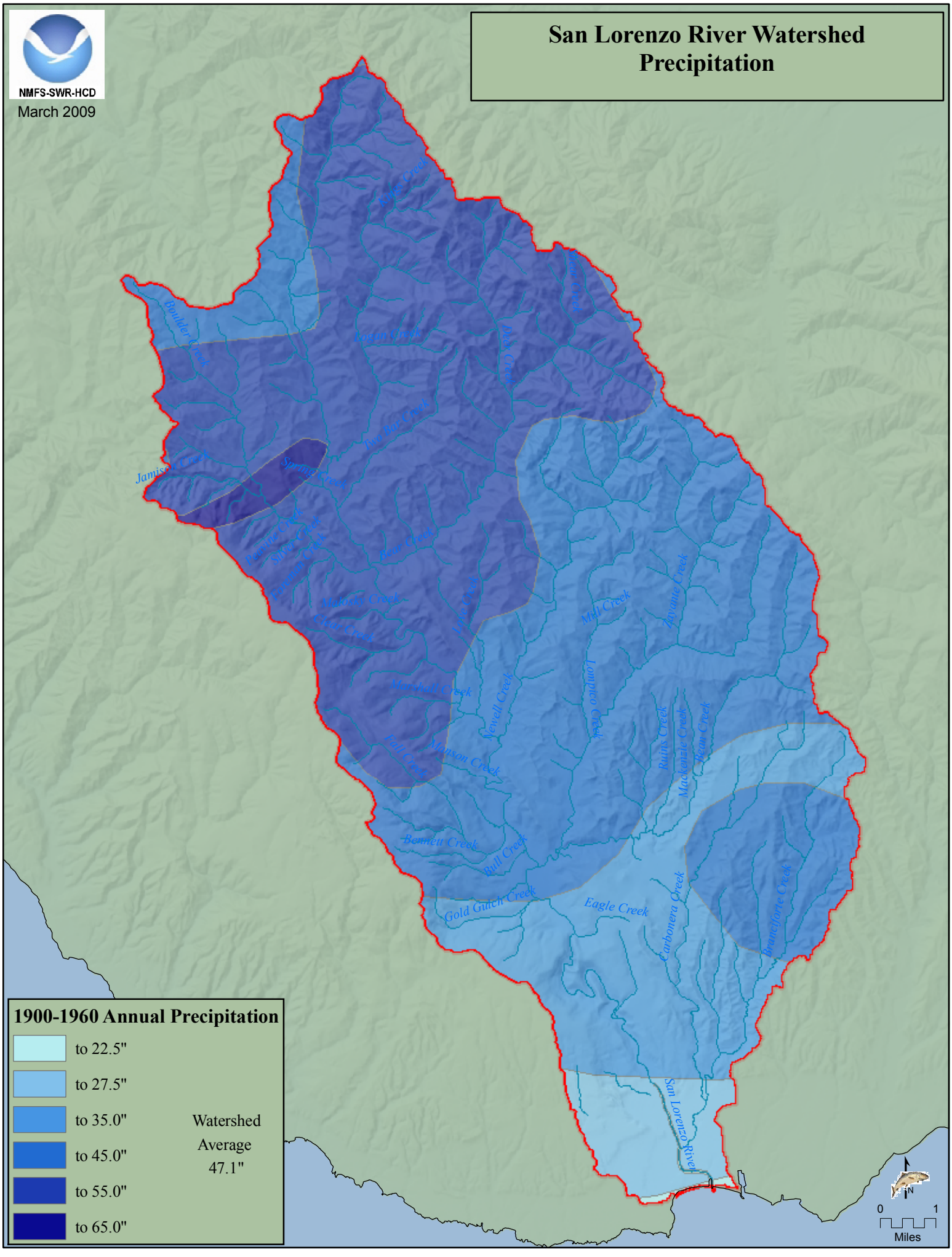


WHR13 Vegetation Classification

California Department of Forestry, 2002.100 meter Grid

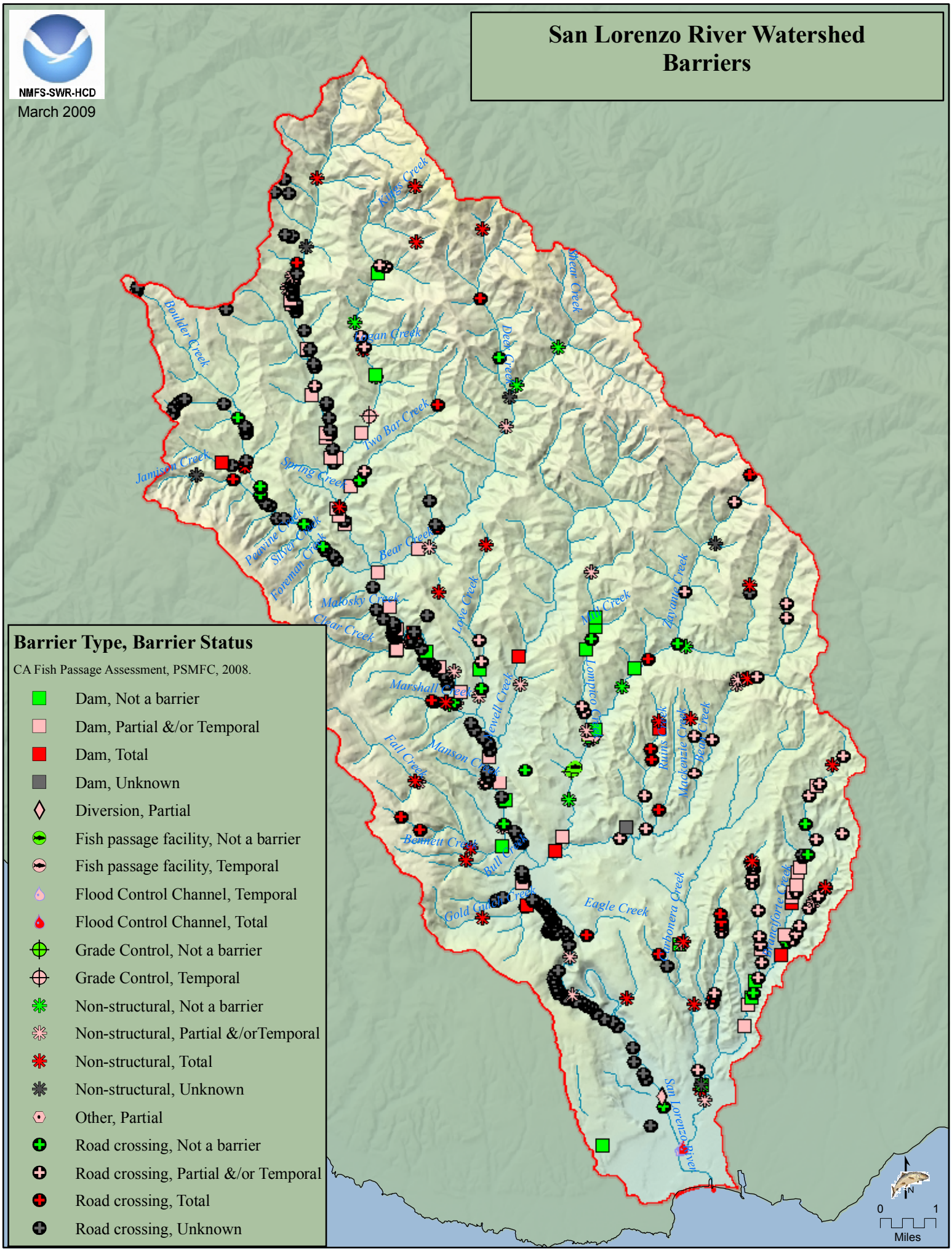
- Agriculture - 1%
- Conifer Forest - 62%
- Hardwood Forest
- Hardwood Woodland
- Herbaceous - 1%
- Shrub - 21%
- Urban - 16%

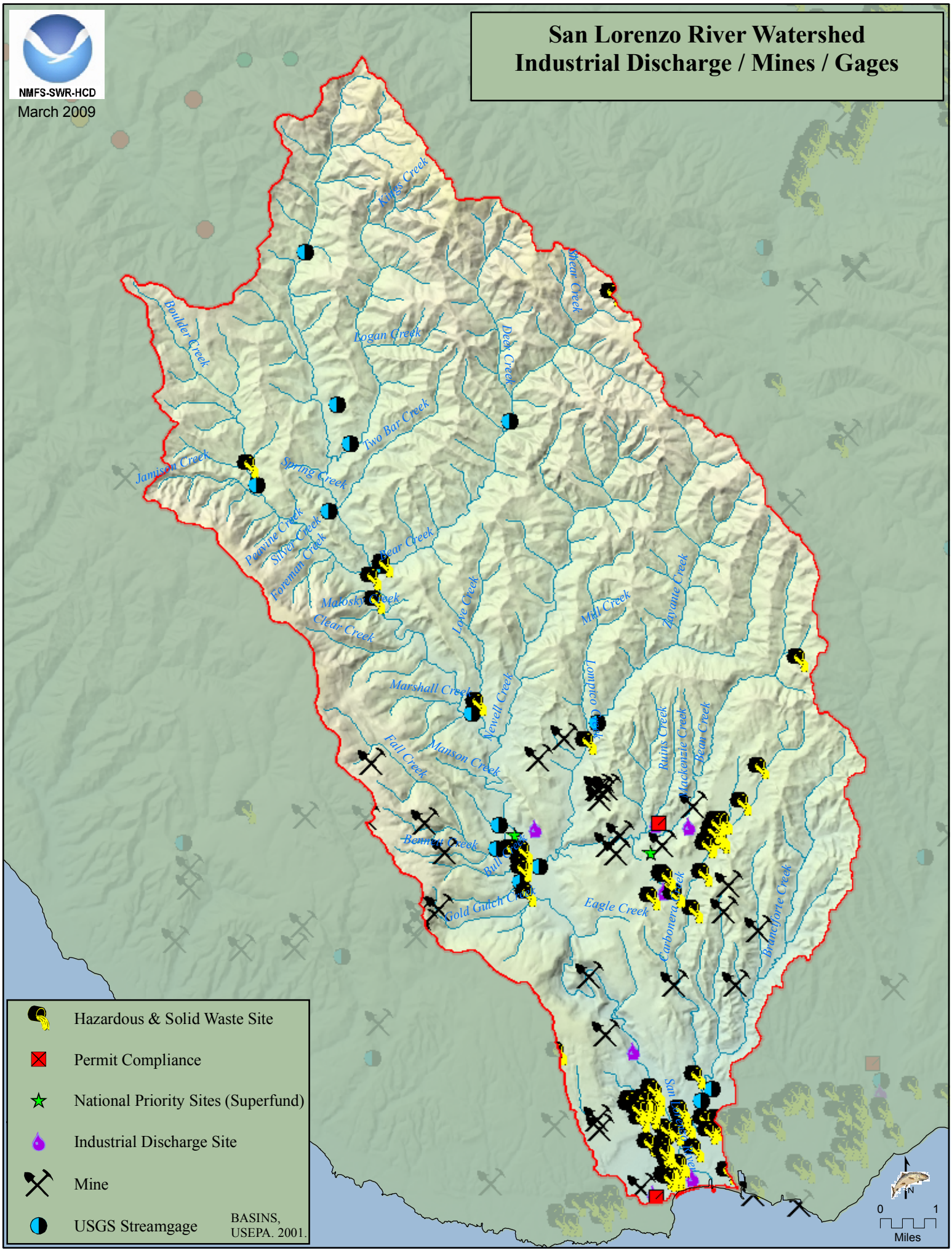

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Timber Harvesting 1994-2006
Kings Creek
Shear Creek
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Matosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Timber Harvest Plans 1994-2006
California Department of Forestry, 2006.
Selection
Not Coded
N
0
1
Miles

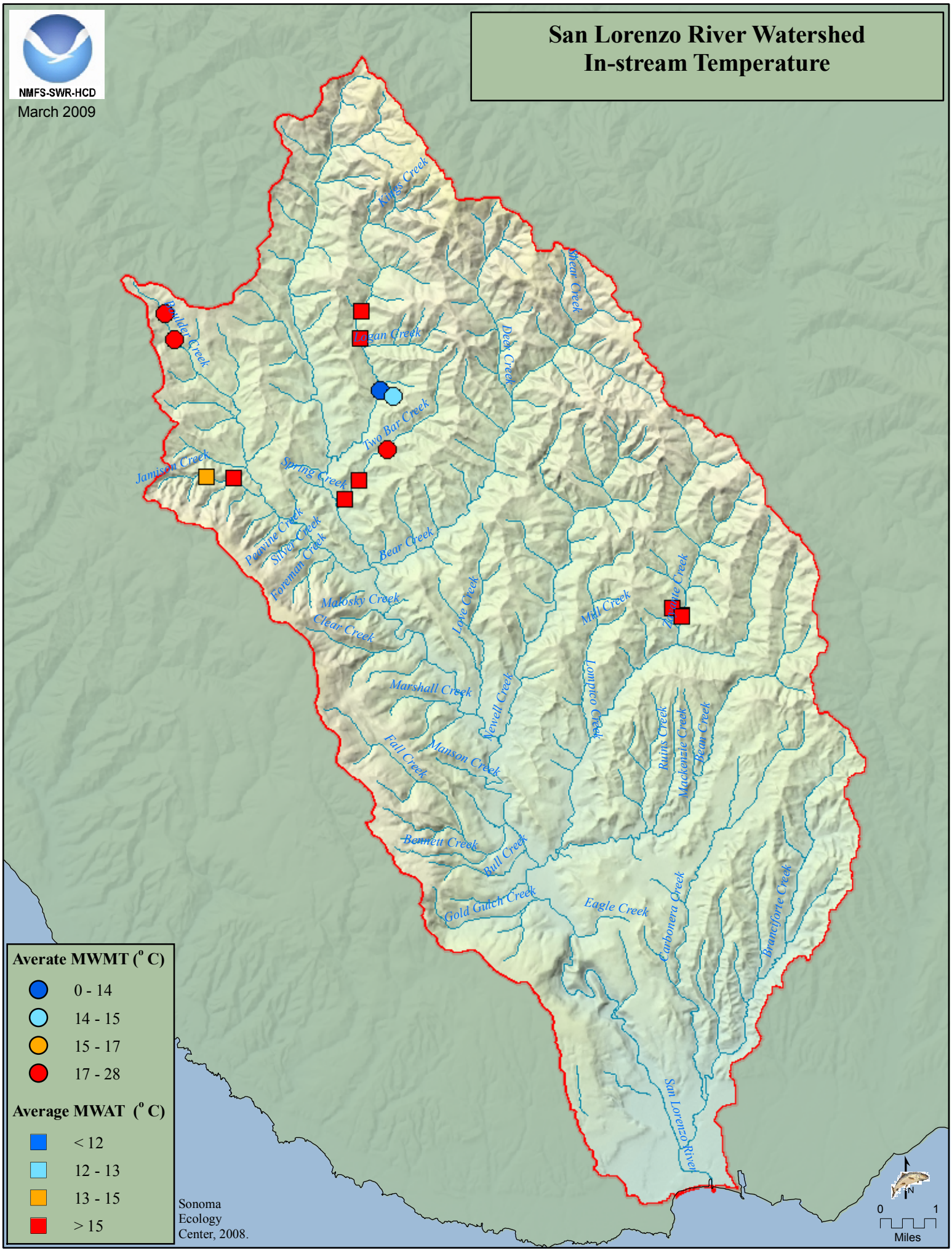

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Precipitation
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Bear Creek
Mill Creek
Zayante Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
1900-1960 Annual Precipitation
to 22.5"
to 27.5"
to 35.0"
to 45.0"
to 55.0"
to 65.0"
Watershed
Average
47.1"
N
0
1
Miles

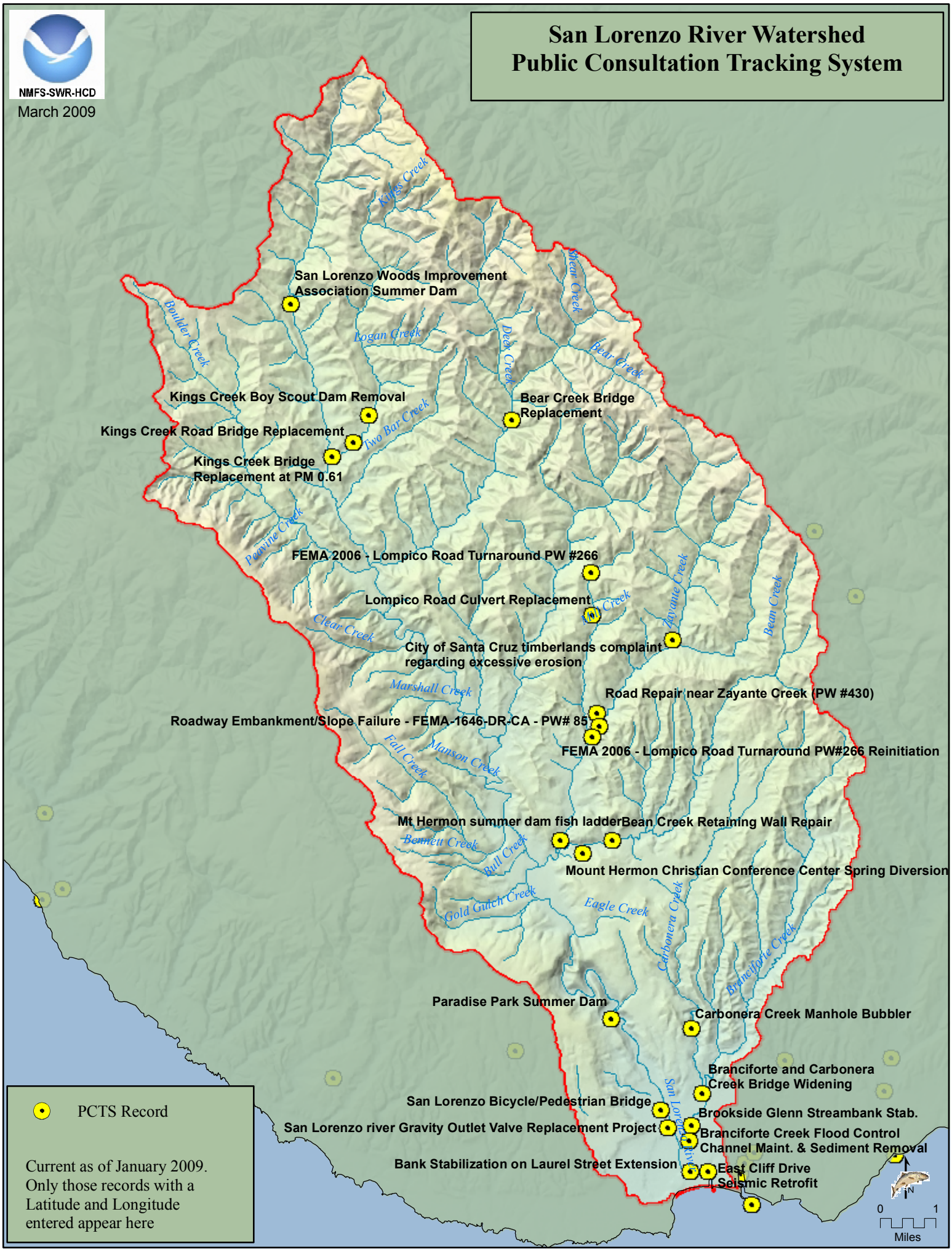
San Lorenzo River Watershed
Flood Zone
NMFS-SWR-HCD
March 2009
Kings Creek
Boulder Creek
Logan Creek
Shear Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Pewine Creek
Silver Creek
Foreman Creek
Bear Creek
Majosky Creek
Clear Creek
Lompico Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Fall Creek
Manson Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
FEMA Flood Zones
FEMA, 1996. 1:24,000
100 Year Flood Zone
500 Year Flood Zone
N
0
1
Miles

NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Geologic Features
Kings Creek
Shear Creek
Boulder Creek
Logan Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Malosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Lompico Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Debris-flow Sources (mapped after 1/82 storm)
Surficial Deposits
Few Landslides
Mostly Landslide
Circuit Rider Productions, 2004.
N
0
1
Miles


NMFS-SWR-HCD
March 2009
San Lorenzo River Watershed
Barriers
Barrier Type, Barrier Status
CA Fish Passage Assessment, PSMFC, 2008.
Dam, Not a barrier
Dam, Partial &/or Temporal
Dam, Total
Dam, Unknown
Diversion, Partial
Fish passage facility, Not a barrier
Fish passage facility, Temporal
Flood Control Channel, Temporal
Flood Control Channel, Total
Grade Control, Not a barrier
Grade Control, Temporal
Non-structural, Not a barrier
Non-structural, Partial &/orTemporal
Non-structural, Total
Non-structural, Unknown
Other, Partial
Road crossing, Not a barrier
Road crossing, Partial &/or Temporal
Road crossing, Total
Road crossing, Unknown
Kings Creek
Boulder Creek
Deer Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Malosky Creek
Clear Creek
Love Creek
Mill Creek
Zayante Creek
Marshall Creek
Lompico Creek
Fall Creek
Manson Creek
Ruins Creek
Mackenzie Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
N
0
1
Miles


San Lorenzo River Watershed
Industrial Discharge / Mines / Gages
NMFS-SWR-HCD
March 2009
Kings Creek
Boulder Creek
Logan Creek
Deer Creek
Bear Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Clear Creek
Lompico Creek
Mill Creek
Zayante Creek
Marshall Creek
Newell Creek
Manson Creek
Fall Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
Hazardous & Solid Waste Site
Permit Compliance
National Priority Sites (Superfund)
Industrial Discharge Site
Mine
USGS Streamgage
BASINS, USEPA. 2001.
N
0
1
Miles


San Lorenzo River Watershed
In-stream Temperature
NMFS-SWR-HCD
March 2009
Kings Creek
Boulder Creek
Logan Creek
Two Bar Creek
Jamison Creek
Spring Creek
Peavine Creek
Silver Creek
Foreman Creek
Bear Creek
Makosky Creek
Clear Creek
Marshall Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
San Lorenzo River
Newell Creek
Lompico Creek
Mill Creek
Ruins Creek
Mackenzie Creek
Bean Creek
Love Creek
Deer Creek
Shear Creek
Averate MWMT (° C)
0 - 14
14 - 15
15 - 17
17 - 28
Average MWAT (° C)
< 12
12 - 13
13 - 15
> 15
Sonoma
Ecology
Center, 2008.
N
0
1
Miles


San Lorenzo River Watershed
Public Consultation Tracking System
NMFS-SWR-HCD
March 2009
San Lorenzo Woods Improvement Association Summer Dam
Kings Creek Boy Scout Dam Removal
Kings Creek Road Bridge Replacement
Kings Creek Bridge Replacement at PM 0.61
Bear Creek Bridge Replacement
FEMA 2006 - Lompico Road Turnaround PW #266
Lompico Road Culvert Replacement
City of Santa Cruz timberlands complaint regarding excessive erosion
Road Repair near Zayante Creek (PW #430)
Roadway Embankment/Slope Failure - FEMA-1646-DR-CA - PW# 85
FEMA 2006 - Lompico Road Turnaround PW#266 Reinitiation
Mt Hermon summer dam fish ladderBean Creek Retaining Wall Repair
Mount Hermon Christian Conference Center Spring Diversion
Paradise Park Summer Dam
Carbonera Creek Manhole Bubbler
Branciforte and Carbonera Creek Bridge Widening
San Lorenzo Bicycle/Pedestrian Bridge
Brookside Glenn Streambank Stab.
San Lorenzo river Gravity Outlet Valve Replacement Project
Branciforte Creek Flood Control Channel Maint. & Sediment Removal
Bank Stabilization on Laurel Street Extension
East Cliff Drive Seismic Retrofit
Kings Creek
Logan Creek
Boulder Creek
Two Bar Creek
Peavine Creek
Clear Creek
Marshall Creek
Fall Creek
Manson Creek
Bennett Creek
Bull Creek
Gold Gulch Creek
Eagle Creek
Carbonera Creek
Branciforte Creek
Bear Creek
Zayante Creek
Bean Creek
Laurel Street Extension
PCTS Record
Current as of January 2009. Only those records with a Latitude and Longitude entered appear here
N
0
1
Miles

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