



*Usal Creek Watershed*

Area	Hydrologic Units	Calwater Subbasins ---	(Planning Watersheds)
17,612 Acres	18010108	1113110101	Lower Usal Creek (7008 Acres)
7,127 Hectares	4th Field HUC	1113110102	Upper Usal Creek (10604 Acres)
28 Square Miles	1113		
<b>Location</b>		4th Field Calwater	
Mendocino County			

Species Potential	Miles of Streams with Species Present
Northern California <b>Steelhead</b> North-central Coastal Diversity Stratum - Potentially Independent Population	<u>Steelhead</u> 18 NOAA Fisheries, Critical Habitat Redesignation, 2005
Central California Coast <b>Coho</b> Lost Coast Diversity Stratum - Dependent Population	<u>Coho</u> 4 CDFG, Coho Distribution, May 2007

Critical Habitat	
Northern California Steelhead	18 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)

Coho Intrinsic Potential	
Km of Historical Coho IP (21.5 C mask)	11
% of IP (21.5 C Mask) with Current Coho Distribution	43%
Spence, B. C., et al., 2008. A framework for assessing the viability of threatened and endangered salmon and steelhead in the North-Central California Coast Recovery Domain. NOAA Tech Memo NMFS-SWFSC-423.	

Miles of Waterway <sup>A</sup>	Miles	Number of Dams <sup>C</sup>
Naturally Occurring Waterways		0
Intermittent Stream	36	
Perennial Stream	21	

<sup>A</sup>USGS National Hydrography Dataset, High Resolution, 2004. 1:24,000

<sup>C</sup>Passage Assessment Database,  
Pacific States Marine Fisheries Commission, 2005

USGS Gaging Stations <sup>B</sup>	Number of Barriers <sup>C</sup>
None	6
	3 Road Crossings (Partially Impassable)
	3 Natural Barriers (Chutes, Falls, Log Jams, etc. (3 Impassable))
	<sup>C</sup> Passage Assessment Database, Pacific States Marine Fisheries Commission, 2006



EPA Total Maximum Daily Load Classification (TMDL)<sup>l</sup>

None

<sup>l</sup>State Water Resources Control Board, 2003

Average Annual Precipitation <sup>E</sup>	Average Annual Precipitation Range <sup>E</sup>
66.6"	45 - 75"

<sup>E</sup>California Mean Annual Precipitation Zones, 1900-1960, CA Department of Forestry, 1990

Roads <sup>A</sup>	Miles
Roads in Watershed	
Secondary and connecting road, state highways	1
Local, neighborhood, and rural road, city street, unseparated	98

Road Density	
Miles of Roads per SqMi of Watershed	3.5
Miles of Roads per SqMi of 100m Riparian Buffer*	4.3

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

<sup>A</sup>U.S. Census Bureau - Tiger 2000, 2002. 1:24,000

Slope <sup>D</sup>	Acres	Percent of watershed
Lands of 0-2 percent slope	57	0%
Lands of 2-4 percent slope	90	1%
Lands of 4-10 percent slope	331	2%
Lands of 10-15 percent slope	357	2%
Lands of 15-30 percent slope	2,618	15%
Lands of 30-60 percent slope	11,370	65%
Lands of 60-100 percent slope	2,722	15%
Lands of 100-117 percent slope	68	0%

Elevation Range	3 - 2021 ft.	1 - 616 m
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<sup>D</sup>Slope derived from USGS 10 meter Digital Elevation Models (DEM's)

Vegetation <sup>G</sup>	Acres	Percent of watershed
Annual grassland	10	0%
Barren	12	0%
Conifer Forest		
Douglas Fir	1,006	6%
Montane Hardwood-Conifer	578	3%
Redwood	12,266	70%
Hardwood Forest		
Montane Hardwood	3,341	19%
Montane Riparian	171	1%
Shrub	215	1%

<sup>G</sup>Multi-source Land Cover Data (2002 v2), CA Department of Forestry, 2002. 100 meter Grid



<b>Erodability of Watershed<sup>F</sup></b>	<b>Acres</b>	<b>Percent of watershed</b>
All of watershed is ranked as 8	17,612	100%

<sup>F</sup>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]

<b>Land Ownership<sup>H</sup></b>	<b>Acres</b>	<b>Percent of watershed</b>
Private	17,344	98%
State (Parks & Recreation)	268	2%

<sup>H</sup>Management Landscape, CA Department of Forestry, 2002

<b>Area Under a Timber Harvest Plan<sup>A</sup> past 10 years</b>	<b>Area Under a Timber Harvest Plan<sup>A</sup> past 15 years (1991-2006)</b>
1,841 10% of watershed	3,088 18% of watershed

<sup>A</sup>California Department of Forestry, Timber Harvest Plans for Ten Mile Watershed, 2006

<b>Population<sup>I</sup></b>	<b>Housing<sup>I</sup></b>
Total Population within the watershed -- 3 People	Total Housing Units within the watershed -- 2 Houses
	Housing Density
	0 to Less than 1 Housing Unit / 160 Acres
	1 Unit / 160 Acres to 1 Unit / 20 Acres
	1 Unit / 20 Acres to 1 Unit / 5 Acres
	1 Unit / 5 Acres to 2 Units / Acre
	2 Units / Acres to Greater than or Equal to 5 Units / Acre
	100%

<sup>I</sup>Census 2000 Block Data (Migrated), CA Department of Forestry, 2003



# Usal Creek

## Vegetation density and age class in the entire watershed

California Department of Forestry and Fire Protection; fveg02\_2. Vector digital dataset. 100m Grid, 2002.

Acres												Grand Total by Size class	
Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water		Wetland
Not Determined	Not Determined	12		10									
	S P M D												
	<b>Total</b>	12		10							22		
Seedling	S P M D												
	<b>Total</b>												
Sapling	S			77		30							
	P			54		25							
	M			89		30							
	D			440		25							
	<b>Total</b>			660		109						768	
Pole	S			245		84							
	P			153		99							
	M			225		116							
	D			909		608							
	<b>Total</b>			1532		907						2439	
Small Tree	S			96		213							
	P			109		86							
	M			168		252							
	D			1868		1772		215					
	<b>Total</b>			2241		2323		215				4779	
Medium/Large Tree	S			573									
	P			712		2							
	M			993									
	D			1670		171							
	<b>Total</b>			3949		173						4121	
Multi Layered	D			5476									
	<b>Total</b>			5476								5476	
<b>Grand Total by Species Type</b>			12	13857	0	3511	0	10	215	0	0	0	17605

SIZE Description	Diameter at Breast Height (DBH)
Not Determined	N/A
Seedling	Less Than 1 inch
Sapling	1 to 6 inches
Pole	6 to 11 inches
Small Tree	11 to 24 inches
Medium/Large Tree	Greater Than 24 inches
Multi Layered	Size 5 Over Size 4 Or 3; Total Tree Crown Closure Greater Than 60%

Percent												Grand Total by Size class	
Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water		Wetland
Not Determined	Not Determined	0%		0%									
	S P M D												
	<b>Total</b>	0%		0%							0%		
Seedling	S P M D												
	<b>Total</b>										0%		
Sapling	S			0%		0%							
	P			0%		0%							
	M			1%		0%							
	D			2%		0%							
	<b>Total</b>			4%		1%						4%	
Pole	S			1%		0%							
	P			1%		1%							
	M			1%		1%							
	D			5%		3%							
	<b>Total</b>			9%		5%						14%	
Small Tree	S			1%		1%							
	P			1%		0%							
	M			1%		1%							
	D			11%		10%		2%					
	<b>Total</b>			13%		13%		2%				28%	
Medium/Large Tree	S			3%									
	P			4%		0%							
	M			6%									
	D			9%		1%							
	<b>Total</b>			22%		1%						23%	
Multi Layered	D			31%									
	<b>Total</b>			31%								31%	
<b>Grand Total by Species Type</b>			0%	79%	20%	0%	2%						101%

SIZE (SHRUB) Desc.	Crown Decadence	DENSITY	Description
Not Determined	N/A		None
Seedling Shrub	Seedlings or sprouts < 3 years	S	10 to 24%
Young Shrub	None	P	25 to 39%
Mature Shrub	1 - 25%	M	40 to 59%
Decadent Shrub	> 25%	D	60 to 100%

# Usal Creek

## Vegetation within Riparian Buffer (100 meter on either side of stream)

California Department of Forestry and Fire Protection; fveg02\_2. Vector digital dataset. 100m Grid, 2002.

Acres													Grand Total by Size class
Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	
Not Determined	Not Determined		9.9					2.5					
	S P M D Total		9.9					2.5					12
Seedling	S P M D Total												0
	S P M D Total			14.8	9.9								
Sapling	S P M D Total			145.8	29.7								175
	S P M D Total			44.5	44.5								
Pole	S P M D Total			397.8	397.8								796
	S P M D Total			22.2	74.1								
Small Tree	S P M D Total			439.8	350.9			27.2					818
	S P M D Total			138.4									
Medium/Large Tree	S P M D Total			1255.3	42.0								1297
	S P M D Total			200.2									
Multi Layered	S P M D Total			1418.4									1418
	S P M D Total			303.9	42.0								
<b>Grand Total by Species Type</b>		0	10	3657	0	820	0	2	27	0	0	0	4517

SIZE	Description	Diameter at Breast Height (DBH)
Not Determined		N/A
Seedling		Less Than 1 inch
Sapling		1 to 6 inches
Pole		6 to 11 inches
Small Tree		11 to 24 inches
Medium/Large Tree		Greater Than 24 inches
Multi Layered		Size 5 Over Size 4 Or 3; Total Tree Crown Closure Greater Than 60%

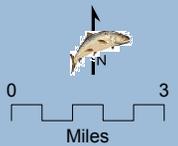
SIZE (SHRUB)	Desc.
Not Determined	
Seedling Shrub	
Young Shrub	
Mature Shrub	
Decadent Shrub	

Percent													Grand Total by Size class
Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	
Not Determined	Not Determined		0%					0%					
	S P M D Total		0%					0%					0%
Seedling	S P M D Total												0%
	S P M D Total			0%	0%								
Sapling	S P M D Total			3%	1%								4%
	S P M D Total			1%	1%								
Pole	S P M D Total			9%	9%								18%
	S P M D Total			1%	1%								
Small Tree	S P M D Total			10%	8%			1%					18%
	S P M D Total			0%	2%								
Medium/Large Tree	S P M D Total			28%	1%								29%
	S P M D Total			7%									
Multi Layered	S P M D Total			31%									31%
	S P M D Total			14%	1%								
<b>Grand Total by Species Type</b>		0%	0%	81%	0%	18%	0%	0%	1%	0%	0%	0%	100%

Crown Decadence
N/A
Seedlings or sprouts < 3 years
None
1 - 25%
> 25%

DENSITY	Description
None	
S	10 to 24%
P	25 to 39%
M	40 to 59%
D	60 to 100%

# Usal Creek Watershed

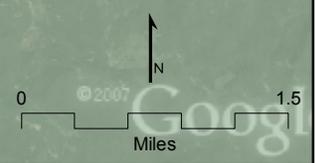




NMFS-SWR-HCD

January 2009

# Usal Creek Watershed

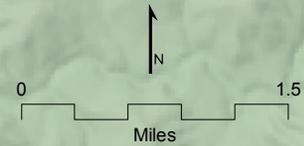




NMFS-SWR-HCD

January 2009

# Usal Creek Watershed

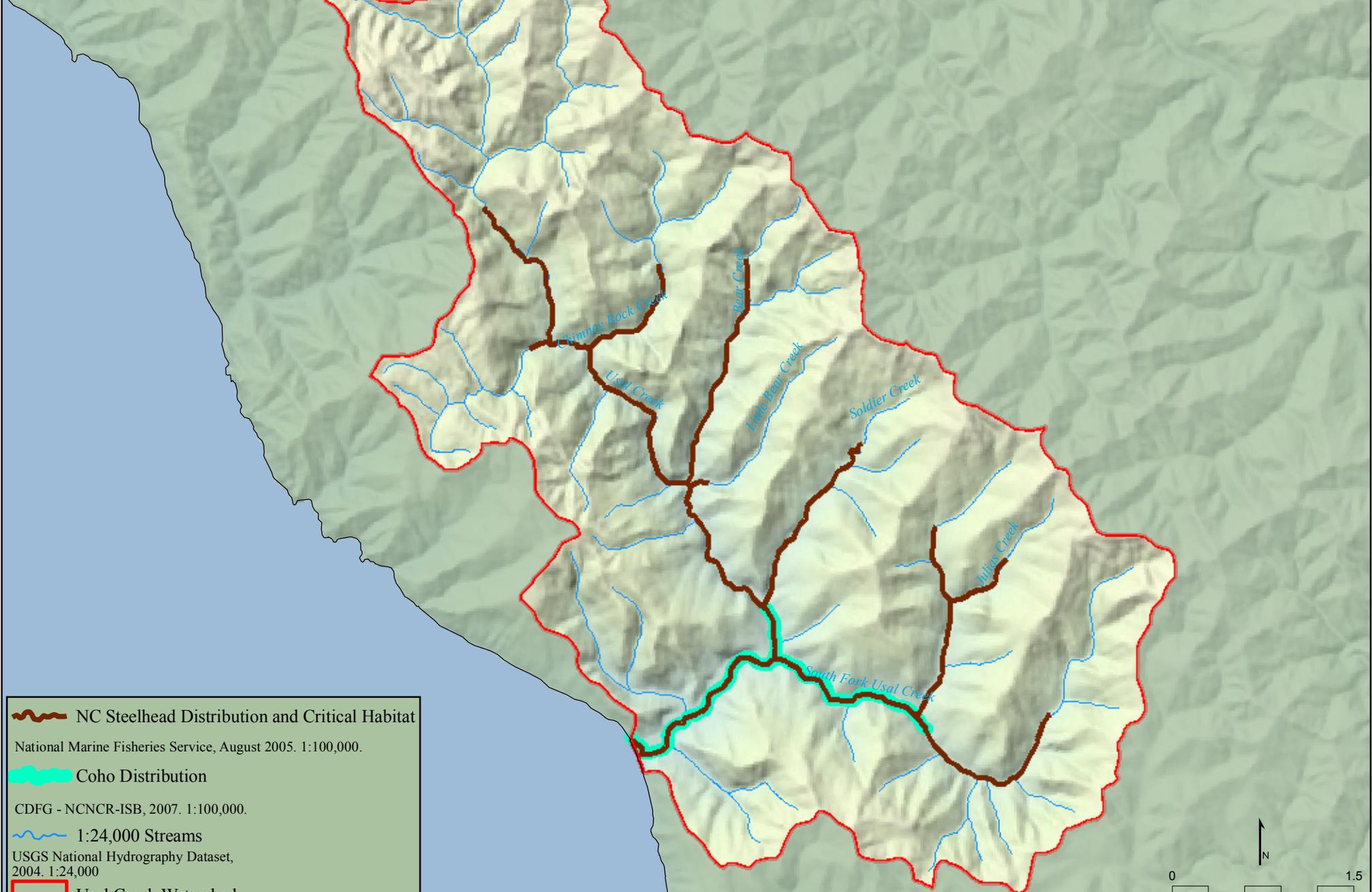




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January 2009

# Usal Creek Watershed Fish Distribution and Critical Habitat

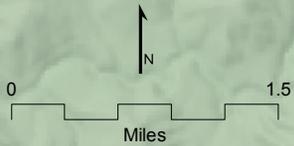


 NC Steelhead Distribution and Critical Habitat  
National Marine Fisheries Service, August 2005. 1:100,000.

 Coho Distribution  
CDFG - NCNCR-ISB, 2007. 1:100,000.

 1:24,000 Streams  
USGS National Hydrography Dataset, 2004. 1:24,000

 Usal Creek Watershed



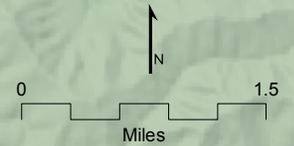


NMFS-SWR-HCD

January 2009

# Usal Creek Watershed Steelhead Current vs. Historical

-  Current NC 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
-  Usal Creek Watershed





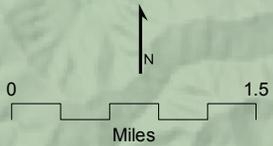
NMFS-SWR-HCD

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# Usal Creek Watershed Coho Current vs. Historical



-  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
-  Usal Creek Watershed





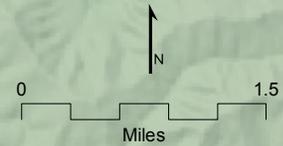
NMFS-SWR-HCD

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# Usal Creek Watershed Chinook Historical



-  Chinook Intrinsic Potential  
NMFS SWR Fisheries Science Center, 2005.
-  Potential historical suitable habitat
-  1:24,000 Streams  
USGS National Hydrography Dataset,  
2004. 1:24,000
-  Usal Creek Watershed





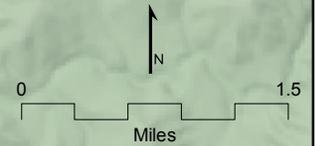
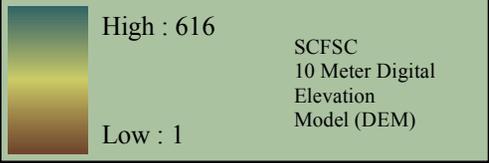
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# Usal Creek Watershed Elevation



## Usal Creek Elevation (Meters)





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# Usal Creek Watershed Development

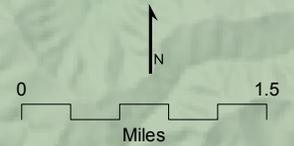


## Housing Density

- 0 to < 1 Housing Unit / 160 Acres (100%)
- 1 Unit / 160 Acres to 1 Unit / 20 Acres
- 1 Unit / 20 Acres to 1 Unit / 5 Acres
- 1 Unit / 5 Acres to 2 Units / Acre
- 2 Units / Acre to  $\geq$  to 5 Units / Acre

Population within the Watershed = 3 People  
 Houses within the Watershed = 2

California Department of Forestry, 2003. 1:100,000.





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# Usal Creek Watershed Ownership

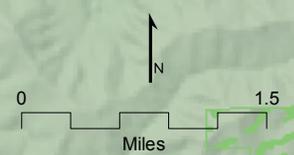
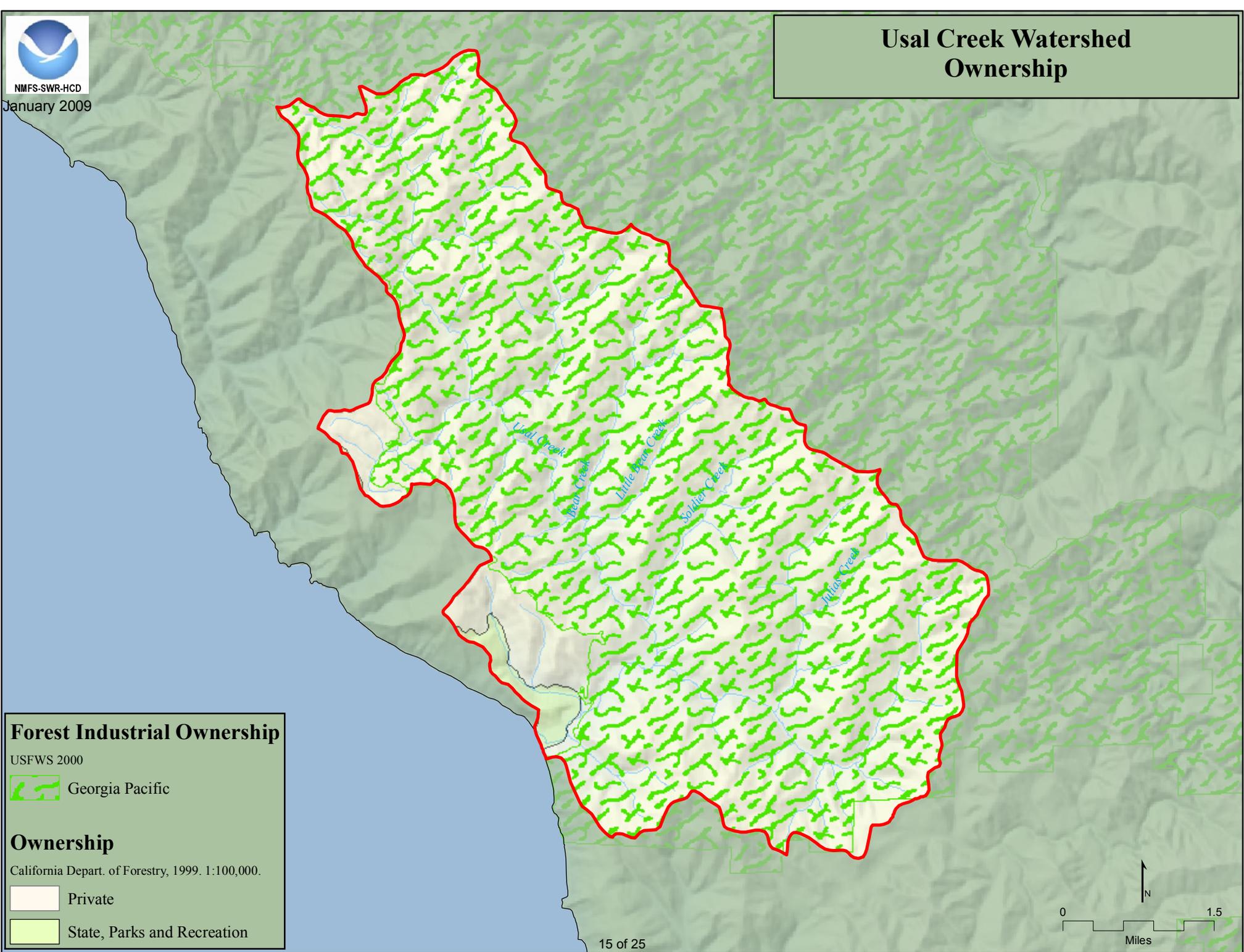
**Forest Industrial Ownership**  
USFWS 2000

 Georgia Pacific

**Ownership**  
California Depart. of Forestry, 1999. 1:100,000.

 Private

 State, Parks and Recreation





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# Usal Creek Watershed Road Density



Road

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

## Road Density (Miles of Road per Square Mile of Watershed)

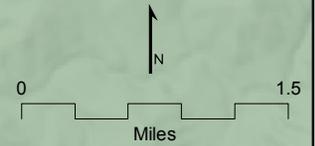


3.2



4.2

Overall Watershed  
Density = 3.5 Miles / SqMi





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# Usal Creek Watershed Road Density in the Riparian Corridor



 Road Segments within the 200 meter Riparian Corridor

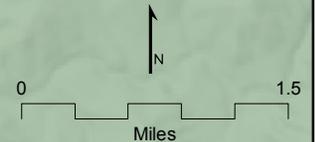
U.S. Census Bureau - Tiger 2000, 2002. 1:24,000

 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 = 4.3 Miles / SqMi of Corridor





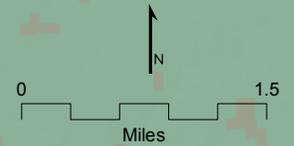
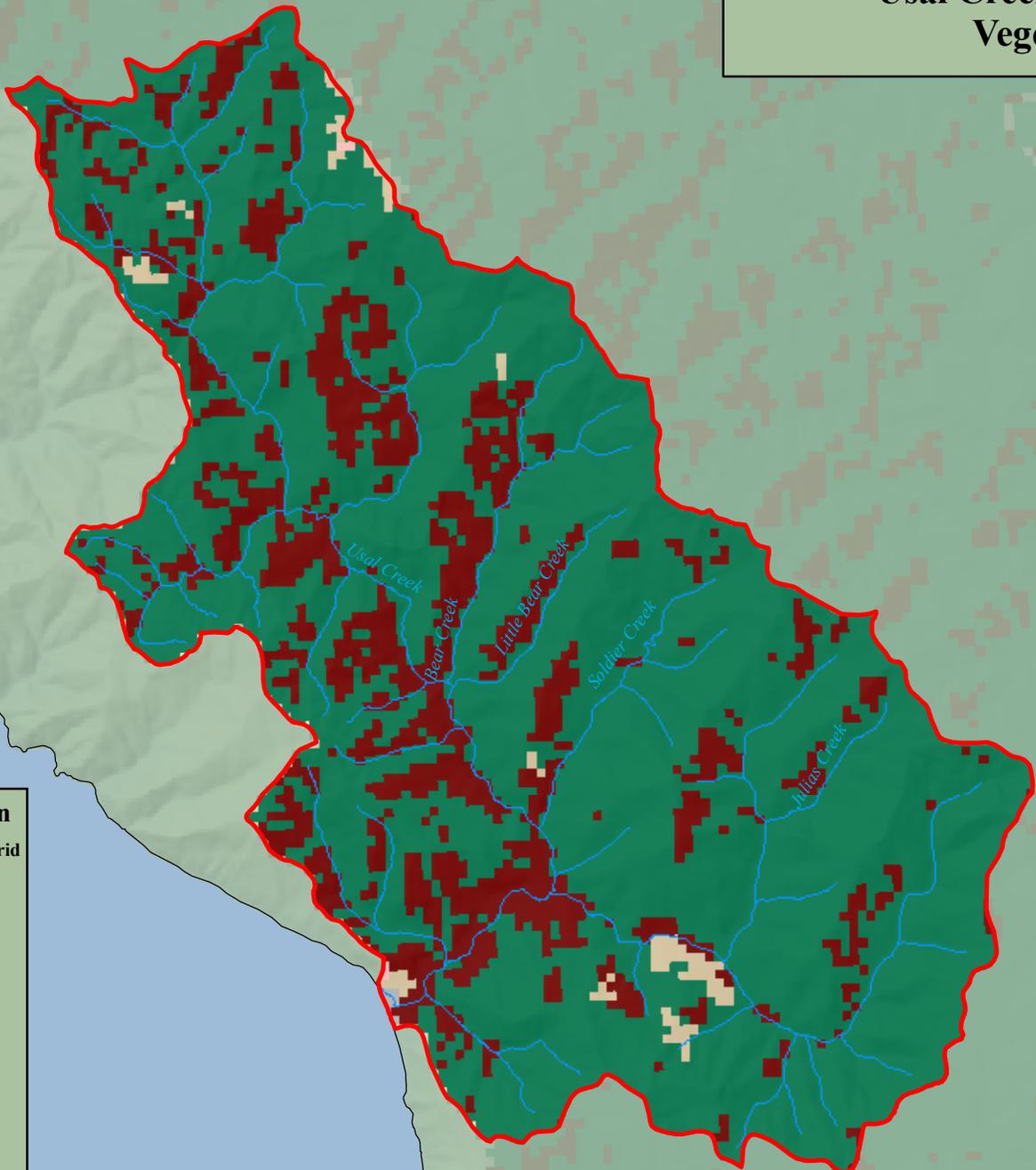
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# Usal Creek Watershed Vegetation

**WHR13 Vegetation Classification**  
CA Department of Forestry, 2002.100 meter Grid

	Barren/Other
	Conifer Forest - 79%
	Hardwood Forest - 20%
	Hardwood Woodland
	Herbaceous
	Shrub - 1%
	Urban
	Water
	Wetland





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# Usal Creek Watershed Timber Harvesting 1991-2004

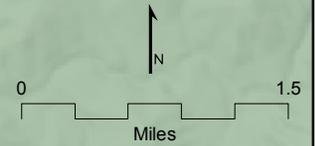


 1:24,000 Streams

USGS National Hydrography Dataset, 2004. 1:24,000

**Timber Harvest Plans 1991-2004** California Department of Forestry, 2006.

 Harvest Plans Footprint (Silviculture method not defined)

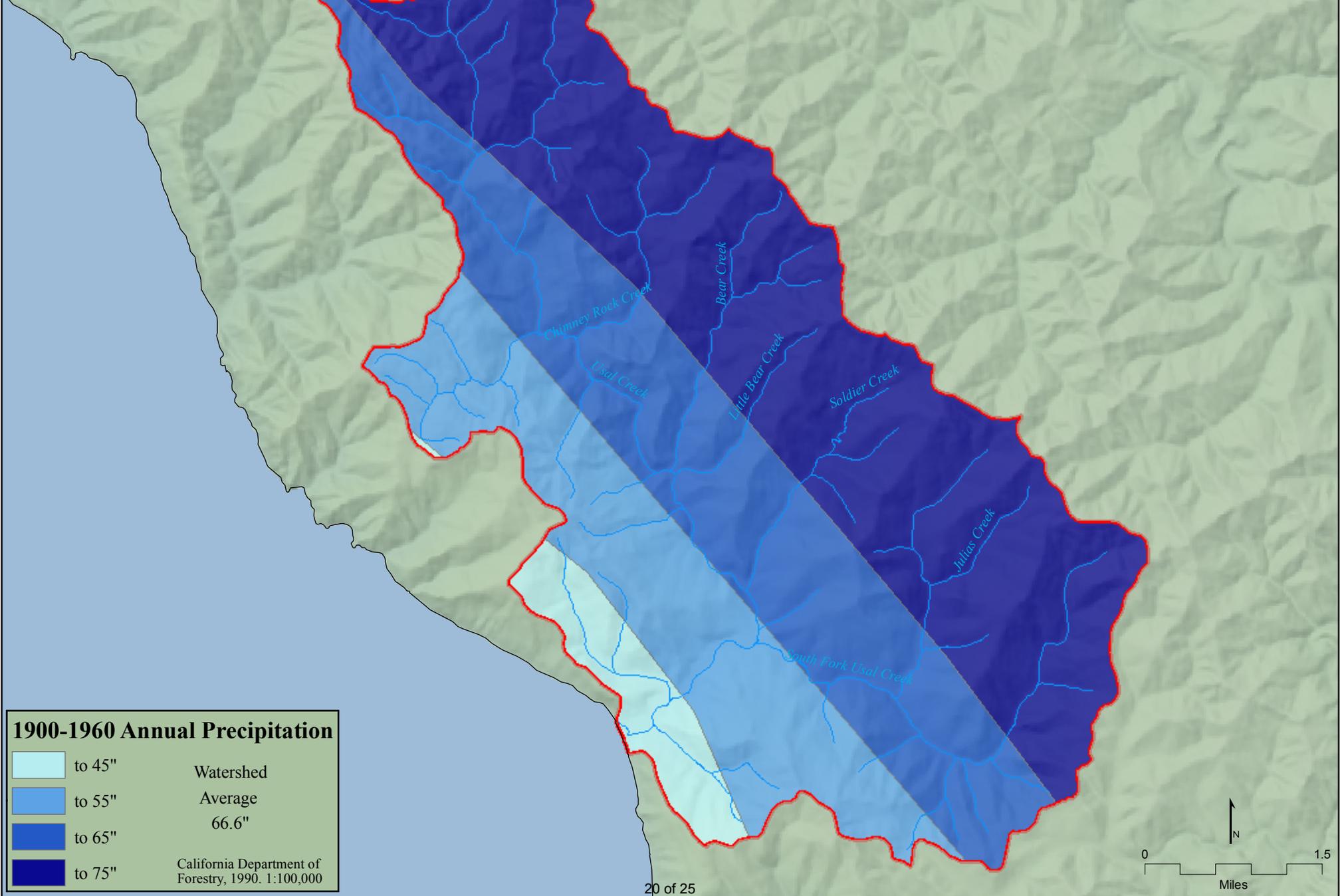




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# Usal Creek Watershed Precipitation





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# Usal Creek Watershed Flood Zone

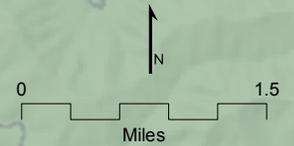


## FEMA Flood Zones

FEMA, 1996. 1:24,000

 100 Year Flood Zone

 500 Year Flood Zone





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# Usal Creek Watershed Geologic Features





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# Usal Creek Watershed Barriers / Industrial Discharge

 Mine  
USGS 2006

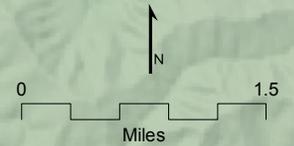
**Barrier Type, Barrier Status**  
CA Fish Passage Assessment, PSMFC, 2008

 Road crossing, Partial

 Non-structural, Total

 1:24,000 Streams  
USGS National Hydrography Dataset,  
2004. 1:24,000

 Usal Creek Watershed



## References

### **Watersheds**

calwater\_ver2\_2  
vector digital data  
California Watersheds (CALWATER 2.2)  
California Department of Forestry and Fire  
Protection  
1:24,000  
1999  
<http://www.ca.nrcs.usda.gov/features/calwater/>

### **Distribution**

Coho\_Distribution  
vector digital data  
Eric Haney - CDFG - NCNCR-ISB  
1:100,000  
2006  
Draft  
<http://www.calfish.org/>

NC\_Steelhead\_Distribution\_06\_2005  
vector digital data  
National Marine Fisheries Service (NOAA  
Fisheries)  
1:100,000  
August 2005  
<http://swr.nmfs.noaa.gov/salmon/layers/finalgis.htm>

### **Critical Habitat**

NC\_Steelhead\_ch\_06\_2005  
vector digital data  
National Marine Fisheries Service (NOAA  
Fisheries)  
1:100,000  
August 2005  
<http://swr.nmfs.noaa.gov/salmon/layers/finalgis.htm>

### **Hydrology**

1801 NHD Flowline  
vector digital data  
National Hydrography Dataset High Resolution  
United States Geological Survey  
1:24,000  
2004

### **Dams**

Dams\_2005  
vector digital data  
Goslin, M.,  
Santa Cruz Fishery Science Center

National Marine Fisheries Service  
2005  
<http://swfsc.noaa.gov/>

### **Barriers and Diversions**

pad\_september2008  
vector digital data  
California Fish Passage Assessment Database  
Pacific States Marine Fisheries Commission  
September 2006  
<http://www.calfish.org/>

### **Gaging Stations**

USGS Streamgages  
vector digital data  
U.S. Geological Survey  
Reston, Va  
2006  
[http://water.usgs.gov/GIS/dsdl/USGS\\_Streamgages-NHD\\_Locations\\_Shape.zip](http://water.usgs.gov/GIS/dsdl/USGS_Streamgages-NHD_Locations_Shape.zip)

### **Total Maximum Daily Load (TMDL)**

R1\_rivers\_2002 303d  
vector digital data  
State Water Resources Control Board (SWRCB)  
California Environmental Protection Agency  
2002

### **Precipitation**

California Mean Annual Precipitation Zones, 1900-  
1960  
Vector digital data  
California Department of Forestry and Fire  
Protection 1990  
1:100,000  
<http://frap.cdf.ca.gov/data/frapgisdata/select.asp>

### **Roads**

TGRR00  
vector digital data  
Roads  
United States Census Bureau  
1:100000  
2000  
<http://www.census.gov/geo/www/tiger/>

### **Elevation**

Dem\_1\_utm\_f

10 Meter Digital Elevation Model (DEM)  
NOAA Fisheries, Santa Cruz Laboratory  
2003

### **Vegetation**

fveg02\_2

raster digital data  
Multi-source Land Cover Data  
California Department of Forestry and Fire  
Protection  
100 meter Grid  
2002

<http://frap.cdf.ca.gov/data/frapgisdata/select.asp>

### **Erodability**

Highly Erodible Watersheds  
vector digital data  
Department of Conservation, Division of Mines and  
Geology  
Minimum Mapping Unit: Approximately 8000  
Acres (20,000 Hectares)  
1994

<http://gis.ca.gov/catalog/BrowseRecord.epl?id=380>

### **Land Ownership**

GOVTOWNA  
vector digital data  
California Department of Forestry Forest and  
Rangeland Resources Assessment Program  
Bureau of Land Management Surface Management  
1:100,000  
September 1999

<http://old.casil.ucdavis.edu/casil/gis.ca.gov/teale/govtowna/>

### **Timber Harvesting**

thp\_(year)  
Annual Timber Harvest Plans  
vector digital data  
California Department of Forestry and Fire  
Protection  
Santa Rosa, CA  
1983-2001

### **Developed Area and Population**

Census 2000 Block Data (Migrated)  
vector digital data  
California and the Department of Forestry and Fire  
Protection, FRAP  
2003

1:100,000

<http://frap.cdf.ca.gov/data/frapgisdata/select.asp>

### **Imagery**

Google Maps  
remote-sensing image  
raster digital data  
2008

<http://datagateway.nrcs.usda.gov/GatewayHome.html>

### **Historic Suitable Habitat (Coho, Chinook, Steelhead)**

Intrinsic Potential Model  
vector digital data  
NOAA Fisheries  
Santa Cruz Laboratory, Santa Cruz, CA  
2005

<http://swfsc.noaa.gov/>

### **Forest Industrial Ownership**

nwca\_own  
vector digital data  
United States Fish and Wildlife Service  
Arcata, CA  
2000

### **Toxins**

mines  
vector digital data  
Better Assessment Science Integrating point and  
Nonpoint Sources (BASINS)  
United States Environmental Protection Agency  
2001

<http://www.epa.gov/waterscience/basins/>

### **Geologic Features**

Geopoint  
vector digital data  
Department of Conservation, Division of Mines and  
Geology  
Minimum Mapping Unit: Approximately 8000  
Acres (20,000 Hectares)  
1994