

Watershed Characterization

March 2009



Aptos Creek Watershed

Area	Hydrologic Units	Calwater Subbasins ---	(Planning Watersheds)
13,699 Acres	18060001	3304130201	Valencia Creek (6214 Acres)
5,544 Hectares	4th Field HUC	3304130202	Borregas Creek (28 Acres)
21 Square Miles		3304130203	Rio Del Mar (367 Acres)
	3304	3304130204	Aptos Creek (7090 Acres)
Location		4th Field Calwater	
Santa Cruz County			

Species Potential	Miles of Streams with Species Present
Central California Coast Steelhead Santa Cruz Mountains Diversity Stratum - Potentially Independent	<u>Steelhead</u> 16 NOAA Fisheries, Critical Habitat Redesignation, 2005
Central California Coast Coho Santa Cruz Mountains Diversity Stratum - Dependent Population	<u>Coho</u> 0 CDFG, Coho Distribution, May 2007

Critical Habitat
Central California Coast Steelhead 16 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) 27	
% of IP (21.5 C Mask) with Current Coho Distribution 0%	
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 ^A	Miles	Number of Dams ^C
Naturally Occurring Waterways		0
Intermittent Stream	24	
Perennial Stream	20	
^C Passage Assessment Database, Pacific States Marine Fisheries Commission, 2008		

^AUSGS National Hydrography Dataset, High Resolution, 2004. 1:24,000

USGS Gaging Stations ^B	Number of Barriers ^C
11159690	36
Aptos Creek near Aptos	0 Dams 5 Road Crossings (2 Impassable, 2 Temp. &/or Partially Impassable) 21 Natural Barriers (Chutes, Falls, Log Jams, etc. (4 Impassable))
^C Passage Assessment Database, Pacific States Marine Fisheries Commission, 2008	

EPA Total Maximum Daily Load Classification (TMDL)^I
 Pathogens and Sediment
 Sources: Urban Runoff/Storm Sewers, Channel Erosion, Distrubed Sites (Land Development)
^IState Water Resources Control Board, 2003



Average Annual Precipitation^E	Average Annual Precipitation Range^E
34.8"	27.5 - 45"

^ECalifornia Mean Annual Precipitation Zones, 1900-1960, CA Department of Forestry, 1990

Roads^A	Miles
Roads in Watershed	
Primary Road / Highway	1
Secondary and connecting road, state highways	0
Local, neighborhood, and rural road, city street, unseparated	72
Vehicular trail, 4WD	2
Driveway or service road	2
Total Miles	78

Road Density	
Miles of Roads per SqMi of Watershed	3.7
Miles of Roads per SqMi of 100m Riparian Buffer*	4.6

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

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

Slope^D	Acres	Percent of watershed
Lands of 0-2 percent slope	85	1%
Lands of 2-4 percent slope	170	1%
Lands of 4-10 percent slope	777	6%
Lands of 10-15 percent slope	1,004	7%
Lands of 15-30 percent slope	4,304	31%
Lands of 30-60 percent slope	6,466	47%
Lands of 60-100 percent slope	889	6%
Lands of 100-117 percent slope	4	0%

Elevation Range	0 - 2615 ft.	0 - 797 m

^DSlope derived from USGS 10 meter Digital Elevation Models (DEM's)

Vegetation^G	Acres	Percent of watershed
Agriculture	702	5%
Annual grassland	128	1%
Conifer Forest		
Redwood	9,350	68%
Unknown Conifer	133	1%
Hardwood Forest		
Montane Hardwood	10	0%
Hardwood Woodland		
Coastal Oak Woodland	1,455	11%
Shrub	951	7%
Urban	969	7%

^GMulti-source Land Cover Data (2002 v2), CA Department of Forestry, 2002. 100 meter Grid

Erodability of Watershed^F	Acres	Percent of watershed
All of watershed is ranked as 4	13,699	100%

^FDepartment 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	7,081	52%
State (Parks & Recreation)	6,618	48%

^HManagement 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	
1,055 Acres	7% of watershed	1,134 Acres	8% of watershed

^ACalifornia Department of Forestry, Timber Harvest Plans for Region 1, 2006

(1994-2006)

Population^I	Housing^I
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Total Population within the watershed -- 6,554 People

Total Housing Units within the watershed -- 2,933 Houses

Housing Density

0 to Less than 1 Housing Unit / 160 Acres	49%
1 Unit / 160 Acres to 1 Unit / 20 Acres	
1 Unit / 20 Acres to 1 Unit / 5 Acres	27%
1 Unit / 5 Acres to 2 Units / Acre	22%
2 Units / Acres to Greater than or Equal to 5 Units / Acre	2%

^ICensus 2000 Block Data (Migrated), CA Department of Forestry, 2003



Aptos 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

Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	Grand Total by Size class
Not Determined	Not Determined	692		109				128	843	932			
	S												
	P												
	M						101						
Seedling	D			9252			793						
	Total	692		9361			894	128	843	932			12850
	S												
	P												
Sapling	M												
	D												
	Total												0
	S												
Pole	P						12						
	M						89						
	D						457						
	Total						558						558
Small Tree	S												
	P			116									
	M								106				
	D			79		10							
Medium/Large Tree	Total			195		10			106				311
	S												
	P												
	M												
Multi Layered	D												
	Total												0
	S												
	P												
Grand Total by Species Type	D												
	Total	692	0	9556	0	10	1452	128	949	932	0	0	13719
	S												
	P												

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

Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	Grand Total by Size class
Not Determined	Not Determined	5%		1%				1%	6%	7%			
	S												
	P												
	M						1%						
Seedling	D			67%			6%						
	Total	5%		68%			7%	1%	6%	7%			94%
	S												
	P												
Sapling	M												
	D												
	Total												0%
	S												
Pole	P						0%						
	M						1%						
	D						3%						
	Total						4%						4%
Small Tree	S												
	P			1%									
	M								1%				
	D			1%		0%				1%			
Medium/Large Tree	Total			1%		0%				1%			2%
	S												
	P												
	M												
Multi Layered	D												
	Total												0%
	S												
	P												
Grand Total by Species Type	D												
	Total	5%		70%		0%	11%	1%	7%	7%			100%
	S												
	P												

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%

Aptos 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

Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	Grand Total by Size class	
Not Determined	Not Determined	193.0		49.0				15.0	99.0	326.0				
	S													
	P													
	M						25.0							
	D			2385.0			235.0							
	Total	193.0		2434.0			260.0	15.0	99.0	326.0			3327	
Seedling	S													
	P													
	M													
	D													
	Total												0	
Sapling	S													
	P													
	M													
	D													
	Total												0	
Pole	S													
	P													
	M						20.0							
	D						74.0							
	Total						94.0						94	
Small Tree	S													
	P			25.0										
	M													
	D			12.0	5.0			7.0						
	Total			37.0	5.0	0.0	0.0	7.0					49	
Medium/Large Tree	S													
	P													
	M													
	D													
	Total												0	
Multi Layered	D													
	Total												0	
	Grand Total by Species Type													
			193	0	2471	0	5	354	15	106	326	0	0	3470

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

Size	Density	Agriculture	Barren	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Herbaceous	Shrub	Urban	Water	Wetland	Grand Total by Size class	
Not Determined	Not Determined	6%		1%				0%	3%	9%				
	S													
	P													
	M			69%			1%							
	D						7%							
	Total	6%		70%		7%	0%	3%	9%				96%	
Seedling	S													
	P													
	M													
	D													
	Total												0%	
Sapling	S													
	P													
	M													
	D													
	Total												0%	
Pole	S													
	P													
	M						1%							
	D						2%							
	Total						3%						3%	
Small Tree	S													
	P			1%										
	M													
	D						0%		0%					
	Total			1%			0%		0%				1%	
Medium/Large Tree	S													
	P													
	M													
	D													
	Total												0%	
Multi Layered	D													
	Total												0%	
	Grand Total by Species Type													
			6%	0%	71%	0%	0%	10%	0%	3%	9%	0%	0%	100%

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%

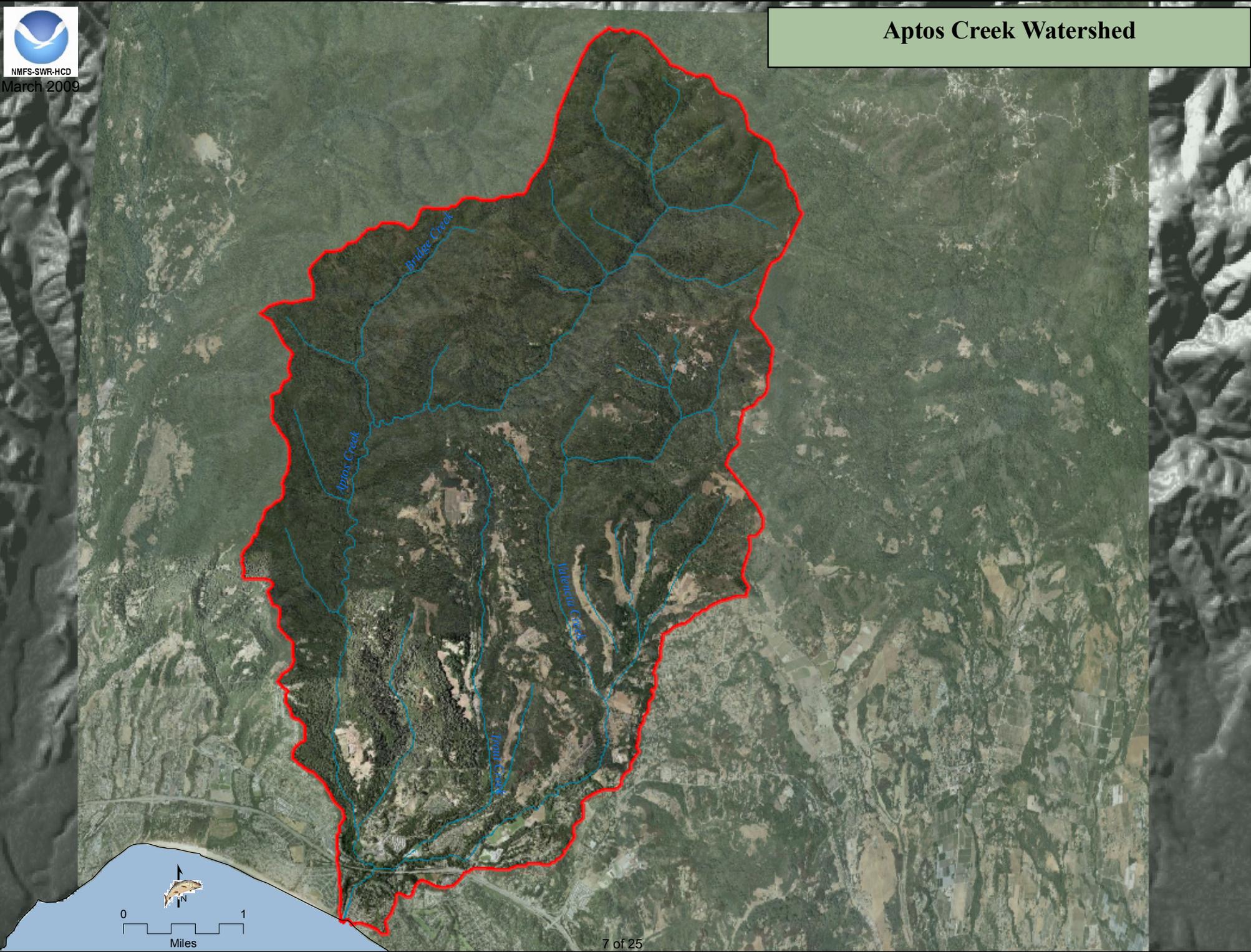
Aptos Creek Watershed





NMFS-SWR-HCD
March 2009

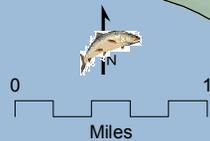
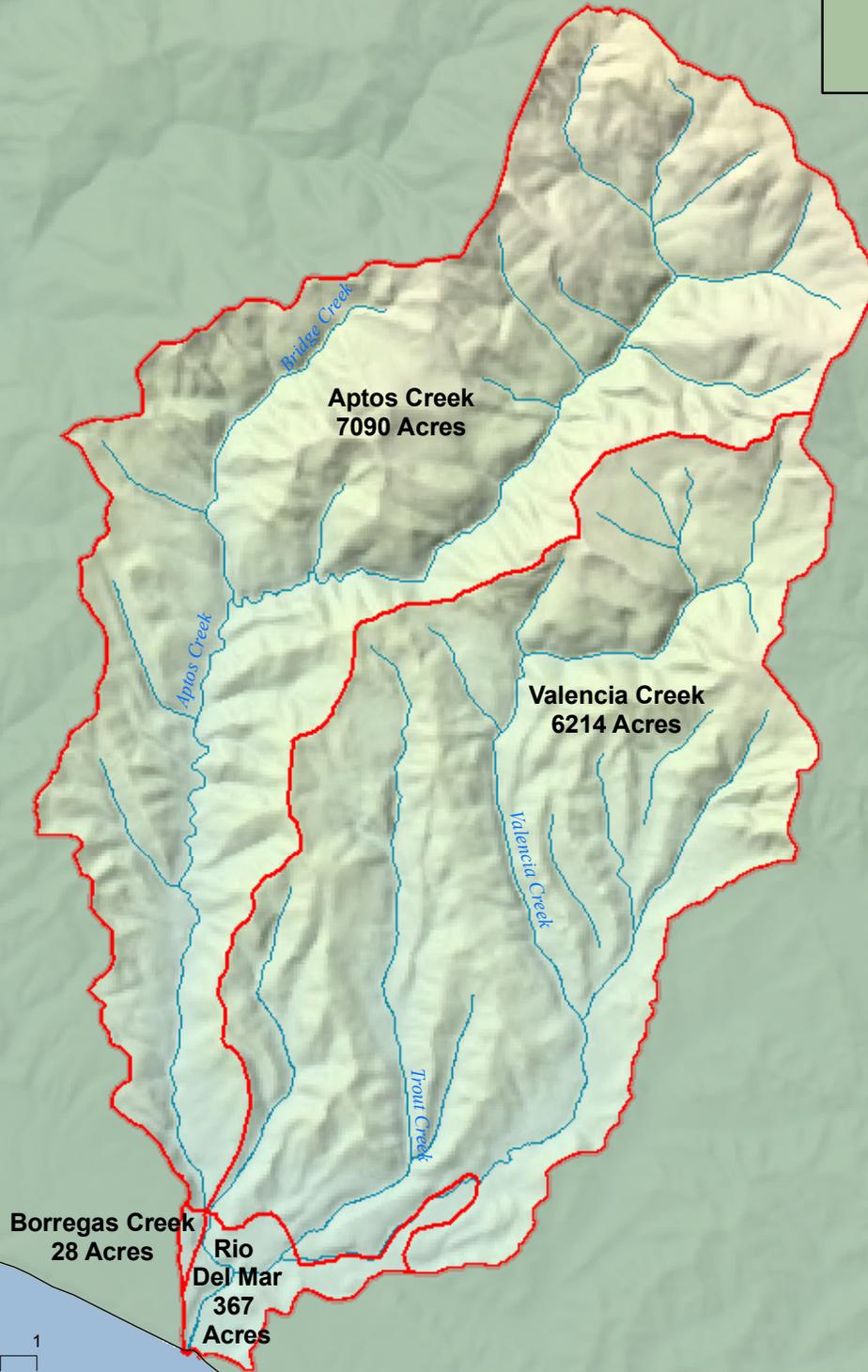
Aptos Creek Watershed





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Aptos Creek Watershed CalWater Planning Watersheds





NMFS-SWR-HCD
March 2009

Aptos Creek Watershed Fish Distribution and Critical Habitat



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

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

 Aptos Creek Watershed



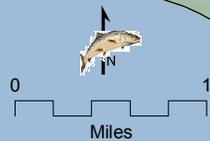


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Aptos Creek Watershed Steelhead Current vs. Historical



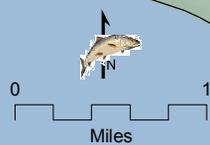
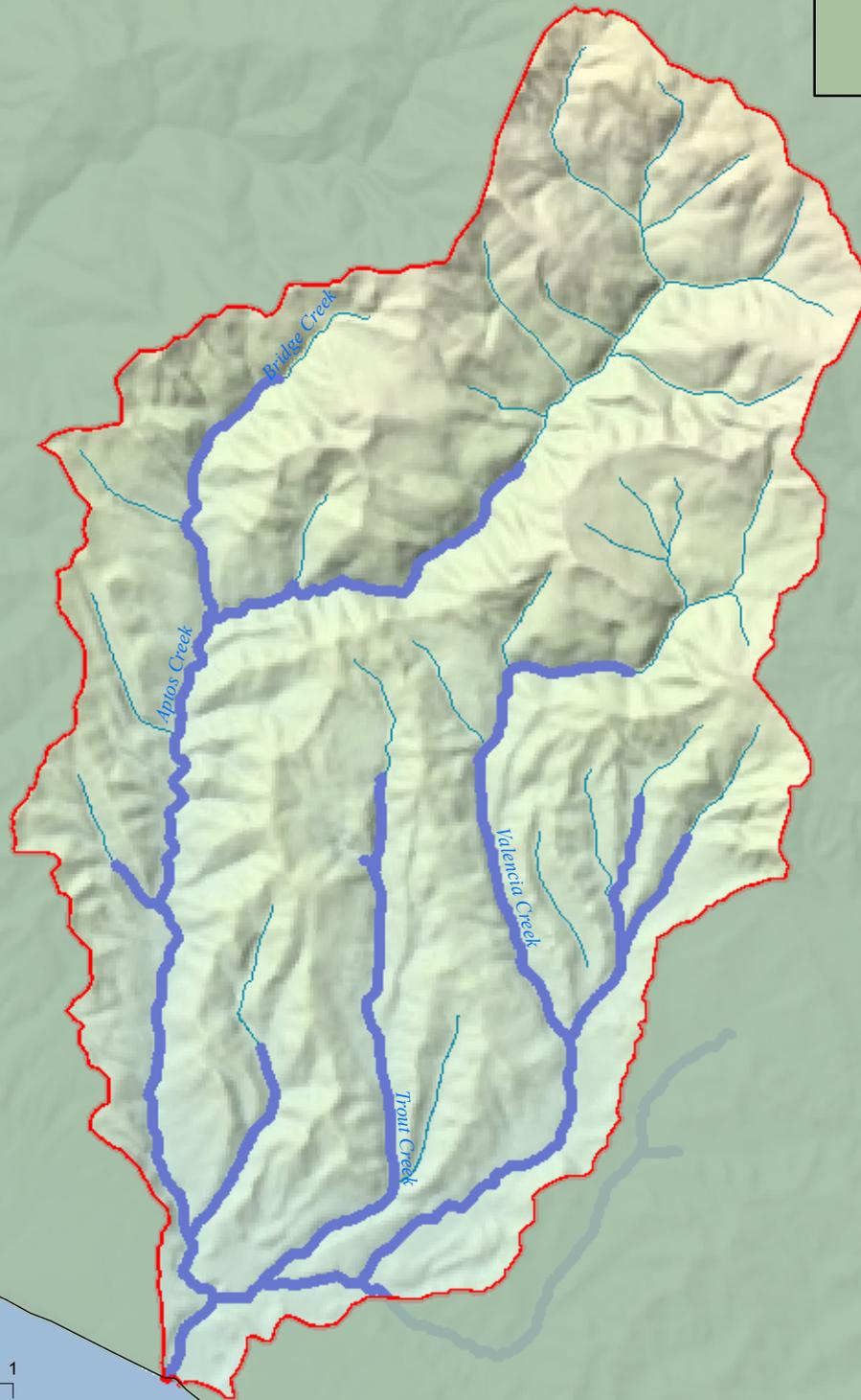
-  Current CCC Steelhead Distribution
National Marine Fisheries Service,
August 2005. 1:100,000.
-  Steelhead Intrinsic Potential
NMFS SWR Fisheries Science Center, 2005.
Potential historical suitable habitat
-  1:24,000 Streams
USGS National Hydrography Dataset, 2004. 1:24,000
-  Aptos Creek Watershed





NMFS-SWR-HCD
March 2009

Aptos Creek Watershed Coho Historical



 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

 Aptos Creek Watershed

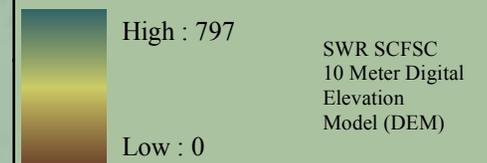


NMFS-SWR-HCD
March 2009

Aptos Creek Watershed Elevation



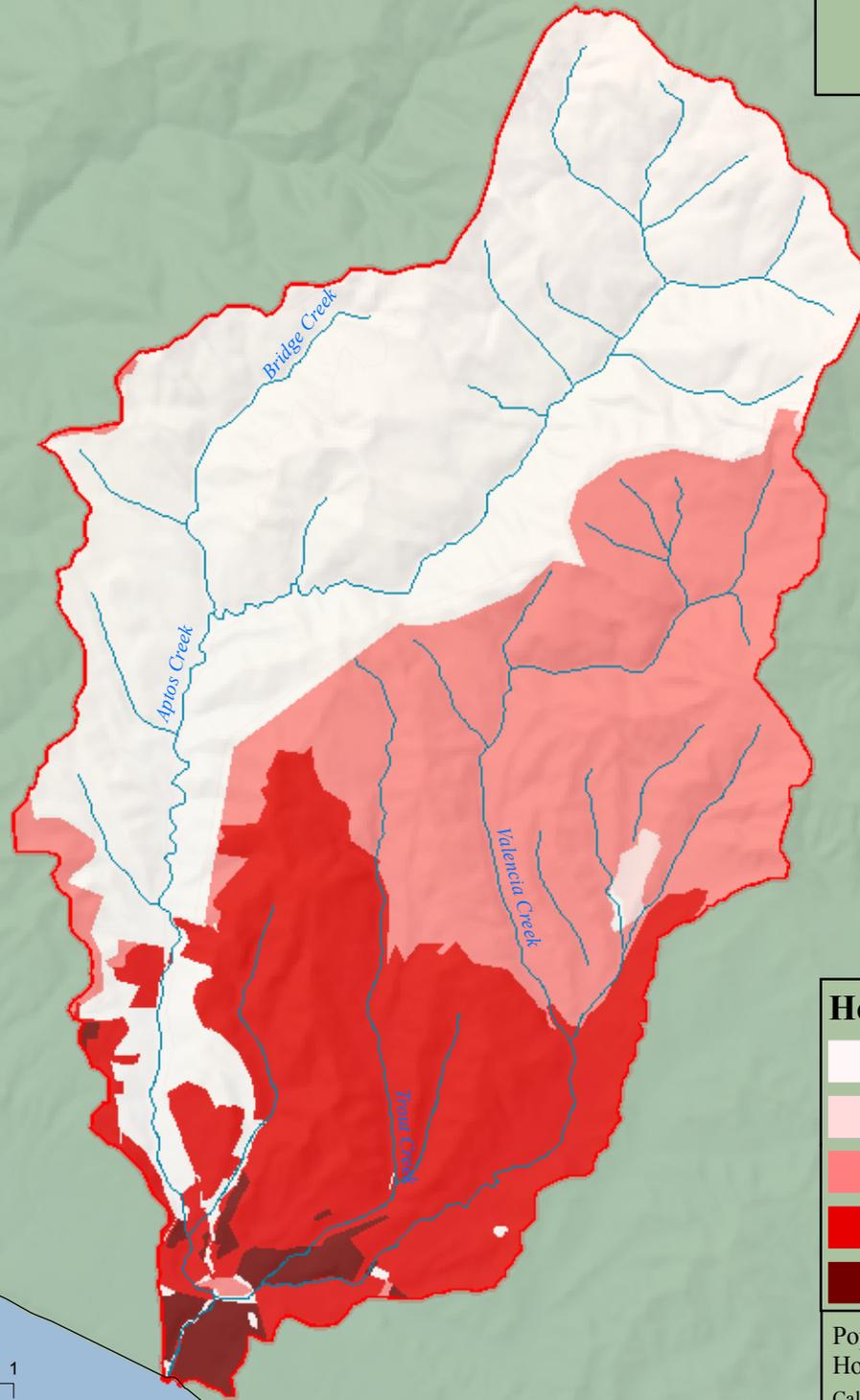
Aptos Creek Elevation (Meters)





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Aptos Creek Watershed Development



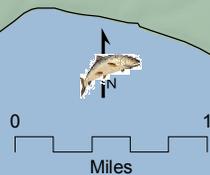
Housing Density

	0 to Less than 1 Housing Unit / 160 Acres (49%)
	1 Unit / 160 Acres to 1 Unit / 20 Acres
	1 Unit / 20 Acres to 1 Unit / 5 Acres (27%)
	1 Unit / 5 Acres to 2 Units / Acre (22%)
	2 Units / Acre to Greater than or Equal to 5 Units / Acre (2%)

Population within the Watershed = 6,554 People

Houses within the Watershed = 2,933

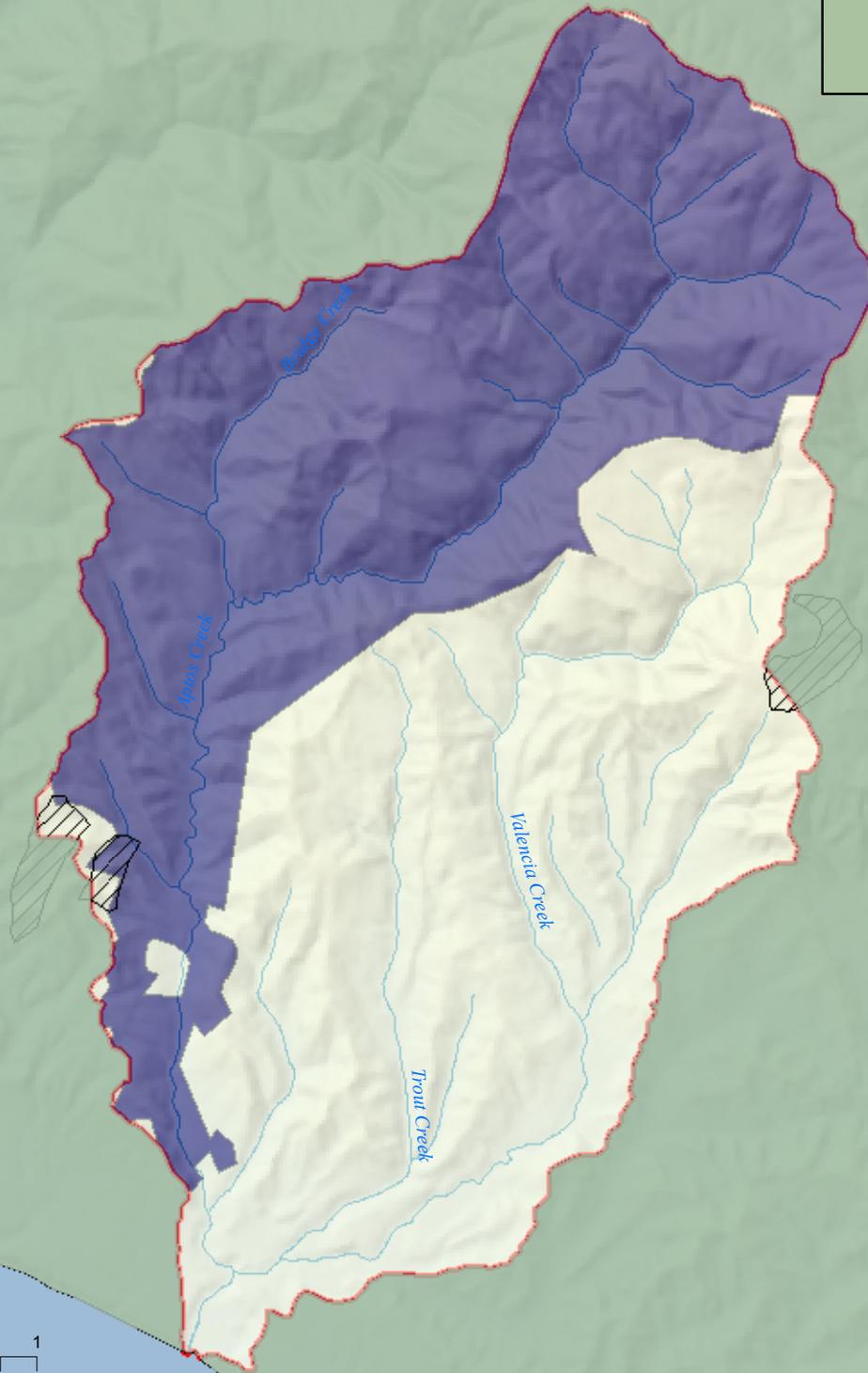
California Department of Forestry, 2003. 1:100,000.





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Aptos Creek Watershed Ownership



 Private Timber Owner

Ownership

California Department of Forestry, 1999. 1:100,000.

 Private

 State, Parks & Recreation





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March 2009

Aptos Creek Watershed Road Density

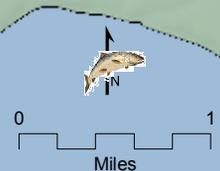


 Road
U.S. Census Bureau - Tiger 2000, 2002. 1:24,000

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

	< 2
	5
	> 17

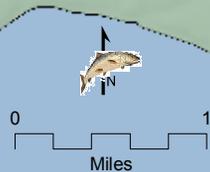
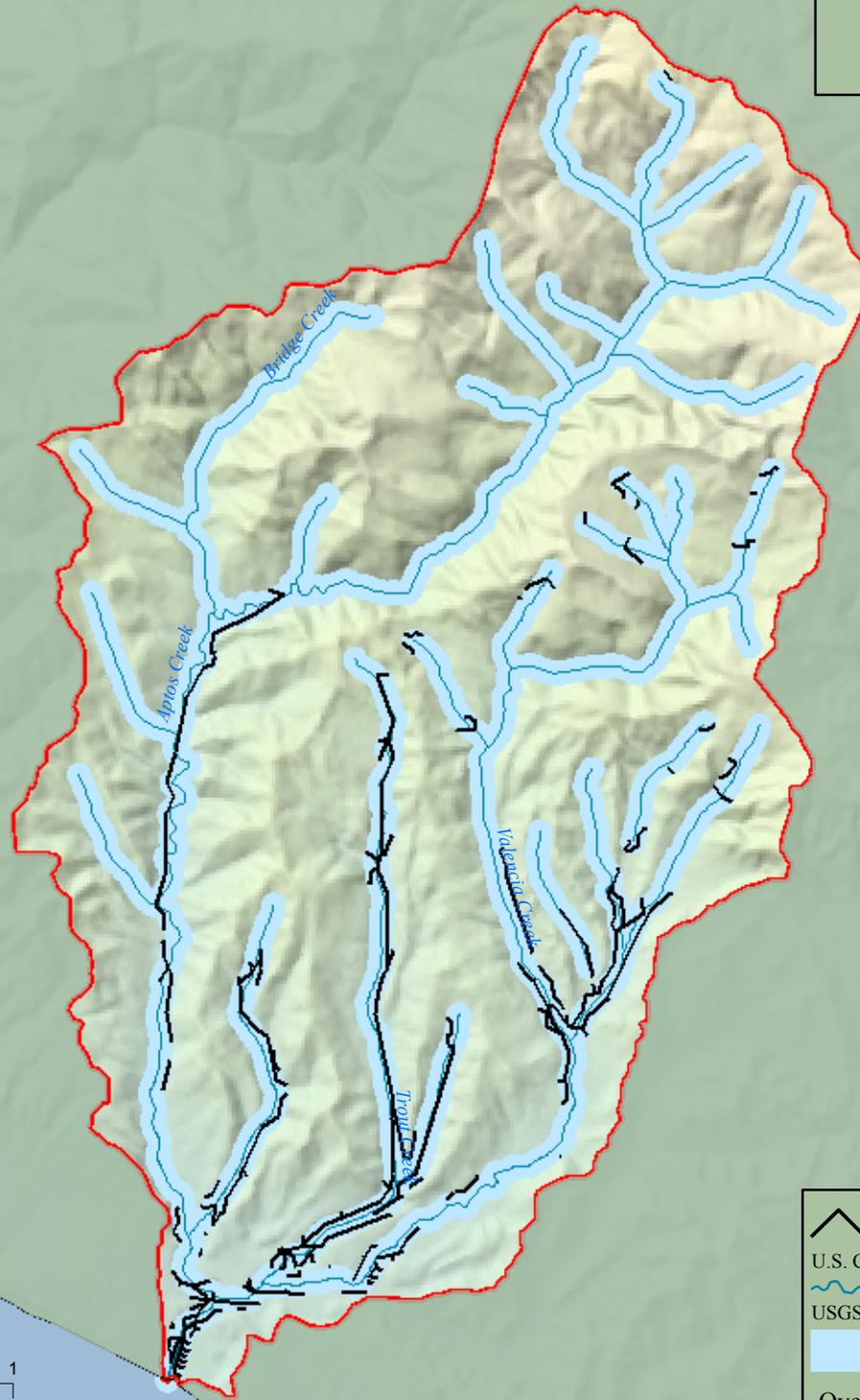
Overall Watershed
Density = 3.7 Miles / SqMi





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Aptos 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

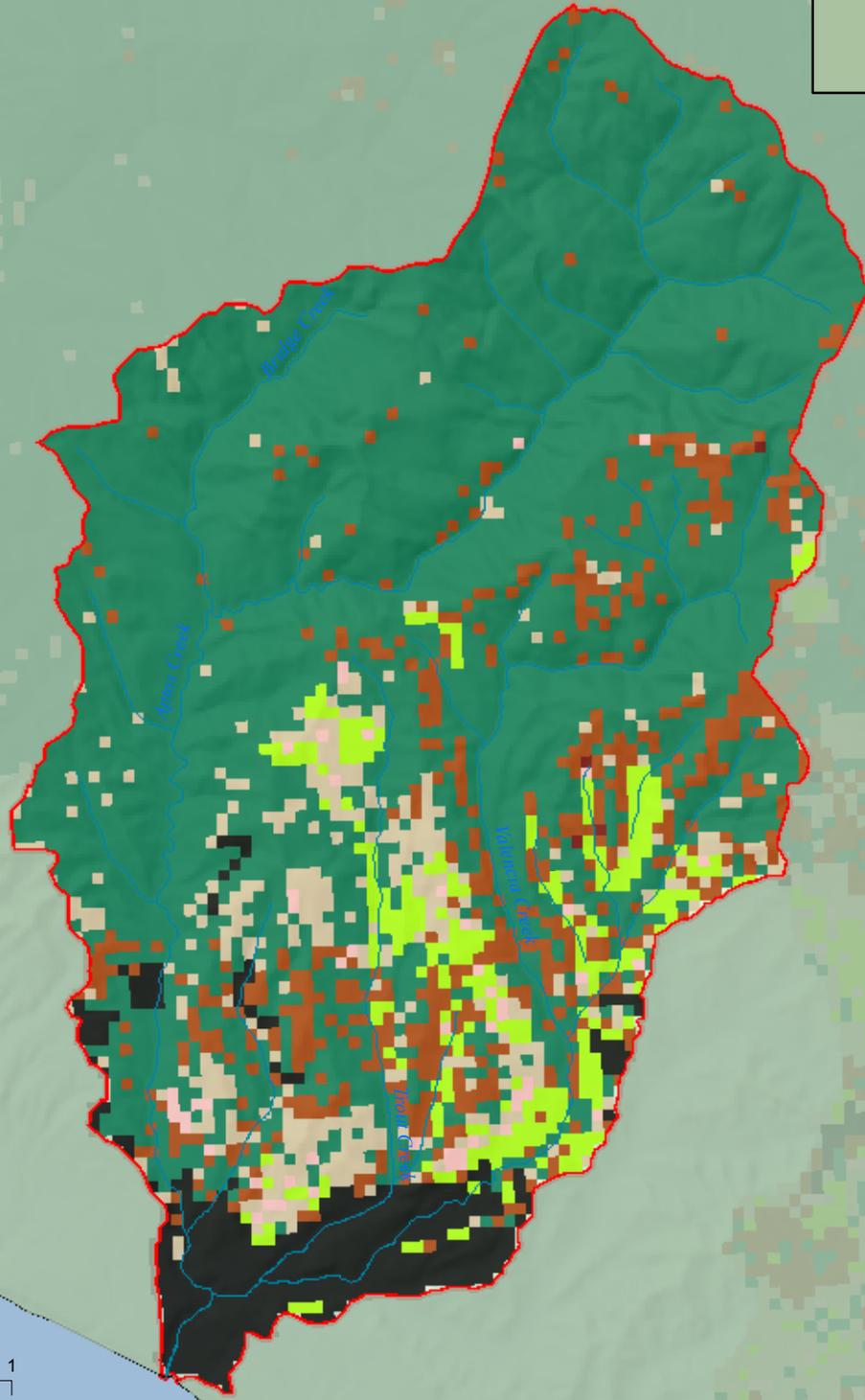
 200 Meter Riparian Buffer (100 m on either side of stream centerline)

Overall Riparian Corridor Density = 4.6 Miles / SqMi of Corridor



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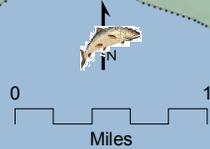
Aptos Creek Watershed Vegetation



WHR13 Vegetation Classification

California Department of Forestry, 2002.100 meter Grid

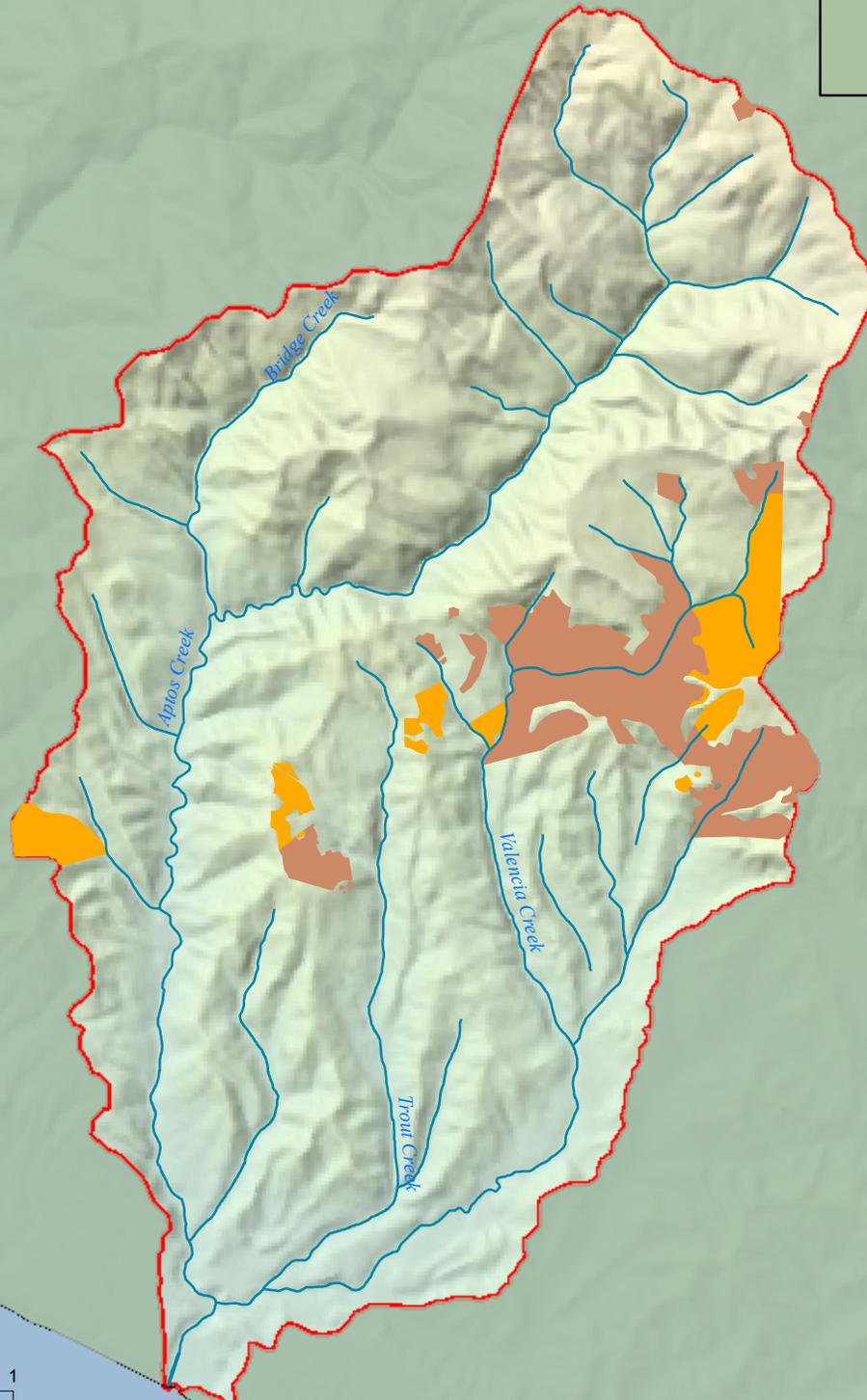
-  Agriculture - 5%
-  Conifer Forest - 69%
-  Hardwood Forest
-  Hardwood Woodland - 11%
-  Herbaceous - 1%
-  Shrub - 7%
-  Urban - 7%





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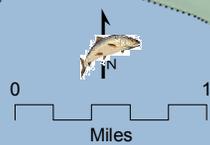
Aptos Creek Watershed Timber Harvesting 1994-2006



Timber Harvest Plans 1994-2006

California Department of Forestry, 2006.

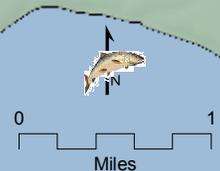
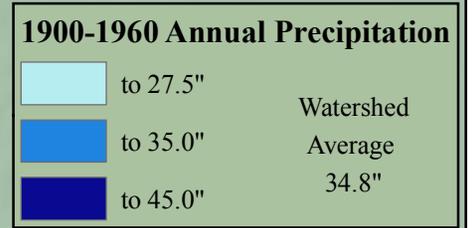
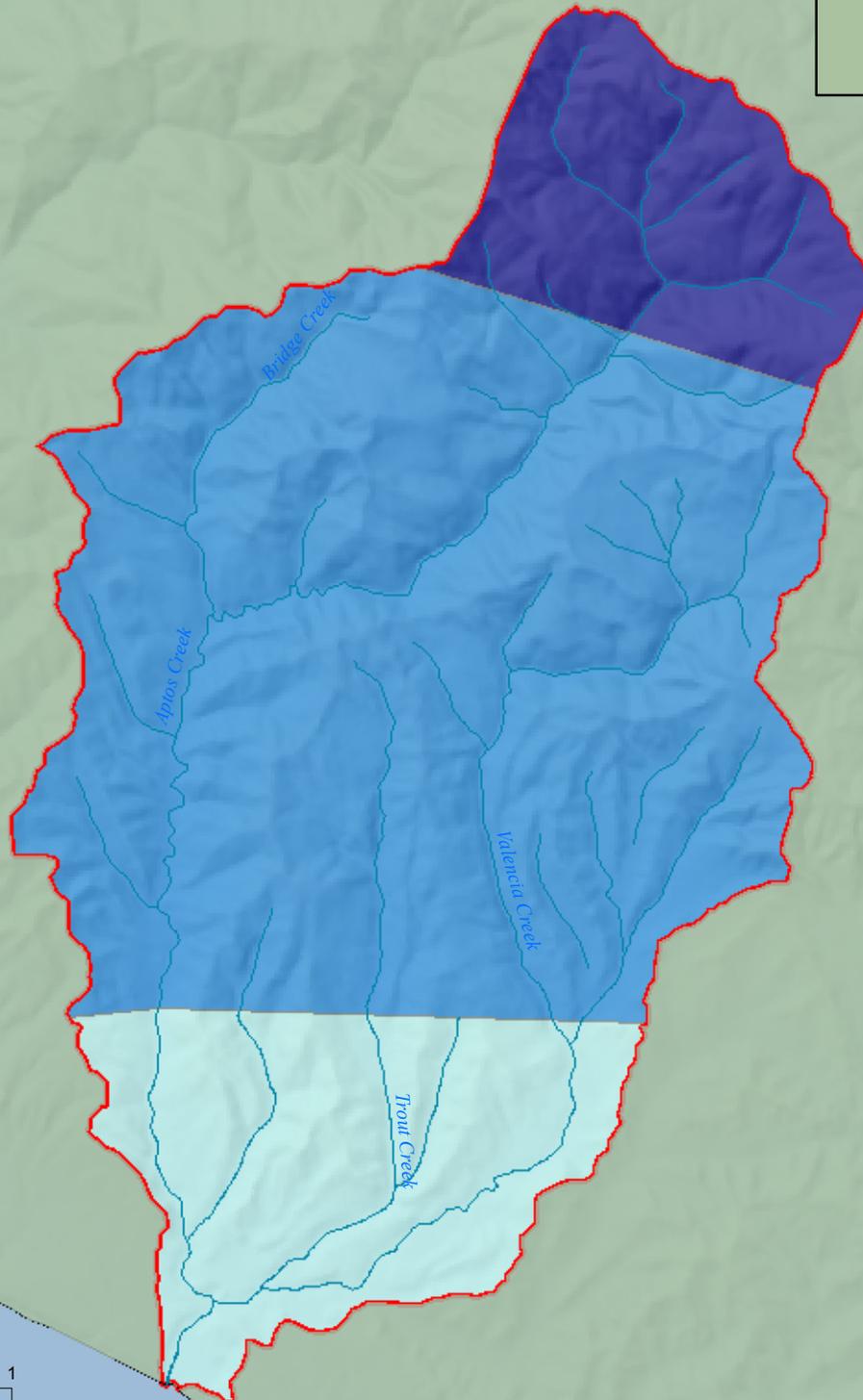
-  Selection
-  Not Coded





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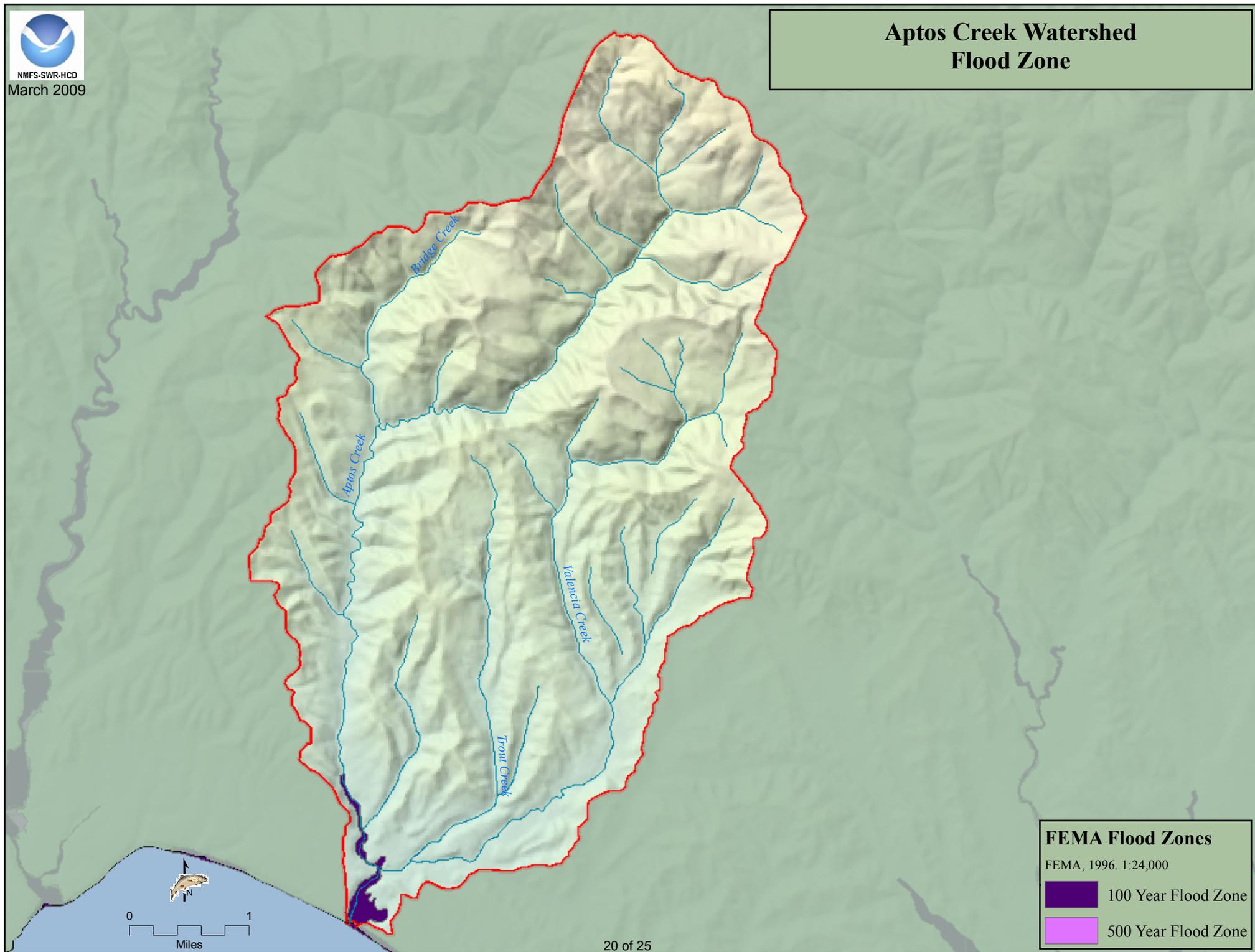
Aptos Creek Watershed Precipitation





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Aptos Creek Watershed Flood Zone



FEMA Flood Zones

FEMA, 1996. 1:24,000

 100 Year Flood Zone

 500 Year Flood Zone



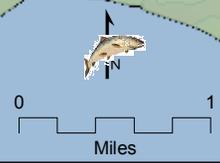
NMFS-SWR-HCD
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Aptos Creek Watershed Geologic Features



- Debris-flow Sources (mapped after 1/82 storm)
- Surficial Deposits
- Few Landslides
- Mostly Landslide

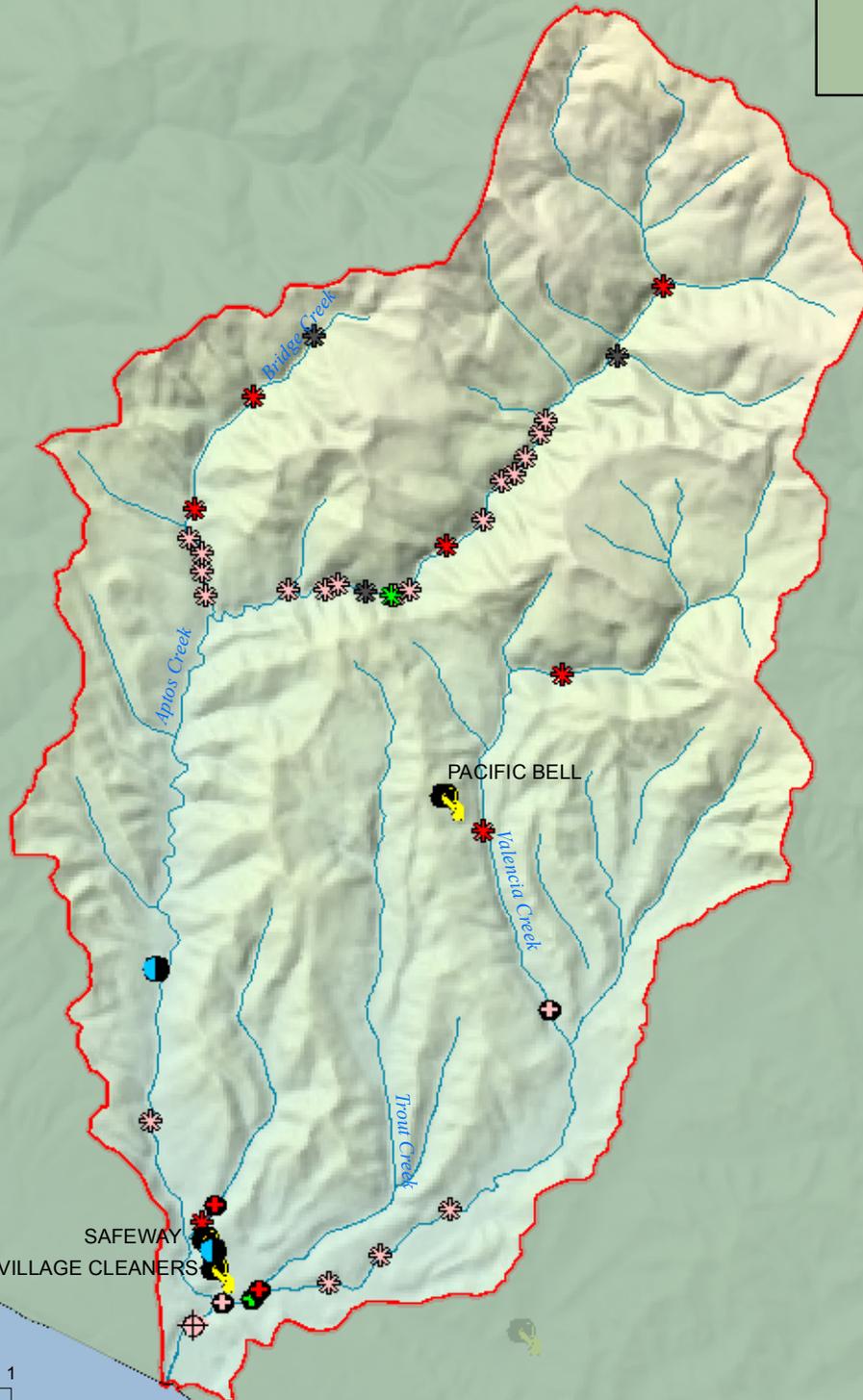
Circuit Rider
Productions, 2004.





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Aptos Creek Watershed Barriers / Discharge / Gages

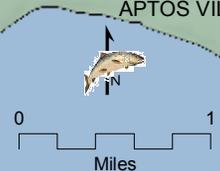


- USGS Streamgage
- Hazardous & Solid Waste Site

BASINS, USEPA. 2001.

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

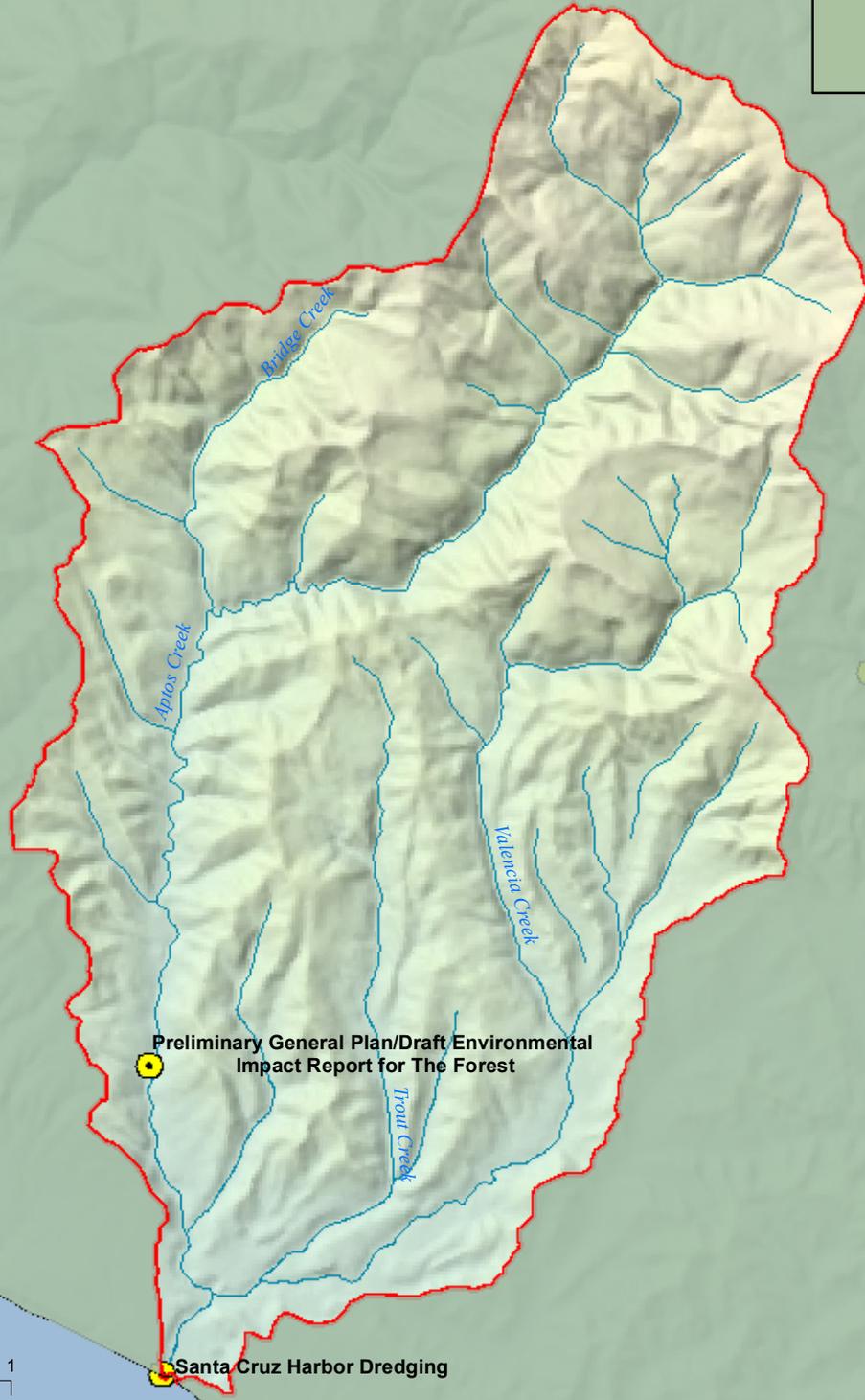
- Grade Control, Temporal
- Non-structural, Not a barrier
- Non-structural, Partial &/or Temporal
- Non-structural, Total
- Non-structural, Unknown
- Road crossing, Not a barrier
- Road crossing, Partial &/or Temporal
- Road crossing, Total





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Aptos Creek Watershed Public Consultation Tracking System

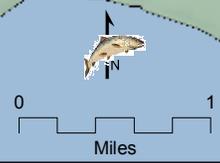


Preliminary General Plan/Draft Environmental Impact Report for The Forest

Santa Cruz Harbor Dredging

 PCTS Record

Current as of January 2009.
Only those records with a Latitude and Longitude entered appear here



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/>

CCC_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

CCC_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

1806 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

gages
vector digital data
Better Assessment Science Integrating point and
Nonpoint Sources (BASINS)
United States Environmental Protection Agency
2001
<http://www.epa.gov/waterscience/basins/>

Total Maximum Daily Load (TMDL)

R2_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

Spln_mos_06
10 Meter Digital Elevation Model (DEM)
NOAA Fisheries, Santa Cruz Laboratory
2003

Vegetation

fveg02_2
raster digital data
Multi-source Land Cover Data
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Santa Cruz Laboratory, Santa Cruz, CA
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