Gualala River Watershed

Area	Hydrologic Units	Calwater Subbasins ---	(Planning Watersheds)
190,994 Acres	18010109	1113810001	Stewart Creek (6581 Acres)
77,293 Hectares	4th Field **HUC**	1113810002	Robinson Creek (8787 Acres)
298 Square Miles		1113810003	Doty Creek (4625 Acres)
	1113	1113810004	Billings Creek (10644 Acres)
Location	4th Field **Calwater**	1113820001	Middle Rockpile Creek (8160 Acres)
Sonoma County		1113820002	Red Rock (2217 Acres)
Mendocino County		1113820003	Lower Rockpile Creek (2945 Acres)
		1113820004	Upper Rockpile Creek (9068 Acres)
		1113830001	Flat Ridge Creek (6525 Acres)
		1113830002	Harpo Reach (2720 Acres)
		1113830003	Grasshopper Creek (5763 Acres)
		1113830004	Little Creek (5865 Acres)
		1113830005	North Fork Osser Creek (4896 Acres)
		1113840101	Tombs Creek (6233 Acres)
		1113840102	Wolf Creek (10094 Acres)
		1113840103	Buck Mountain (8183 Acres)
		1113840201	Pepperwood Creek (6237 Acres)
		1113840202	House Creek (5290 Acres)
		1113840203	Britain Creek (6704 Acres)
		1113840301	Haupt Creek (6039 Acres)
		1113840302	Flat Ridge Creek (7034 Acres)
		1113840303	Annapolis (7574 Acres)
		1113840304	Tobacco Creek (8055 Acres)
		1113850101	Upper Marshall Creek (6614 Acres)
		1113850102	Lower Marshall Creek (6012 Acres)
		1113850103	Middle South Fork Gualala Riv (7904 Acres)
		1113850104	Upper South Fork Gualala River (8397 Acres)
		1113850201	Big Pepperwood Creek (6527 Acres)
		1113850202	Mouth of Gualala River (5301 Acres)

Species Potential	Miles of Streams with Species Present
Northern California **Steelhead**	Steelhead
Central coastal Diversity Stratum	208
- Functionally Independent	NOAA Fisheries, Critical Habitat Redesignation, 2005
Central California Coast **Coho**	Coho
Navarro Pt.-Gualala Pt.Diversity Stratum	72
- Functionally Independent	CDFG, Coho Distribution, May 2007
California Coastal **Chinook**	Chinook
Central coastal Diversity Stratum	0
- Potentially Independent	NOAA Fisheries, Critical Habitat Redesignation, 2005

Critical Habitat

Northern California Steelhead	208 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)
California Coastal Chinook	0 Miles of Stream

Coho Intrinsic Potential

Km of Historical Coho IP (21.5 C mask)	252
% of IP (21.5 C Mask) with Current Coho Distribution	24%

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
Naturally Occurring Waterways	
Intermittent Stream	401
Perennial Stream	250
Artificial Path	34
Connector	1

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

Number of Dams[C]
5
1 - Impassable
1 - Not a Barrier
1 - Partial Barrier
2 - Unknow Barrier Status

[C]Passage Assessment Database,
Pacific States Marine Fisheries Commission, 2005

USGS Gaging Stations[B]
11467295
SF Gualala River above Wheatfield Fork near Annapolis
11467300
Unnamed Trib to Whearfield Fork Gualala River near Annapolis
11467500
SF Gualala River near Annapolis
11467510
SF Gualala River near The Sea Ranch
11467553
NF Gualala River above SF Gualala River near Gualala
11467560
China Gulch at Gualala
11467585
Wheatfield Fork Gualalal River above SF near Annapolis

Number of Barriers[C]
46
5 Dams
1 Road Crossings
13 Natural Barriers (Chutes, Falls, Log Jams, etc. (6 Impassable))
27 Diversions

[C]Passage Assessment Database,
Pacific States Marine Fisheries Commission, 2006

EPA Total Maximum Daily Load Classification (**TMDL**)[I]
Sediment / Siltation; Temperature, water
Sources: Distrubed Sites, Land Development; Erosion/Siltation; Harvesting, Restoration, Residue Management; Highway/Road/Bridge Construction; Logging Road Construction/Maintenance; Nonpoint Source; Silviculture; Channel Erosion; Removal of Riparian Vegetation; Streambank Modification/Destabilization
[I]State Water Resources Control Board, 2003

Average Annual Precipitation[E]	Average Annual Precipitation Range[E]
62.4"	45 - 75"

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

Roads[A]	*(US Census Bureau (TIGER))*	Miles
Roads in Watershed		
Secondary and connecting road, state highways		1
Local, neighborhood, and rural road, city street, unseparated		526
Vehicular trail, 4WD		27
Driveway or service road		6
Total Miles		

Road Density	*(US Census Bureau (TIGER))*
Miles of Roads per SqMi of Watershed	1.9
Miles of Roads per SqMi of 100m Riparian Buffer*	2.0

*Buffer is 100 meters on either side of the stream centerline
[A]U.S. Census Bureau - Tiger 2000, 2002. 1:24,000

Roads[A1]	*(Timber Harvest Plans)*	Miles
Roads in Watershed		
Abandoned Seasonal		6
Bridge		0
Existing Permanent (rocked)		175
Existing Seasonal		1054
Existing Temporary & 4WD		155
Proposed Permanent (rocked)		2
Proposed Seasonal		21
Proposed Temporary & 4WD		2
Reconstructed Seasonal		
Secondary Road (2-3 lanes)		1

Road Density	*(Timber Harvest Plans)*	
Miles of Roads per SqMi of Watershed		4.8
Miles of Roads per SqMi of 100m Riparian Buffer*		4.1

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

[A1]California Department of Forestry, Timber Harvest Plans for Gualala Watershed, 2006

Slope[D]	Acres	Percent of watershed
Lands of 0-2 percent slope	1,575	1%
Lands of 2-4 percent slope	2,363	1%
Lands of 4-10 percent slope	9,092	5%
Lands of 10-15 percent slope	8,570	4%
Lands of 15-30 percent slope	35,961	19%
Lands of 30-60 percent slope	100,572	53%
Lands of 60-100 percent slope	32,049	17%
Lands of 100-252 percent slope	814	0%
Elevation Range	0 - 2661 ft.	0 - 811 m

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

Vegetation[G]	Acres	Percent of watershed
Agriculture	581	0%
Annual grassland	30,033	16%
Barren	178	0%
Conifer Forest		
Closed Cone-Pine-Cypress	2,876	2%
Douglas Fir	21,506	11%
Montane Hardwood-Conifer	5,006	3%
Redwood	68,900	36%
Hardwood Forest		
Montane Hardwood	59,387	31%
Montane Riparian	67	0%
Hardwood Woodland		
Coastal Oak Woodland	1,152	1%
Shrub	759	0%
Urban	551	0%
Water	138	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
0	22,389	12%
4	11,880	6%
5	21,031	11%
6	36,625	19%
7	44,004	23%
8	55,066	29%

[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	190,773	100%
State (Parks & Recreation)	38	0%
Fedral (BIA)	180	0%

[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 **15** years (1991-2006)	
24,043	13% of watershed	56,294	29% of watershed

[A]California Department of Forestry, Timber Harvest Plans for Ten Mile Watershed, 2006

Population[I]

Total Population within the watershed -- 1,497 People

Housing[I]

Total Housing Units within the watershed -- 883 Houses

Housing Density	
0 to Less than 1 Housing Unit / 160 Acres	87%
1 Unit / 160 Acres to 1 Unit / 20 Acres	11%
1 Unit / 20 Acres to 1 Unit / 5 Acres	2%
1 Unit / 5 Acres to 2 Units / Acre	
2 Units / Acres to Greater than or Equal to 5 Units / Acre	

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

Gualala River

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	578.2	180.4					30,023.3		538.7	140.8		
	S			2.5		7.4							
	P					2.5							
	M			2.5		12.4							
	D			24.7		56.8							
	Total	578.2	180.4	29.7		79.1		30023.3		538.7	140.8		31570
Seedling													
	S												
	P												
	M												
	D												
	Total												0
Sapling													
	S			1,539.5		3,306.3							
	P			1,171.3		4,472.6	24.7						
	M			1,843.4		8,038.3	46.9						
	D			6,911.5		8,685.7	98.8						
	Total			11465.7		24502.9	170.5						36139
Pole													
	S			741.3		296.5							
	P			1,003.2		563.4	2.5						
	M			1,759.4		1,186.1	4.9						
	D			12,234.2		4,979.2	299.0						
	Total			15738.1		7025.2	306.4						23070
Small Tree													
	S			345.9		565.9							
	P			598.0		1,317.1	17.3						
	M			1,013.1		2,535.3	44.5						
	D			11,994.5		13,489.5	605.4		746.3				
	Total			13951.5		17907.7	667.2		746.3				33273
Medium/Large Tree													
	S			2,253.6		126.0							
	P			1,920.0		215.0							
	M			4,193.4		832.7							
	D			17,524.7		8,717.9							
	Total			25891.7		9891.6							35783
Multi Layered													
	D			31,152.5									
	Total			31152.5									31153
Grand Total by Species Type		578	180	98229	0	59407	1144	30023	746	539	141	0	190987

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	0%	0%					16%		0%	0%		
	S												
	P												
	M			0%		0%							
	D			0%		0%							
	Total	0%	0%	0%		0%		16%		0%	0%		17%
Seedling													
	S												
	P												
	M												
	D												
	Total												0%
Sapling													
	S			1%		2%							
	P			1%		2%							
	M			1%		4%	0%						
	D			4%		5%	0%						
	Total			6%		13%	0%						19%
Pole													
	S			0%		0%							
	P			1%		0%							
	M			1%		1%							
	D			6%		3%	0%						
	Total			8%		4%	0%						12%
Small Tree													
	S			0%		0%							
	P			0%		1%							
	M			1%		1%	0%						
	D			6%		7%	0%		1%				
	Total			7%		9%	0%		1%				18%
Medium/Large Tree													
	S			1%		0%							
	P			1%		0%							
	M			2%		0%							
	D			9%		5%							
	Total			14%		5%							19%
Multi Layered													
	D			16%									
	Total			16%									16%
Grand Total by Species Type		0%	0%	51%	0%	31%	1%	16%	1%	0%	0%	0%	101%

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.	Crown Decadence
Not Determined	N/A
Seedling Shrub	Seedlings or sprouts < 3 years
Young Shrub	None
Mature Shrub	1 - 25%
Decadent Shrub	> 25%

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

Gualala River

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	71.7	93.9					5317.7		123.6	84.0		
	S												
	P												
	M			2.5		2.5							
	D			14.8		12.4							
	Total	71.7	93.9	17.3		14.8		5317.7		123.6	84.0		5723
Seedling													
	S												
	P												
	M												
	D												
	Total												0
Sapling													
	S			388.0		911.8							
	P			261.9		1282.5							
	M			514.0		2238.8	14.8						
	D			2238.8		2760.2	24.7						
	Total			3402.6		7193.2	39.5						10635
Pole													
	S			296.5		86.5							
	P			343.5		158.1							
	M			543.6		341.0							
	D			4529.4		1692.7	113.7						
	Total			5713.1		2278.3	113.7						8105
Small Tree													
	S			108.7		145.8							
	P			185.3		360.8							
	M			299.0		746.3	7.4						
	D			3447.1		3335.9	200.2		131.0				
	Total			4040.2		4588.7	207.6		131.0				8967
Medium/Large Tree													
	S			741.3		29.7							
	P			620.2		59.3							
	M			1388.7		276.8							
	D			4536.8		3214.8							
	Total			7287.1		3580.6							10868
Multi Layered													
	D			8787.1									
	Total			8787.1									8787
Grand Total by Species Type		72	94	29247	0	17656	361	5318	131	124	84	0	53086

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	0%	0%					10%		0%	0%		
	S												
	P												
	M			0%		0%							
	D			0%		0%							
	Total	0%	0%	0%		0%		10%		0%	0%		11%
Seedling													
	S												
	P												
	M												
	D												
	Total												0%
Sapling													
	S			1%		2%							
	P			0%		2%							
	M			1%		4%	0%						
	D			4%		5%	0%						
	Total			6%		14%	0%						20%
Pole													
	S			1%		0%							
	P			1%		0%							
	M			1%		1%							
	D			9%		3%	0%						
	Total			11%		4%	0%						15%
Small Tree													
	S			0%		0%							
	P			0%		1%							
	M			1%		1%	0%						
	D			6%		6%	0%		0%				
	Total			8%		9%	0%		0%				17%
Medium/Large Tree													
	S			1%		0%							
	P			1%		0%							
	M			3%		1%							
	D			9%		6%							
	Total			14%		7%							20%
Multi Layered													
	D			17%									
	Total			17%									17%
Grand Total by Species Type		0%	0%	55%	0%	33%	1%	10%	0%	0%	0%	0%	100%

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.	Crown Decadence
Not Determined	N/A
Seedling Shrub	Seedlings or sprouts < 3 years
Young Shrub	None
Mature Shrub	1 - 25%
Decadent Shrub	> 25%

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

Gualala River Watershed

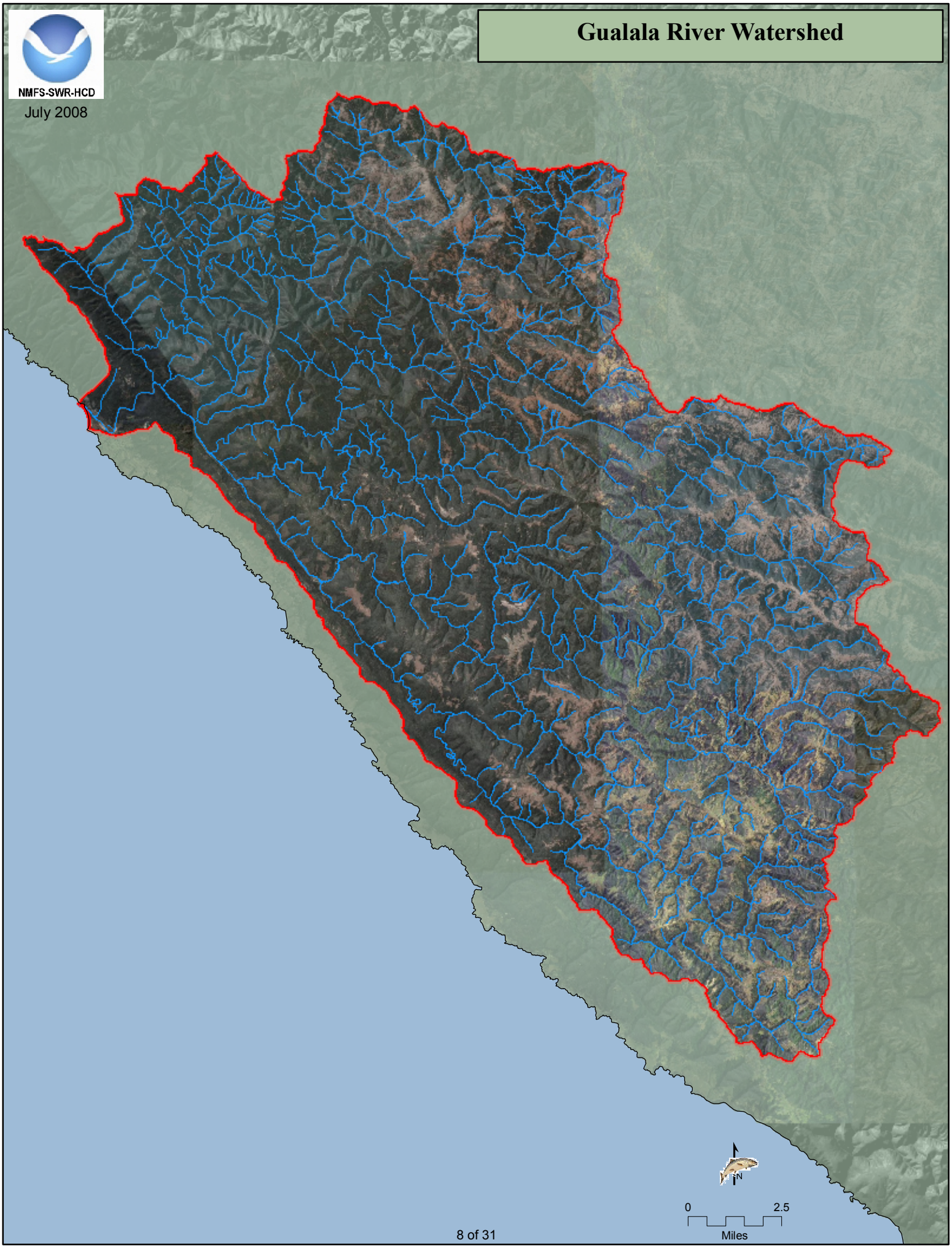
NMFS-SWR-HCD

July 2008

Gualala River Watershed

NMFS-SWR-HCD

July 2008



Gualala River Watershed
CalWater Planning Watersheds

NMFS-SWR-HCD

July 2008

Gualala River Watershed
Fish Distribution and Critical Habitat

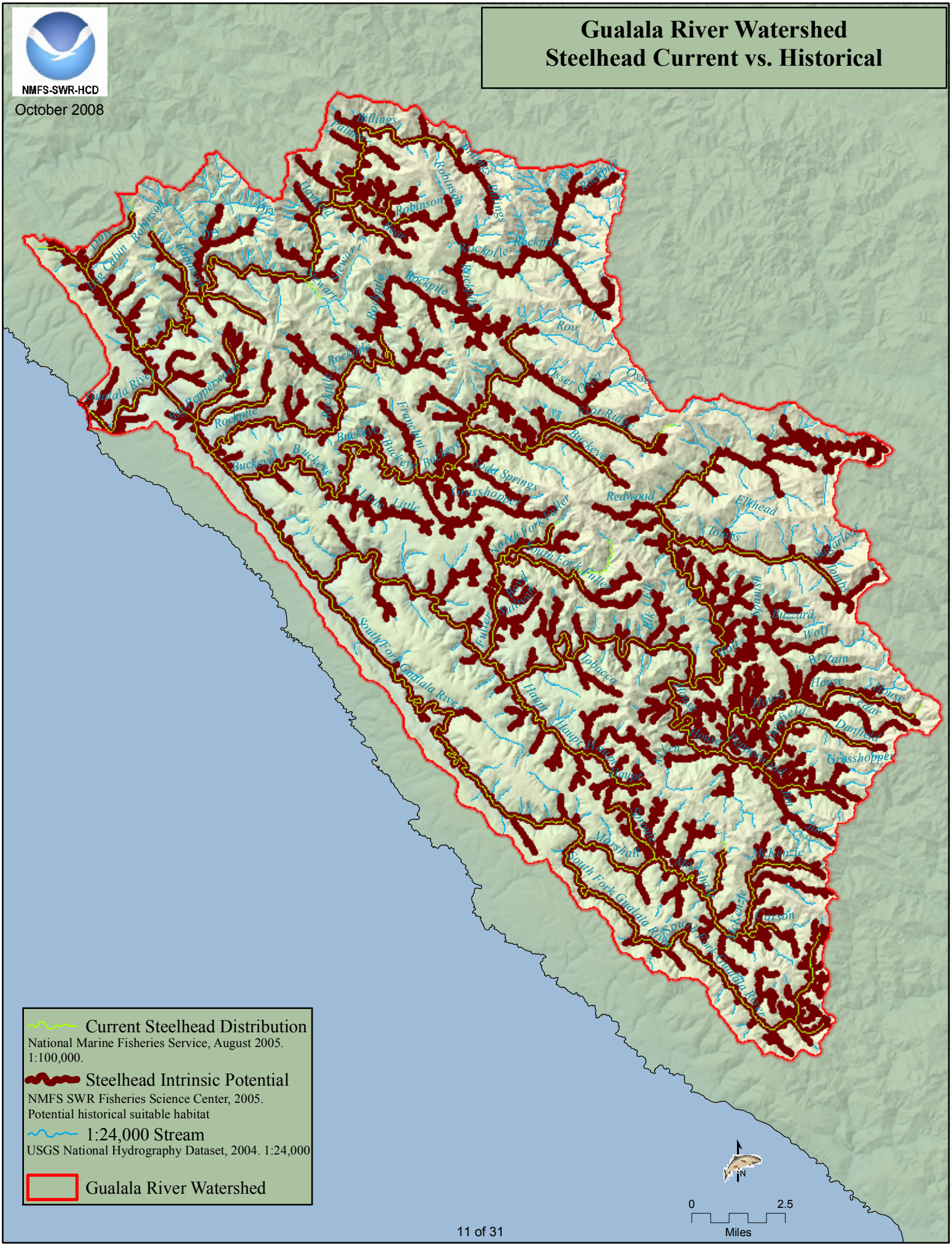
NMFS-SWR-HCD

September 2009

Gualala River Watershed
Steelhead Current vs. Historical

NMFS-SWR-HCD

October 2008



Gualala River Watershed
Coho Current vs. Historical

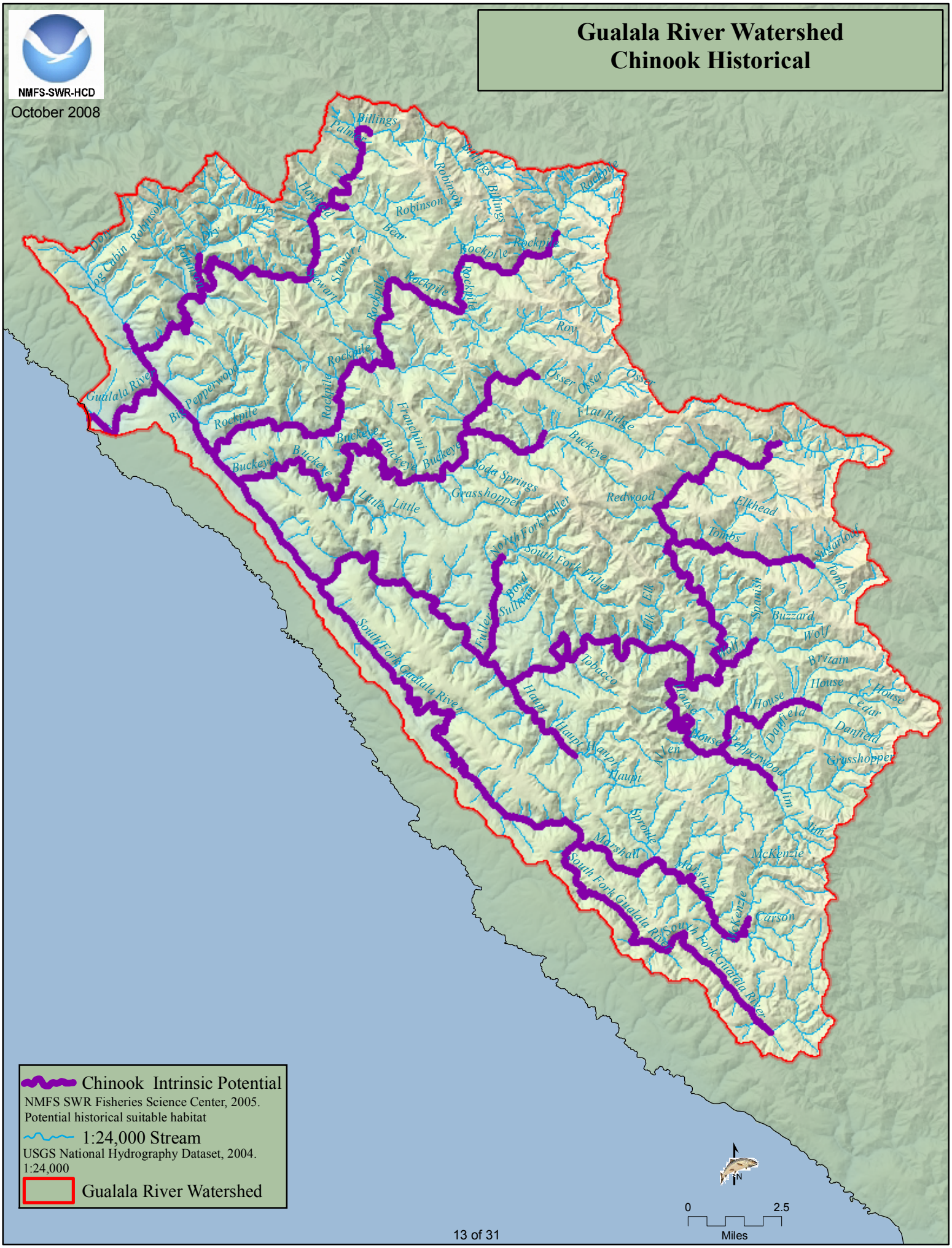
NMFS-SWR-HCD

September 2009

Gualala River Watershed
Chinook Historical

NMFS-SWR-HCD

October 2008



Gualala River Watershed Elevation

NMFS-SWR-HCD

October 2008

Gualala River Elevation (Meters)

High : 811

Low : 0

USGS
10 Meter Digital
Elevation
Model (DEM)

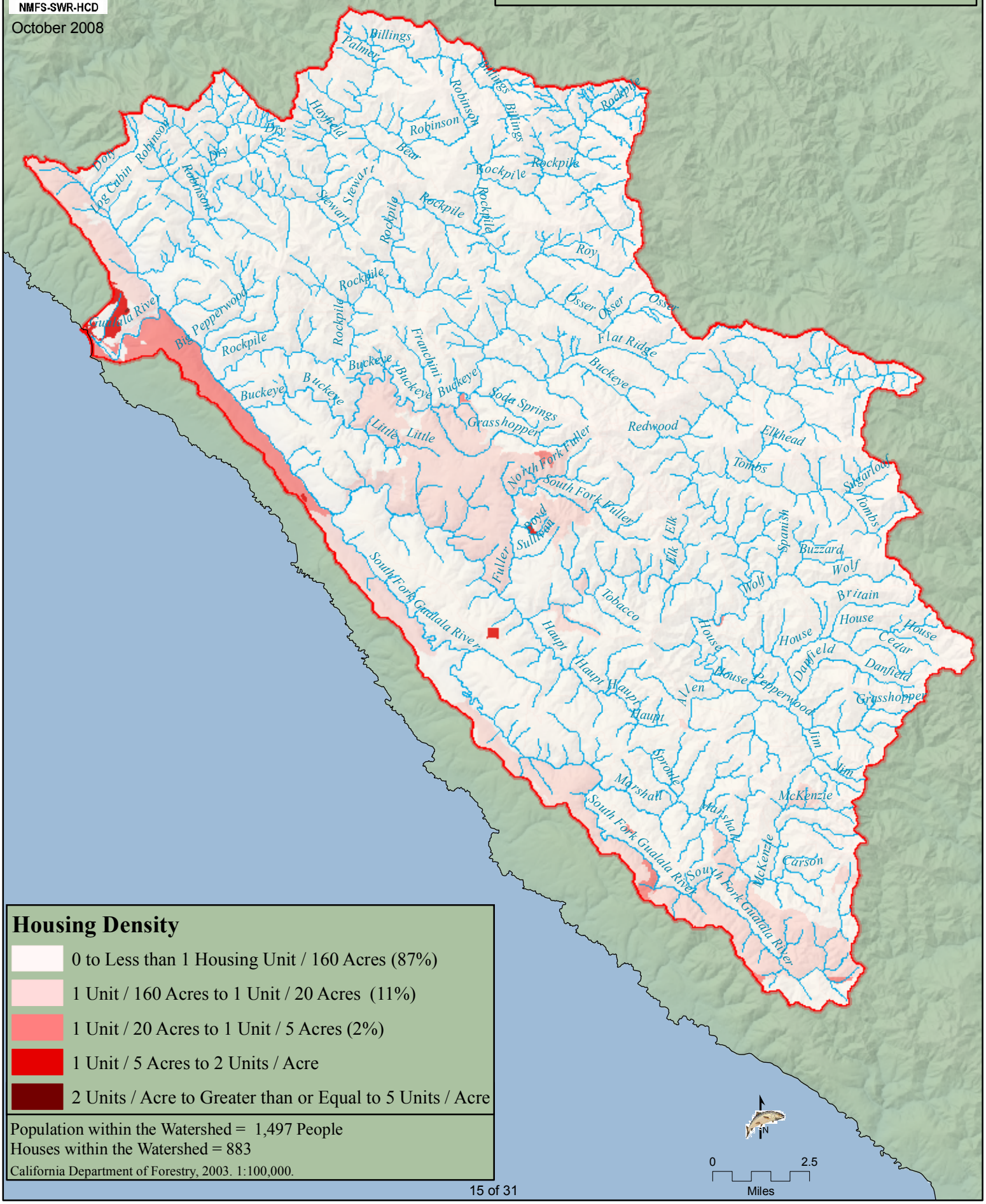
N

0 2.5
Miles

Gualala River Watershed Development

NMFS-SWR-HCD

October 2008



Housing Density

- 0 to Less than 1 Housing Unit / 160 Acres (87%)
- 1 Unit / 160 Acres to 1 Unit / 20 Acres (11%)
- 1 Unit / 20 Acres to 1 Unit / 5 Acres (2%)
- 1 Unit / 5 Acres to 2 Units / Acre
- 2 Units / Acre to Greater than or Equal to 5 Units / Acre

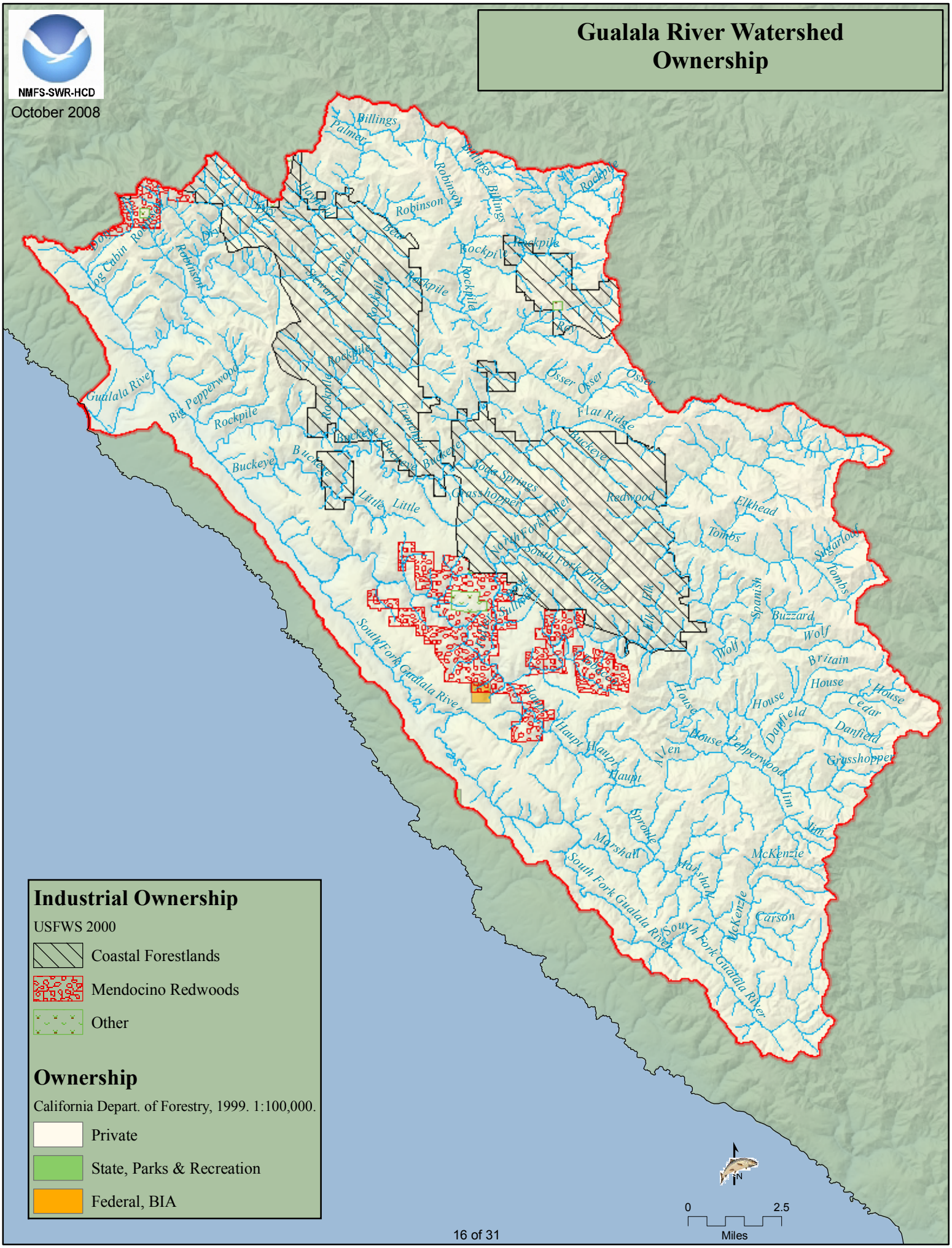
Population within the Watershed = 1,497 People
Houses within the Watershed = 883

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

Gualala River Watershed Ownership

NMFS-SWR-HCD

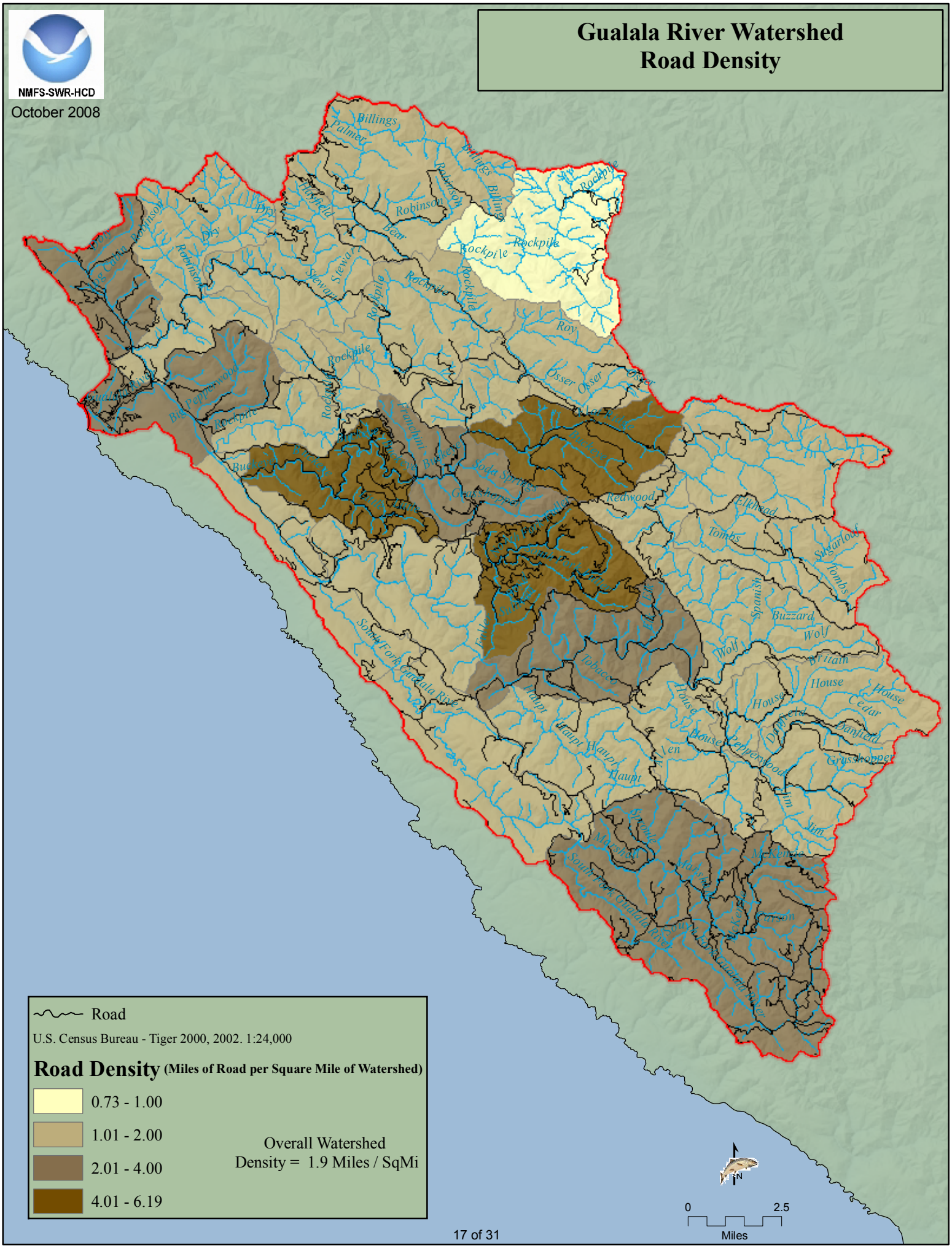
October 2008



Gualala River Watershed
Road Density

NMFS-SWR-HCD

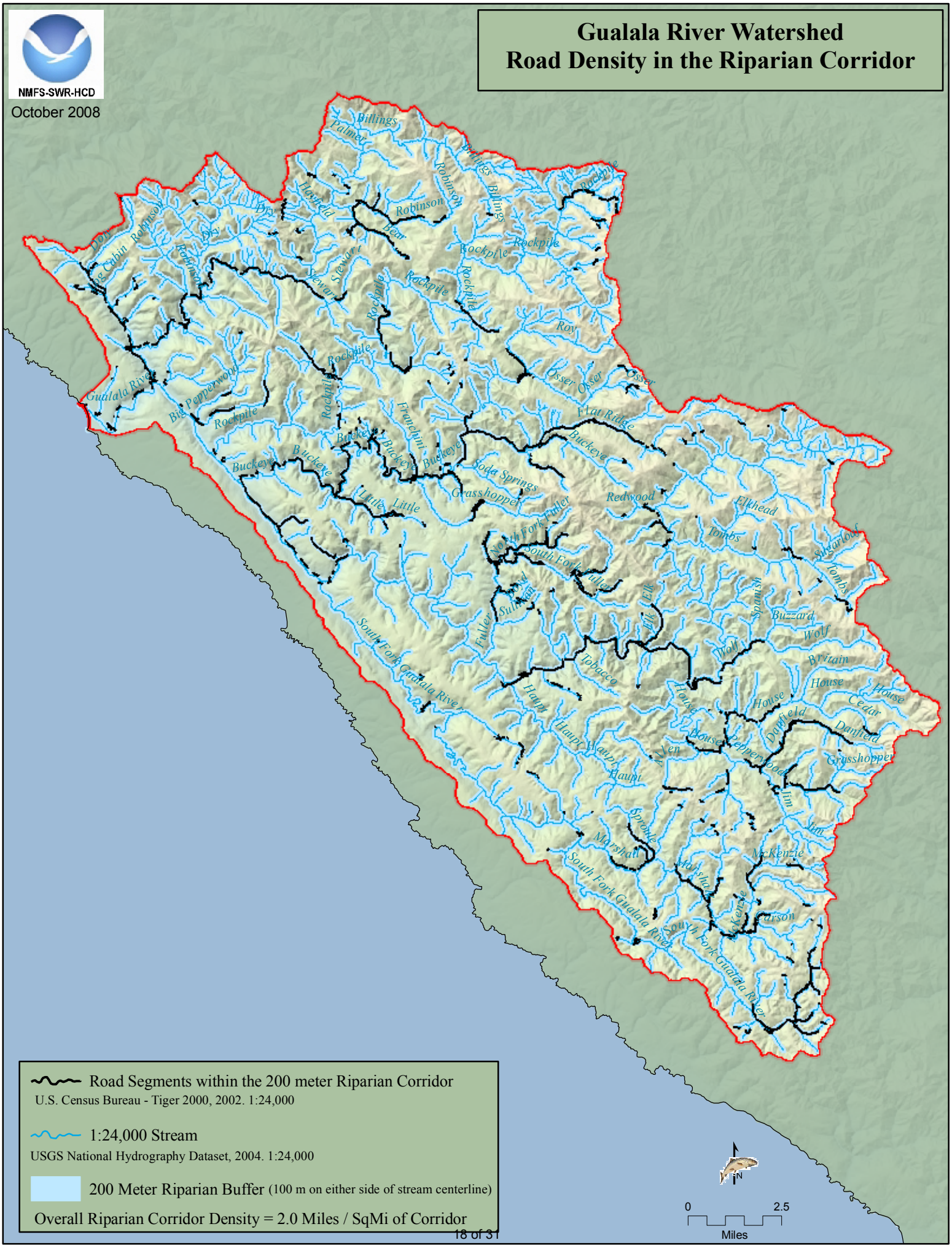
October 2008



Gualala River Watershed
Road Density in the Riparian Corridor

NMFS-SWR-HCD

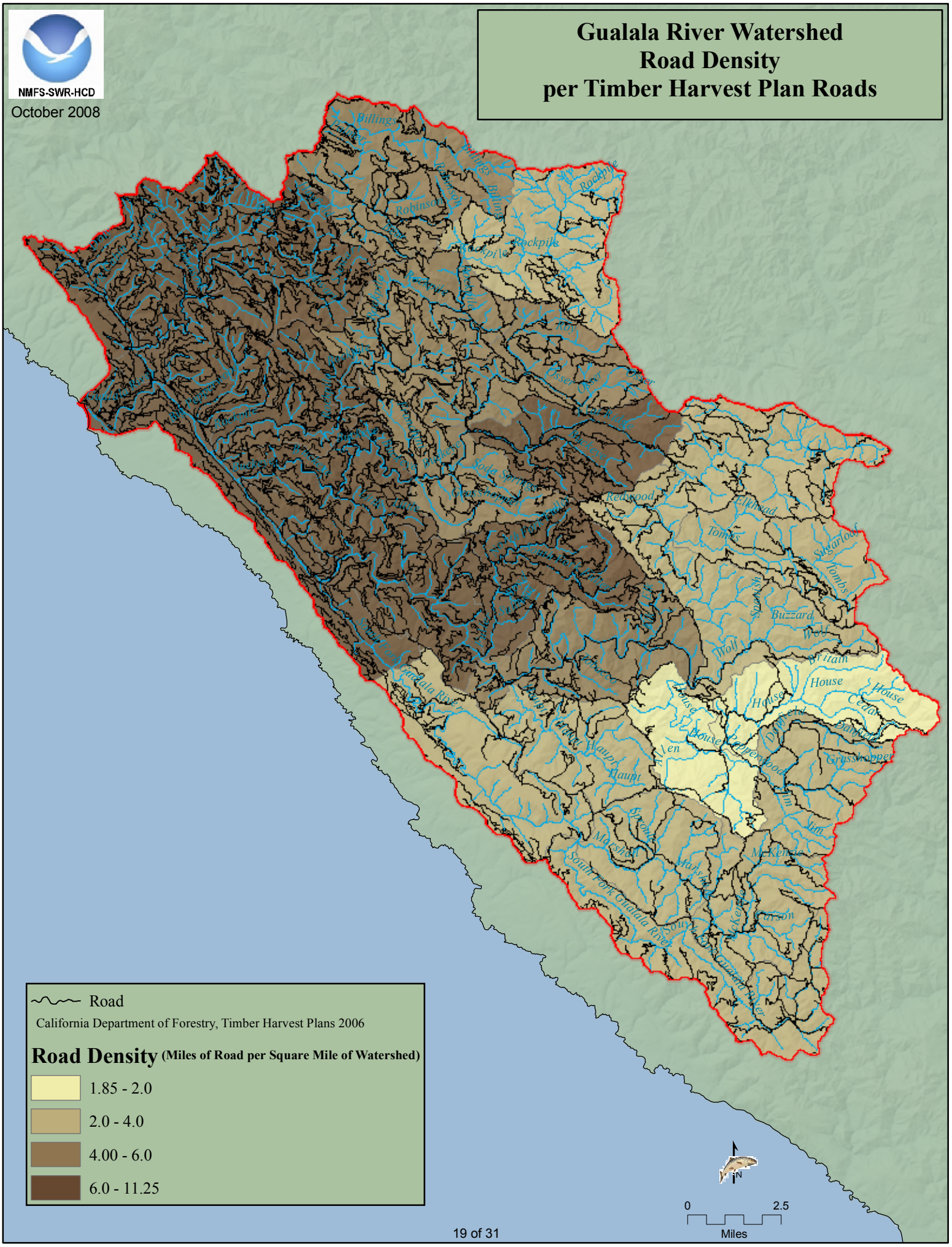
October 2008



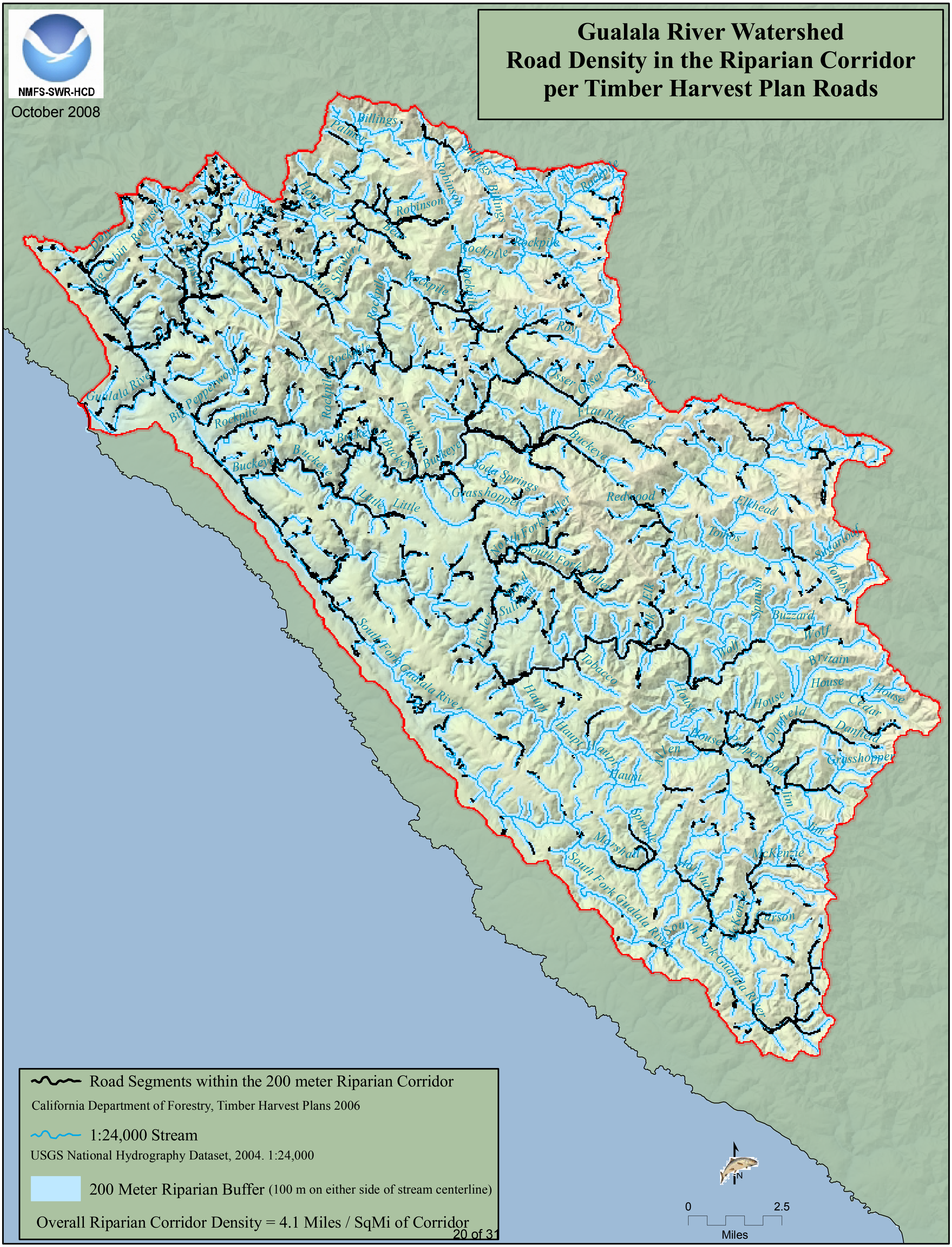
Gualala River Watershed
Road Density
per Timber Harvest Plan Roads

NMFS-SWR-HCD

October 2008



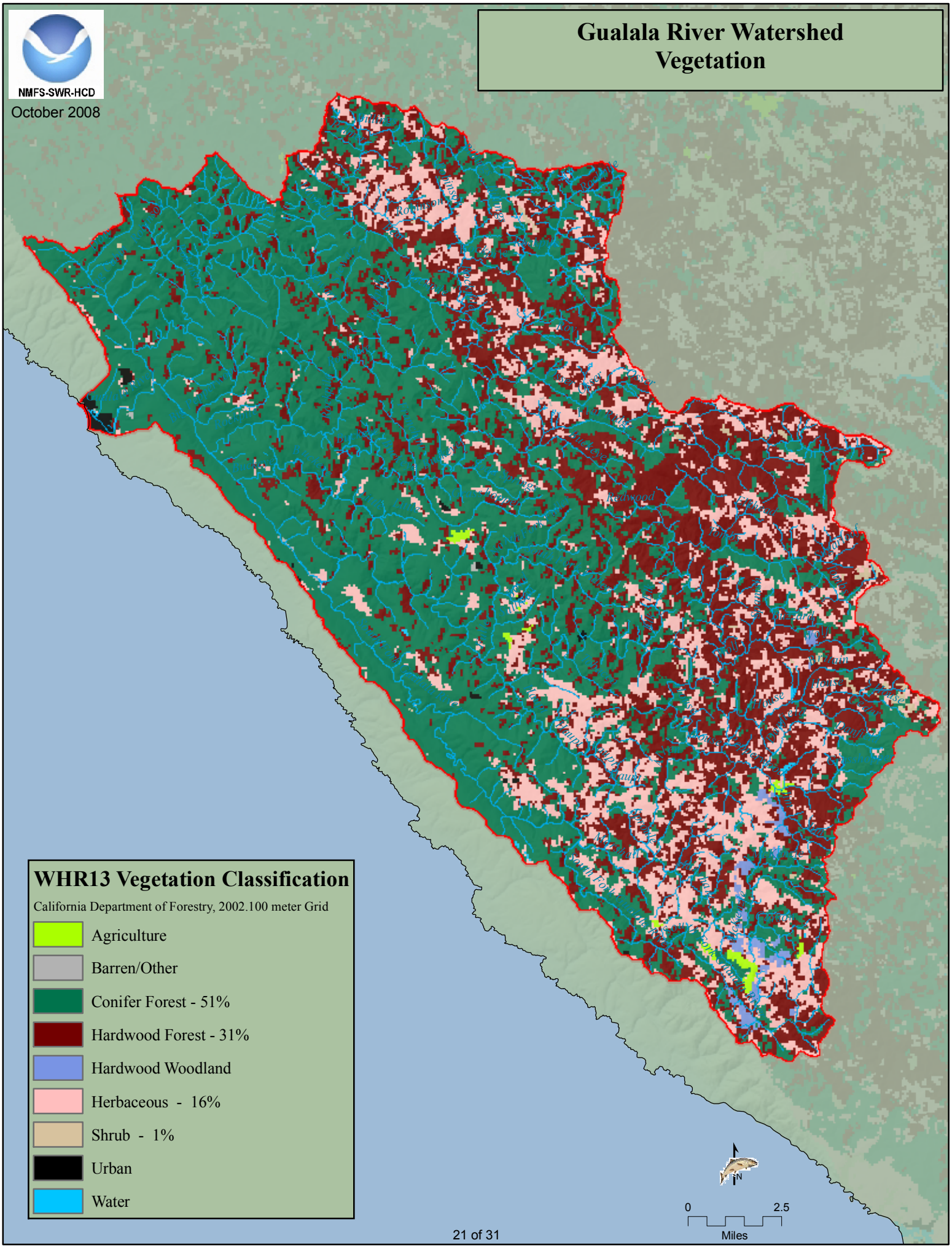
Gualala River Watershed Road Density in the Riparian Corridor per Timber Harvest Plan Roads



Gualala River Watershed Vegetation

NMFS-SWR-HCD

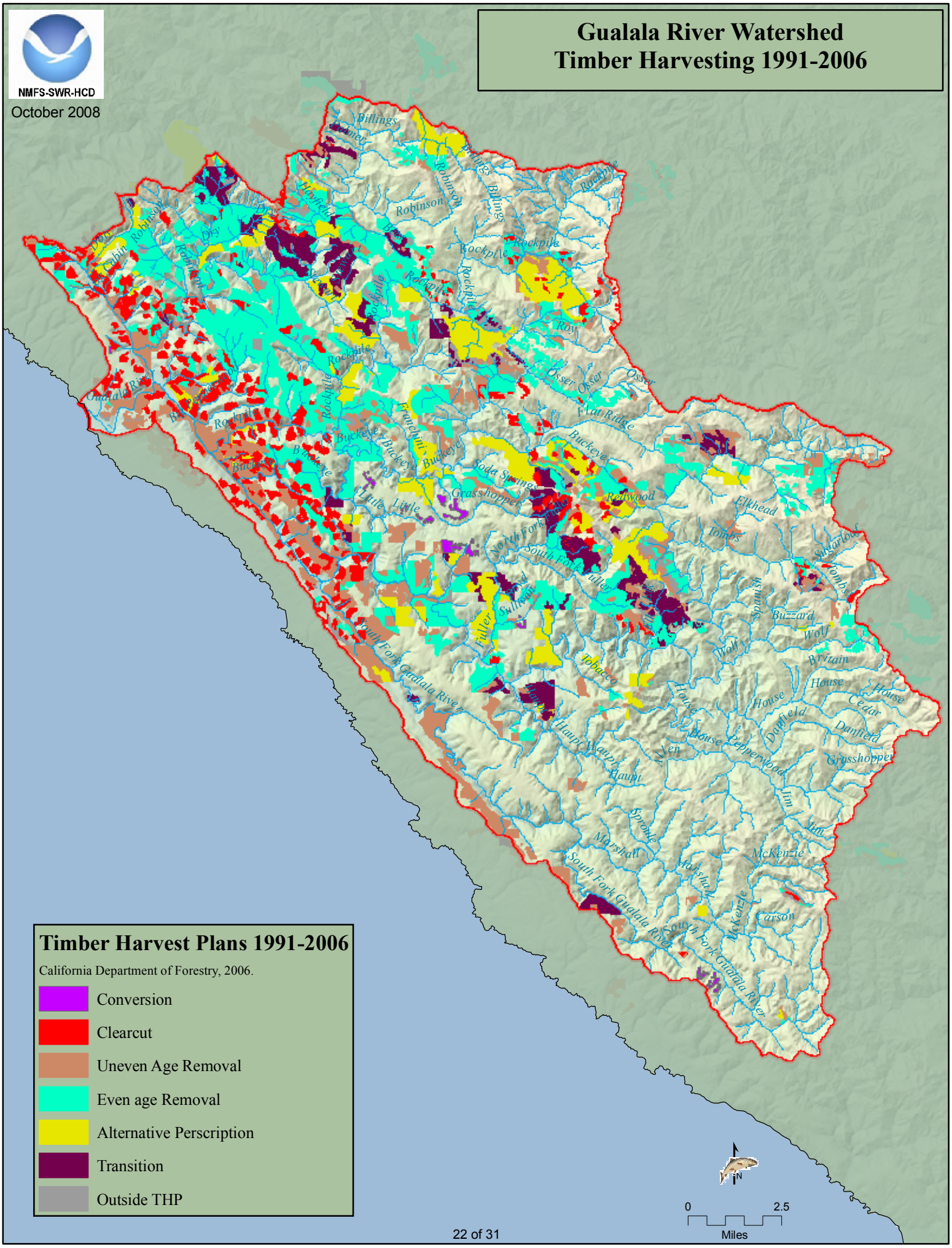
October 2008



Gualala River Watershed
Timber Harvesting 1991-2006

NMFS-SWR-HCD

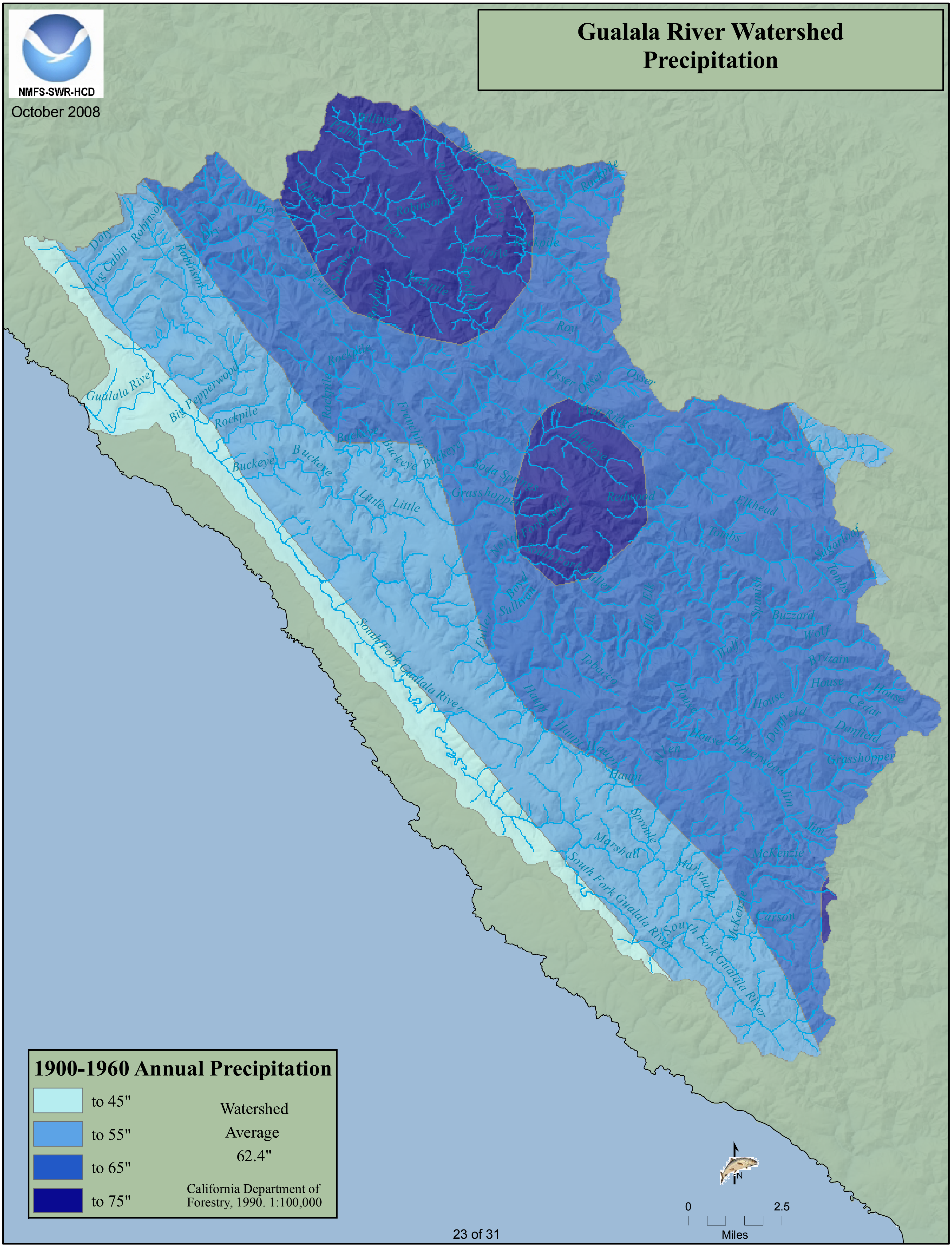
October 2008



Gualala River Watershed Precipitation

NMFS-SWR-HCD

October 2008



1900-1960 Annual Precipitation

- to 45"
- to 55"
- to 65"
- to 75"

Watershed Average 62.4"

California Department of Forestry, 1990. 1:100,000

Gualala River Watershed Flood Zone

NMFS-SWR-HCD

October 2008

FEMA Flood Zones

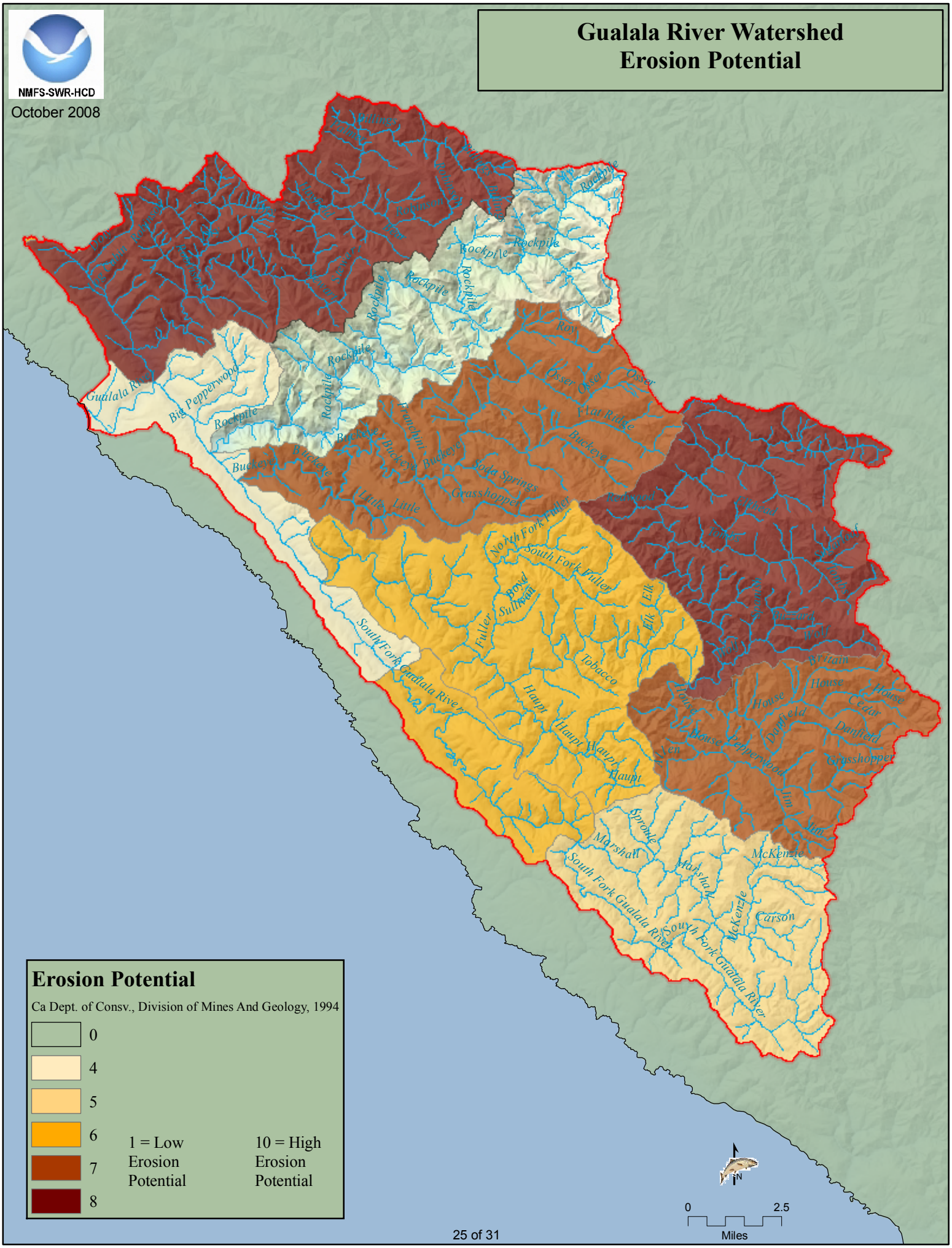
FEMA, 1996. 1:24,000

- 100 Year Flood Zone
- 500 Year Flood Zone

Gualala River Watershed
Erosion Potential

NMFS-SWR-HCD

October 2008



Erosion Potential

Ca Dept. of Consv., Division of Mines And Geology, 1994

- 0
- 4
- 5
- 6
- 7
- 8

1 = Low Erosion Potential

10 = High Erosion Potential

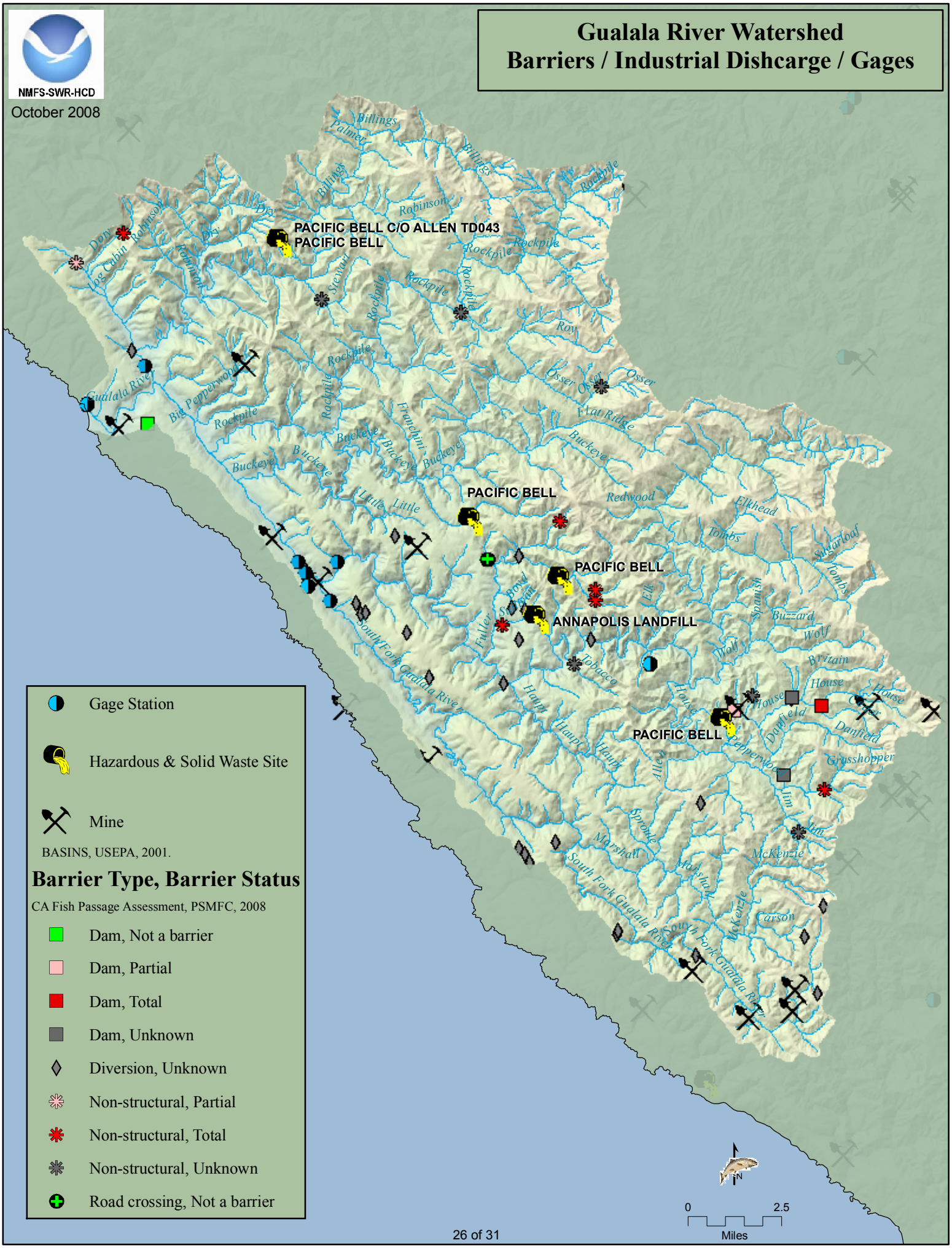
N

0 2.5 Miles

Gualala River Watershed
Barriers / Industrial Dishcarge / Gages

NMFS-SWR-HCD

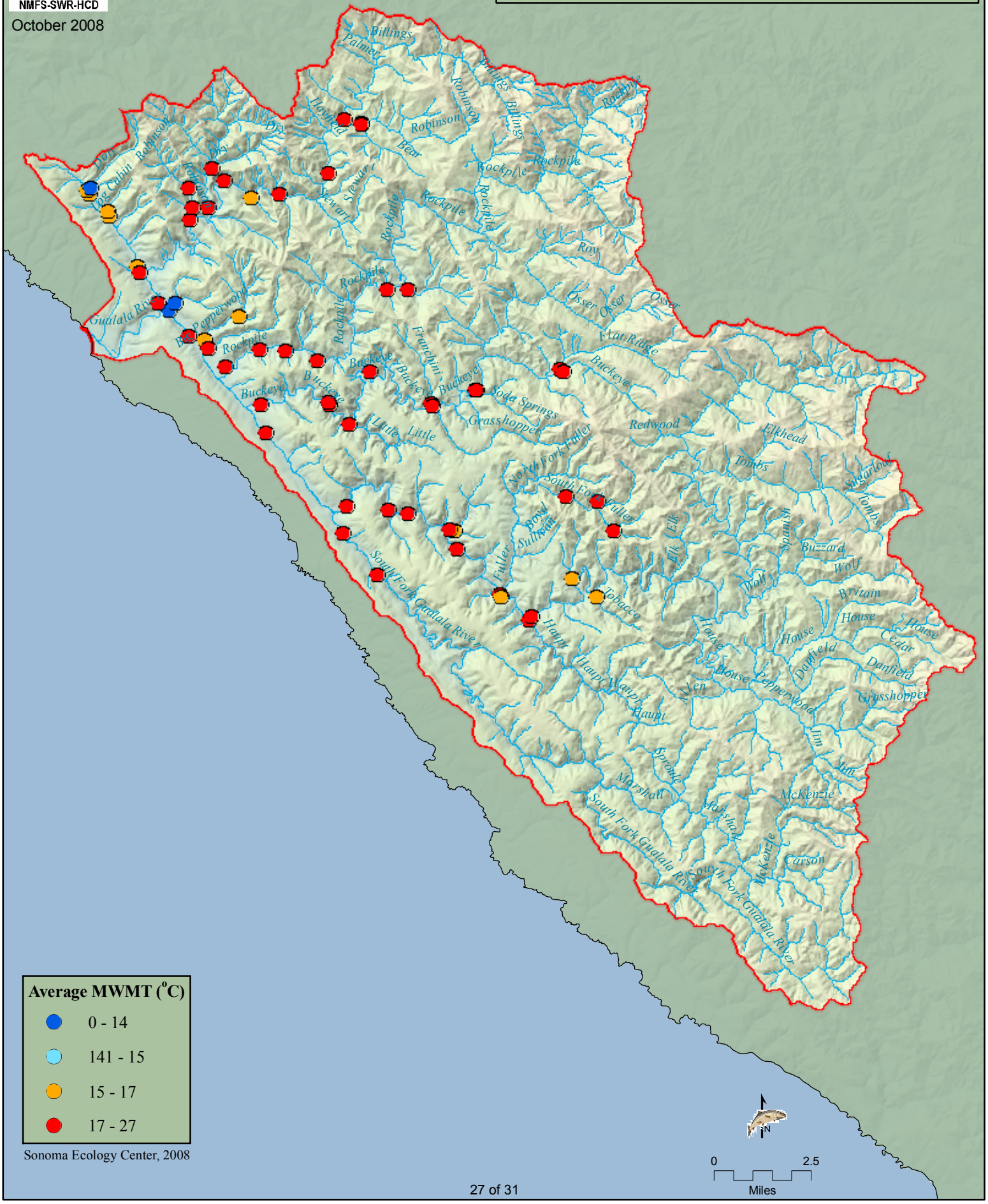
October 2008



Gualala River Watershed Temperature

NMFS-SWR-HCD

October 2008



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