



NMFS-SWR-HCD

*Big River Watershed*

| Area             | Hydrologic Units   | Calwater Subbasins --- | (Planning Watersheds)                         |
|------------------|--------------------|------------------------|---|
| 115,888 Acres    | 18010108           | 1113300101             | Dark Gulch (7151 Acres)                       |
| 46,898 Hectares  | 4th Field HUC      | 1113300102             | South Daugherty Creek (10659 Acres)           |
| 181 Square Miles |                    | 1113300103             | Mettick Creek (11724 Acres)                   |
|                  | 1113               | 1113300104             | Leonaro Lake (5325 Acres)                     |
| <b>Location</b>  | 4th Field Calwater | 1113300201             | Martin Creek (5940 Acres)                     |
| Mendocino County |                    | 1113300202             | Russell Brook (7011 Acres)                    |
|                  |                    | 1113300203             | Rice Creek (8033 Acres)                       |
|                  |                    | 1113300301             | James Creek (4456 Acres)                      |
|                  |                    | 1113300302             | Chamberlain Creek (7863 Acres)                |
|                  |                    | 1113300303             | East Branch North Fork Big River (5156 Acres) |
|                  |                    | 1113300304             | Lower North Fork Big River (4950 Acres)       |
|                  |                    | 1113300305             | Upper North Fork Big River (5416 Acres)       |
|                  |                    | 1113300401             | Laguna Creek (3244 Acres)                     |
|                  |                    | 1113300402             | Berry Gulch (7993 Acres)                      |
|                  |                    | 1113300403             | Mouth of Big River (9542 Acres)               |
|                  |                    | 1113300406             | Two Log Creek (11424 Acres)                   |

| Species Potential  | Miles of Streams with Species Present   |
|--|---|
| Northern California <b>Steelhead</b><br>North-Central Coastal Diversity Stratum<br>- Independent Population    | <u>Steelhead</u><br>147<br>NOAA Fisheries, Critical Habitat Redesignation, 2005 |
| Central California Coast <b>Coho</b><br>Lost Coast-Navarro Point Diversity Stratum<br>- Independent Population | <u>Coho</u><br>111<br>CDFG, Coho Distribution, May 2007                         |
| California Coastal Chinook<br>North-Central Coastal Diversity Stratum<br>- Independent Population              | <u>Chinook</u><br>35<br>NOAA Fisheries, Critical Habitat Redesignation, 2005    |

| Critical Habitat              | Miles of Stream   |
|-------------------------------|---|
| Northern California Steelhead | 147 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    | 35 Miles of Stream  |

| Miles of Waterway <sup>A</sup> | Miles | Number of Dams <sup>C</sup> |
|--------------------------------|-------|-----------------------------|
| Naturally Occurring Waterways  |       | 4                           |
| Intermittent Stream            | 283   | 1 - Impassable              |
| Perennial Stream               | 183   | 0 - Not a Barrier           |
| Artificial Path                | 10    | 0 - Temporal Barriers       |
|                                |       | 3 - Unknow Barrier Status   |

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

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

| USGS Gaging Stations <sup>B</sup>                           | Number of Barriers <sup>C</sup>                               |
|---|---|
| Big River Below Two Log Creek near Comptche<br>USGS11468092 | 63<br>4 Dams (1 Impassable)                                   |
| South Fork Big River Near Comptche<br>USGS11468070          | 7 Water Rights Diversions<br>39 Road Crossings (7 Impassable) |

<sup>C</sup>Passage Assessment Database,  
Pacific States Marine Fisheries Commission, 2006



EPA Total Maximum Daily Load Classification (TMDL)<sup>1</sup>

High Priority- Sedimentation/Siltation, Water Temperature

Sources: Disturbed Sites; Logging Roads; Silviculture; Nonpoint Sources; Road Construction; Drainage/Filling of Wetlands; Erosion/Siltation

Habitat Modification; Removal of Riparian Vegetation; Streambank Modification/Destabilization

<sup>1</sup>State Water Resources Control Board, 2003

Average Annual Precipitation<sup>E</sup>

55.5"

Average Annual Precipitation Range<sup>E</sup>

40 - 65"

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

| Roads <sup>A</sup>  | (US Census Bureau (TIGER)) | Miles |
|---|----------------------------|-------|
| Roads in Watershed  |                            |       |
| Primary Road / Highway  |                            | 0     |
| Secondary and connecting road, state highways                 |                            | 15    |
| Local, neighborhood, and rural road, city street, unseparated |                            | 400   |
| Vehicular trail, 4WD  |                            | 13    |
| Driveway or service road                                      |                            | 3     |

| Road Density                                     | (US Census Bureau (TIGER)) |     |
|--|----------------------------|-----|
| Miles of Roads per SqMi of Watershed             |                            | 2.4 |
| Miles of Roads per SqMi of 100m Riparian Buffer* |                            | 3.1 |

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

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

| Roads <sup>A1</sup>         | (Timber Harvest Plans) | Miles |
|-----------------------------|------------------------|-------|
| Roads in Watershed          |                        |       |
| Abandoned Seasonal          |                        | 7     |
| Bridge                      |                        | 2     |
| Existing Permanent (rocked) |                        | 162   |
| Existing Seasonal           |                        | 872   |
| Existing Temporary & 4WD    |                        | 48    |
| Proposed Permanent (rocked) |                        |       |
| Proposed Seasonal           |                        | 18    |
| Proposed Temporary & 4WD    |                        | 4     |
| Reconstructed Seasonal      |                        |       |
| Secondary Road (2-3 lanes)  |                        | 36    |

| Road Density                                     | (Timber Harvest Plans) |     |
|--|------------------------|-----|
| Miles of Roads per SqMi of Watershed             |                        | 6.3 |
| Miles of Roads per SqMi of 100m Riparian Buffer* |                        | 8.7 |

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

<sup>A1</sup>California Department of Forestry, Timber Harvest Plans for Big Watershed, 2006

| Slope <sup>D</sup>             | Acres  | Percent of watershed |
|--------------------------------|--------|----------------------|
| Lands of 0-2 percent slope     | 1,372  | 1%                   |
| Lands of 2-4 percent slope     | 1,171  | 1%                   |
| Lands of 4-10 percent slope    | 3,472  | 3%                   |
| Lands of 10-15 percent slope   | 3,835  | 3%                   |
| Lands of 15-30 percent slope   | 23,313 | 20%                  |
| Lands of 30-60 percent slope   | 63,927 | 55%                  |
| Lands of 60-100 percent slope  | 18,038 | 16%                  |
| Lands of 100-117 percent slope | 766    | 1%                   |

| Elevation Range | 13-2812 ft. | 4-857 m |
|-----------------|-------------|---------|
|-----------------|-------------|---------|

<sup>D</sup>Slope derived from USGS 10 meter Digital Elevation Models (DEM's)



| Vegetation <sup>G</sup>   | Acres  | Percent of watershed |
|---------------------------|--------|----------------------|
| Barren                    | 20     | 0%                   |
| Annual grassland          | 6,993  | 6%                   |
| Conifer Forest            |        |                      |
| Closed Cone -Pine-Cypress | 381    | 0%                   |
| Douglas Fir               | 8,211  | 7%                   |
| Montane Hardwood-Conifer  | 4,940  | 4%                   |
| Redwood                   | 74,675 | 64%                  |
| Hardwood Forest           |        |                      |
| Montane Hardwood          | 17,016 | 15%                  |
| Montane Hardwood Riparian | 178    | 0%                   |
| Hardwood Woodland         |        |                      |
| Coastal Oak Woodland      | 161    | 0%                   |
| Shrub                     | 3,153  | 3%                   |
| Urban                     | 0      | 0%                   |
| Water                     | 114    | 0%                   |
| Wetland                   | 114    | 0%                   |

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

| Erodability of Watershed <sup>F</sup> | Acres  | Percent of watershed |
|---------------------------------------|--------|----------------------|
| Ranking = 5                           | 32,148 | 28%                  |
| Ranking = 8                           | 62,698 | 54%                  |
| Ranking = 9                           | 20,984 | 18%                  |

<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]

| Land Ownership <sup>H</sup> | Acres  | Percent of watershed |
|-----------------------------|--------|----------------------|
| Private                     | 89,147 | 77%                  |
| State (Forestry)            | 24,047 | 21%                  |
| State (Parks & Recreation)  | 1,481  | 1%                   |
| State (Other)               | 38     | 0%                   |
| Federal (BLM)               | 1,176  | 1%                   |

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

| Area Under a Timber Harvest Plan <sup>A</sup> past 10 years | Area Under a Timber Harvest Plan <sup>A</sup> past 20 years |
|---|---|
| 16,556 Acres<br>14% of watershed                            | 50,030 Acres<br>43% of watershed                            |

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

| Population <sup>I</sup>                             | Housing <sup>I</sup>                                       |
|---|--|
| Total Population within the watershed -- 564 People | Total Housing Units within the watershed -- 288 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 |
|   | 93%  |
|   | 6%   |

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

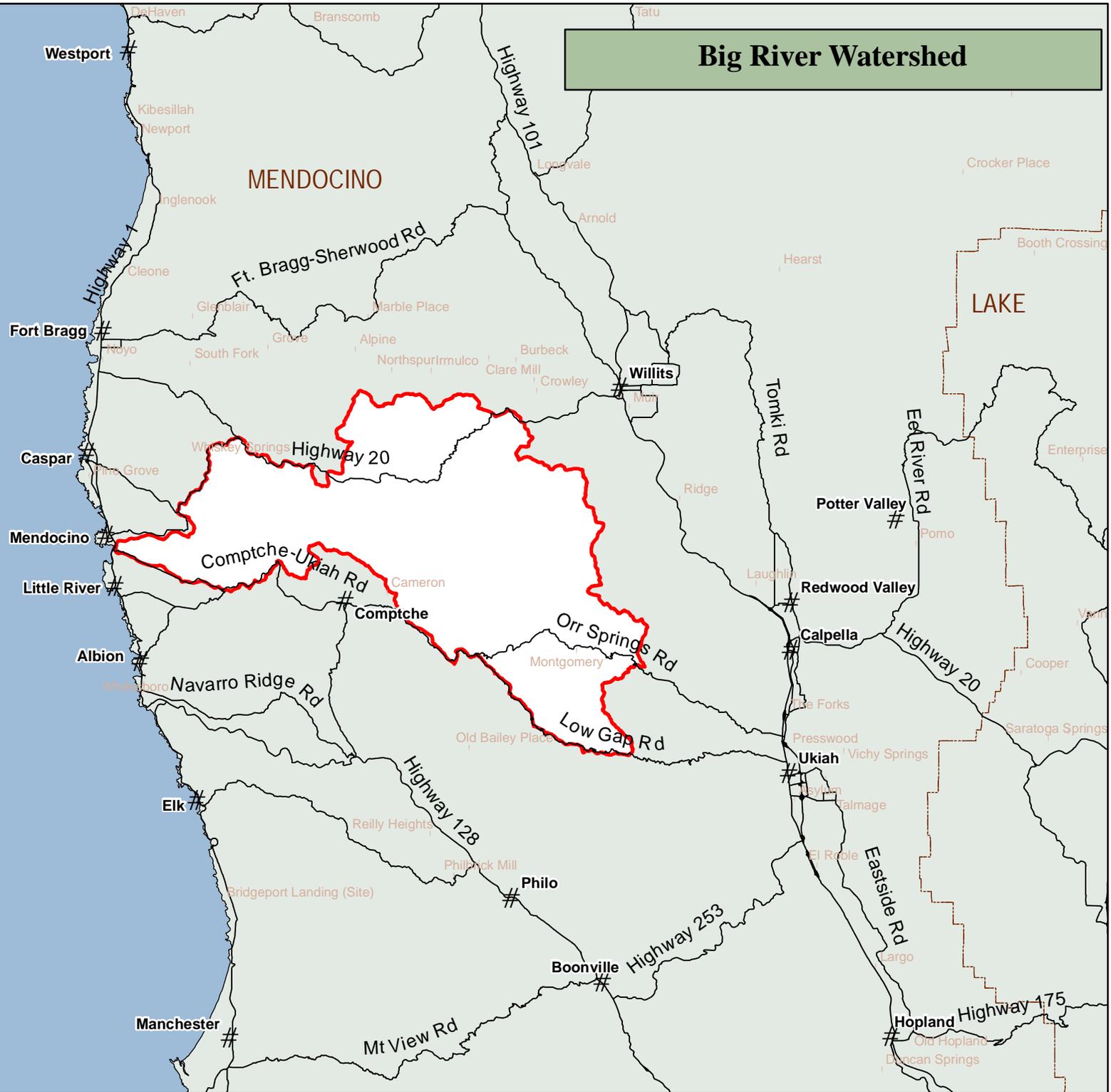




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# Big River Watershed







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# Big River Watershed CalWater Planning Watersheds



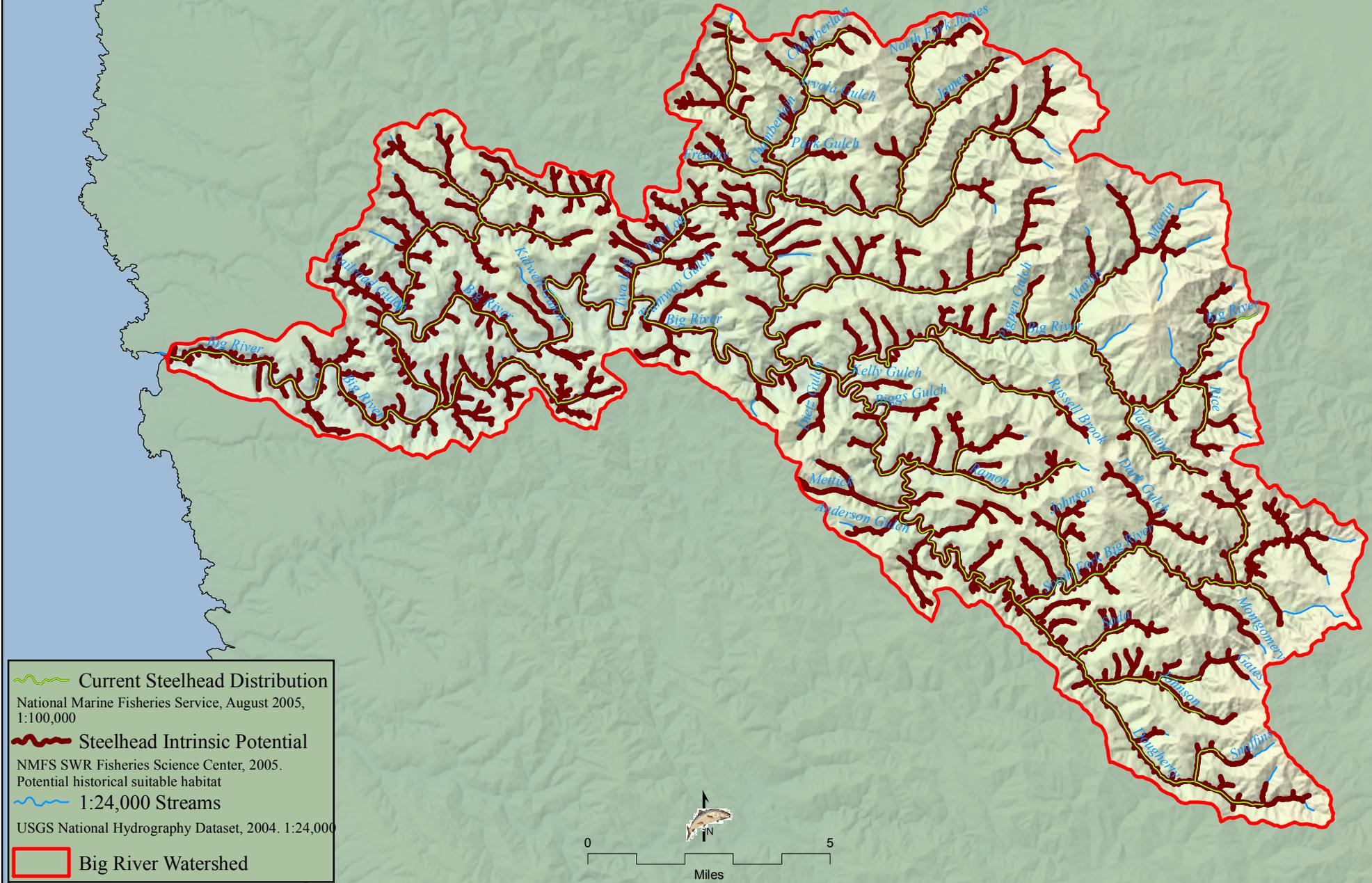




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# Big River Watershed Steelhead Current vs. Historical

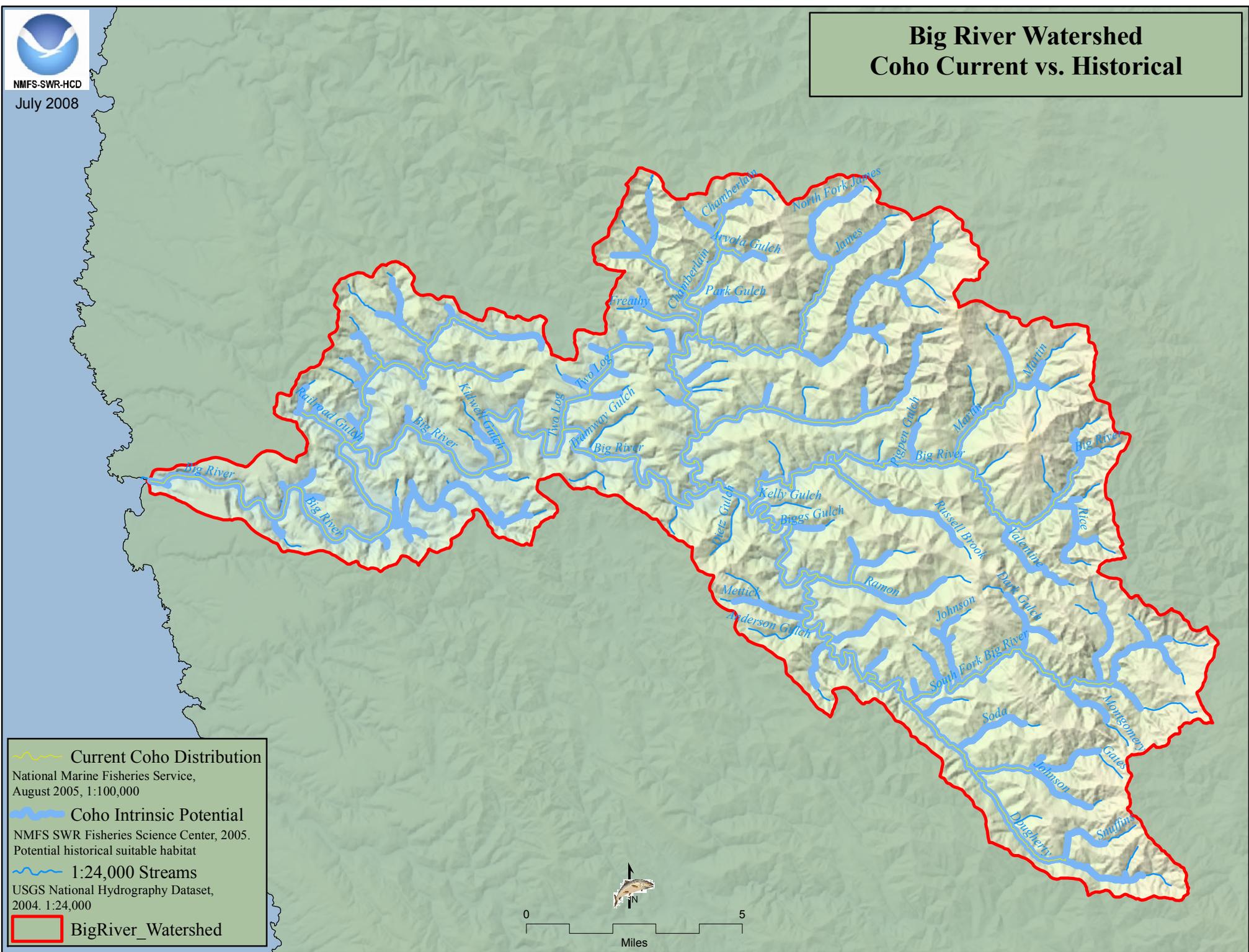




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# Big River Watershed Coho Current vs. Historical



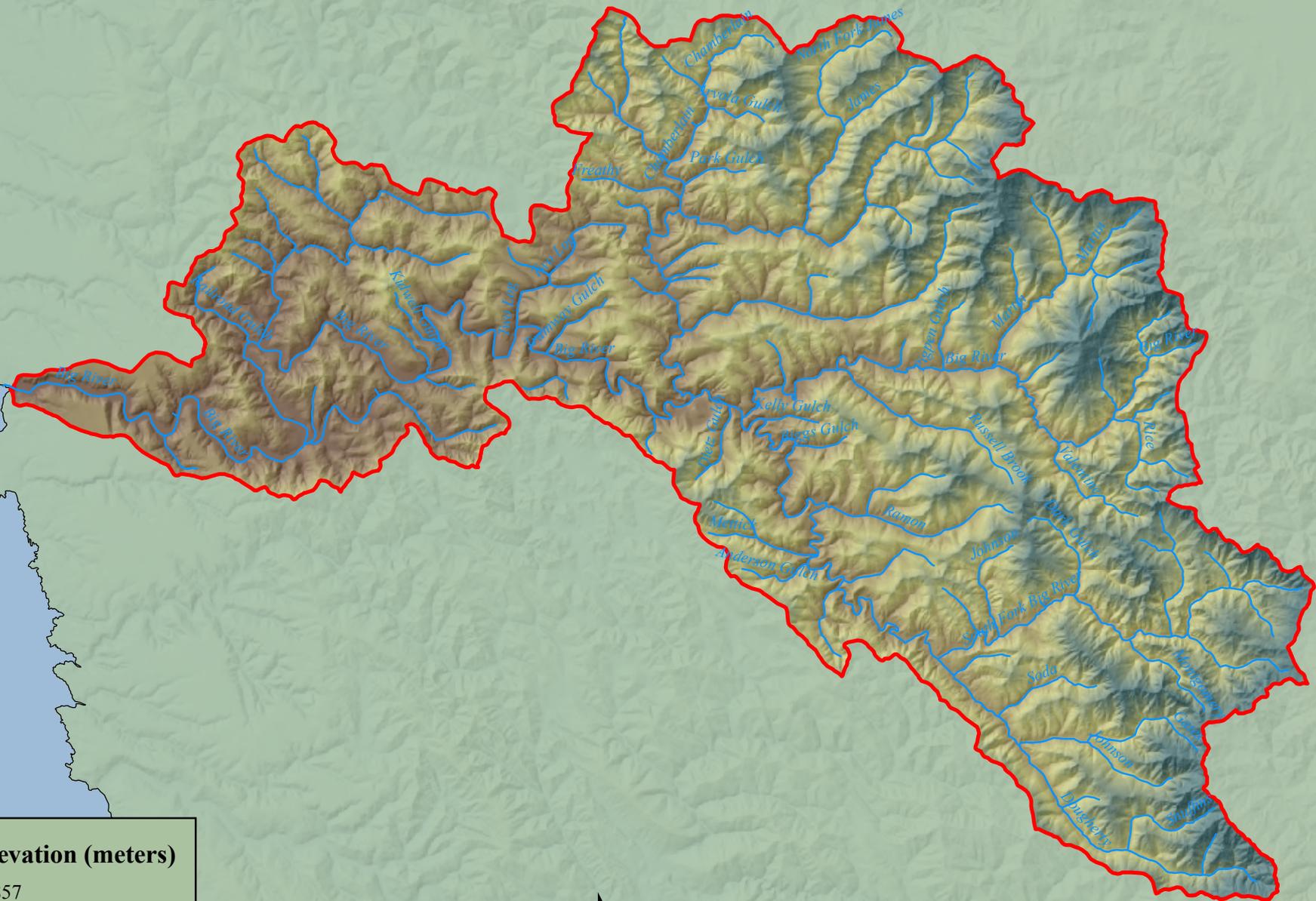




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# Big River Watershed Elevation



**Big River Elevation (meters)**

High : 857

Low : 4

SWR-SCFSC,  
10 Meter Digital  
Elevation Model  
(DEM)

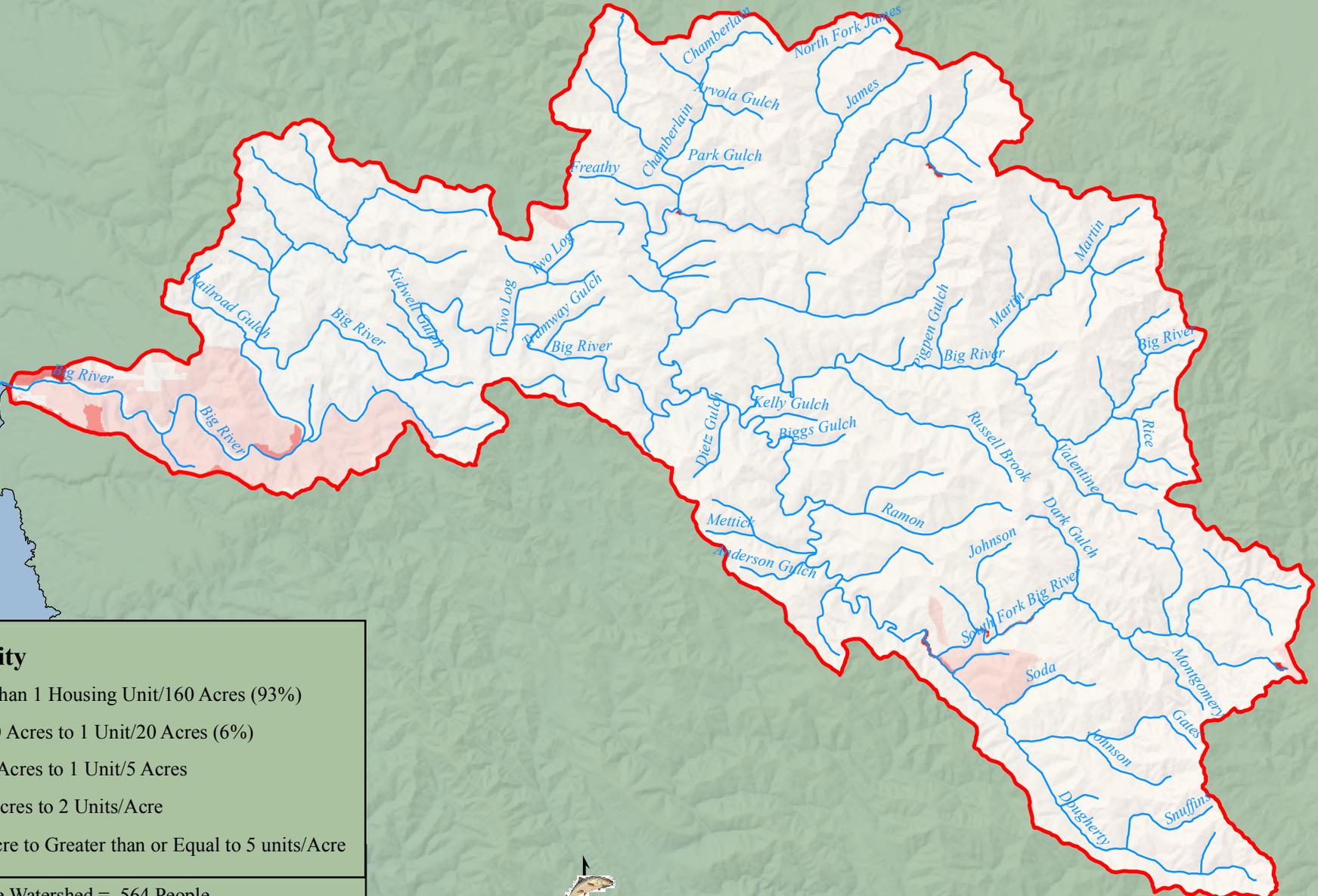




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# Big River Watershed Development



## Housing Density

- 0 to Less than 1 Housing Unit/160 Acres (93%)
- 1 Unit/160 Acres to 1 Unit/20 Acres (6%)
- 1 Unit/20 Acres to 1 Unit/5 Acres
- 1 Unit/5 Acres to 2 Units/Acre
- 2 Units/Acre to Greater than or Equal to 5 units/Acre

Population within the Watershed = 564 People

Houses within the Watershed = 288

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





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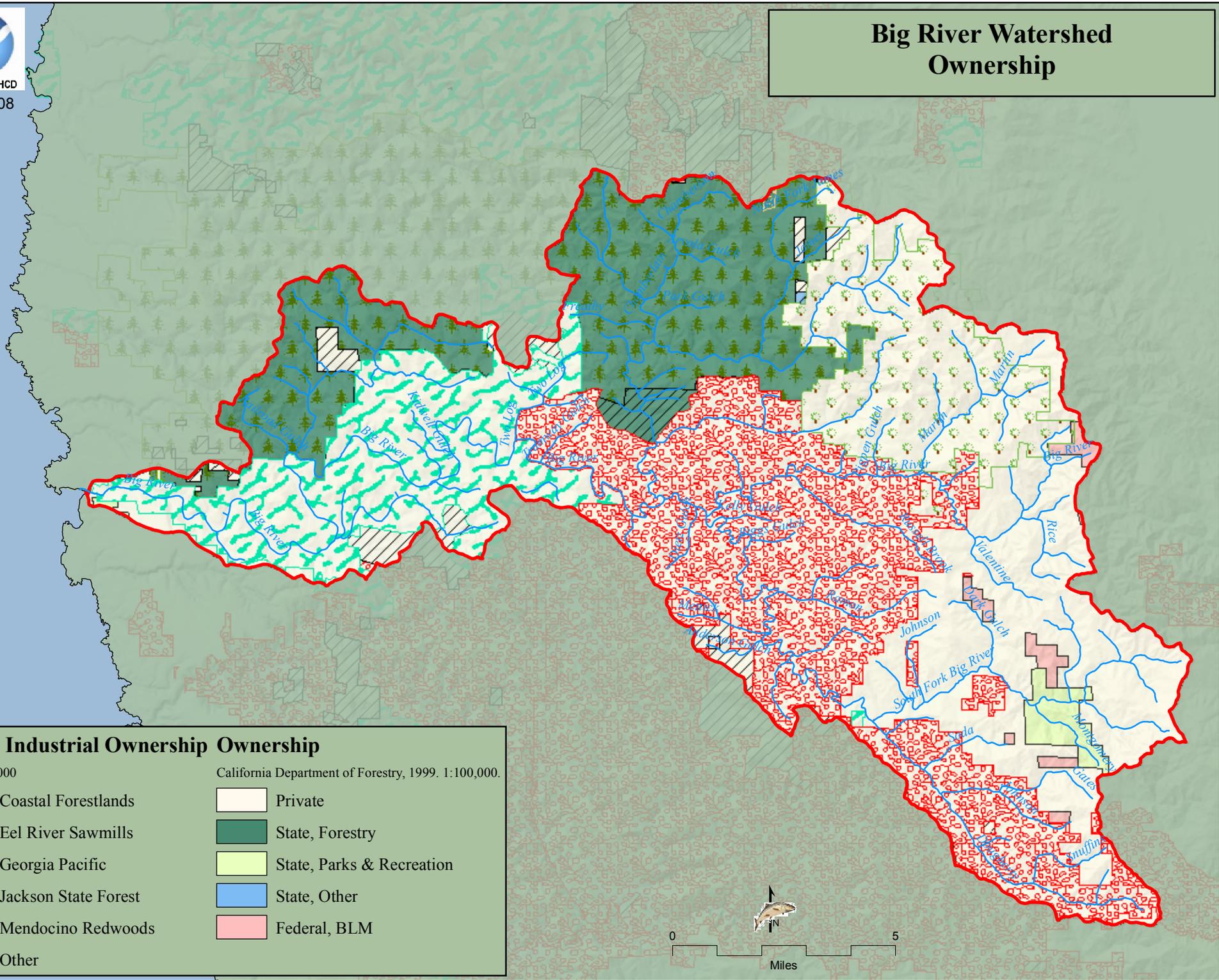
# Big River Watershed Ownership

## Forest Industrial Ownership Ownership

USFWS 2000

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

- |  |                      |  |                           |
|--|----------------------|--|---------------------------|
|  | Coastal Forestlands  |  | Private                   |
|  | Eel River Sawmills   |  | State, Forestry           |
|  | Georgia Pacific      |  | State, Parks & Recreation |
|  | Jackson State Forest |  | State, Other              |
|  | Mendocino Redwoods   |  | Federal, BLM              |
|  | Other                |  |                           |

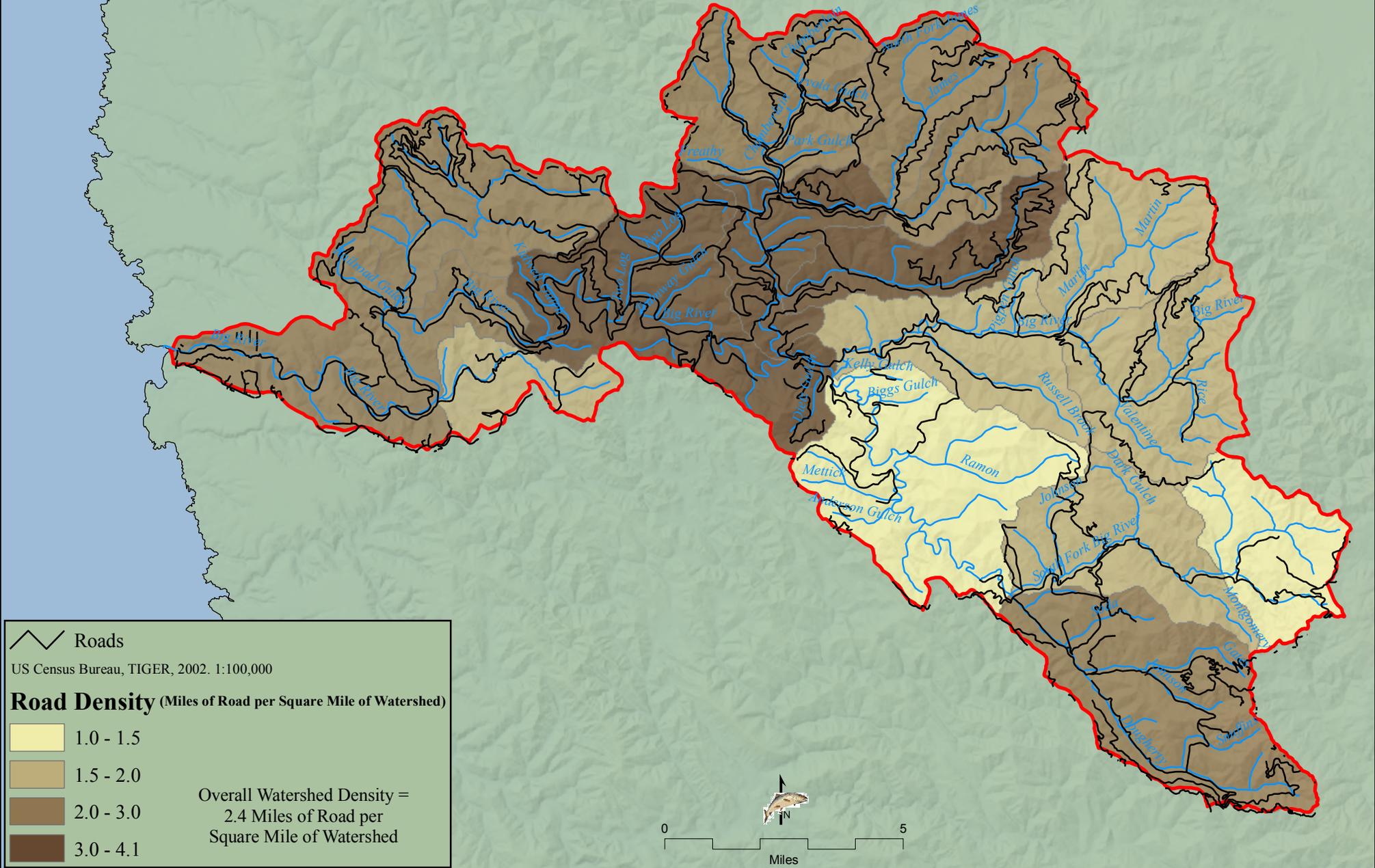




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# Big River Watershed Road Density



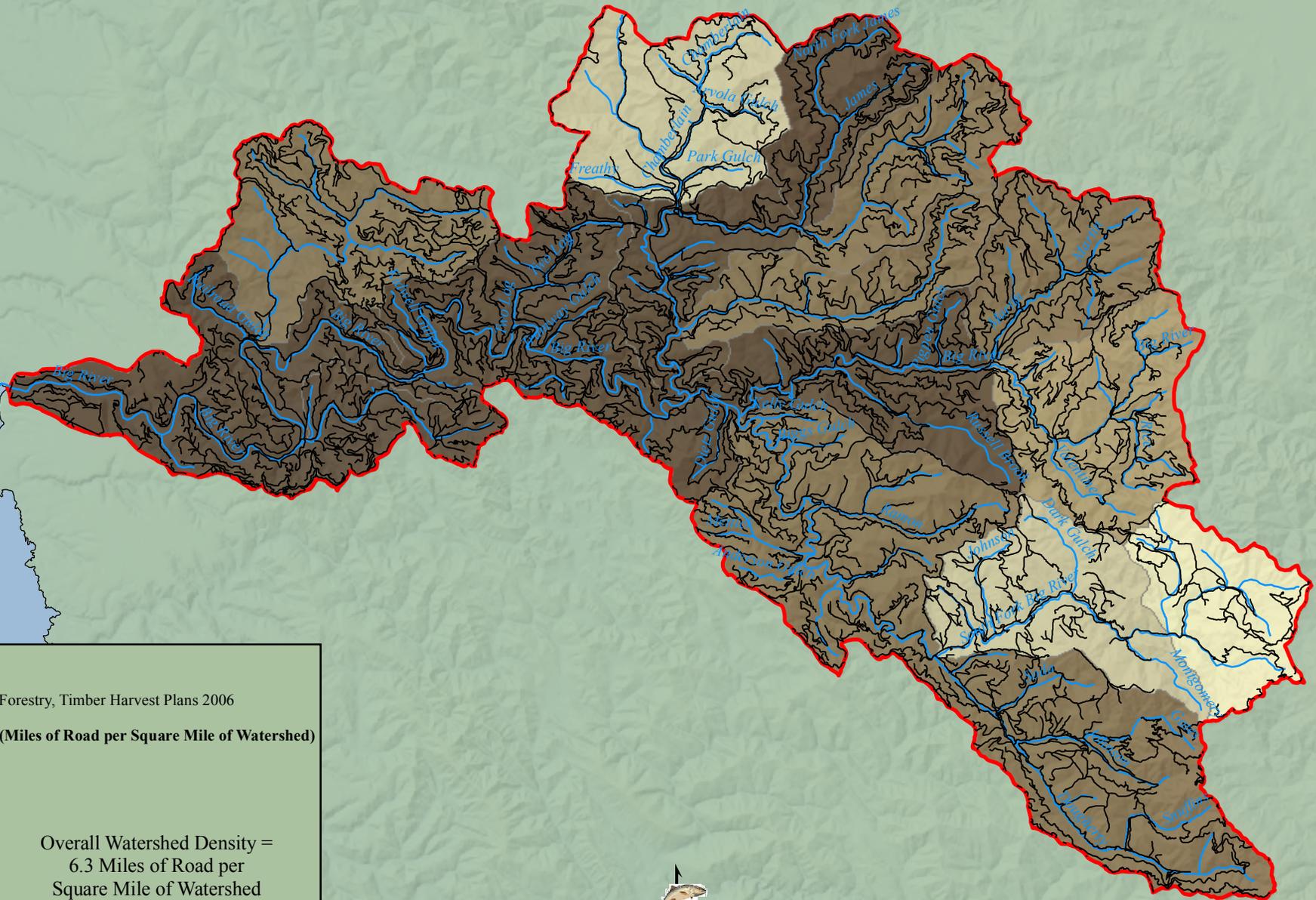




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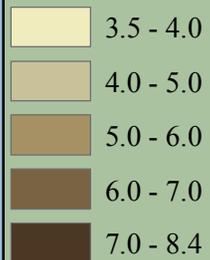
# Big River Watershed Road Density per Timber Harvest Plan Roads



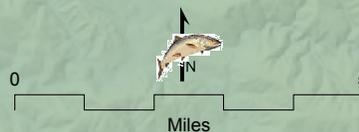
Road

California Department of Forestry, Timber Harvest Plans 2006

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



Overall Watershed Density =  
6.3 Miles of Road per  
Square Mile of Watershed

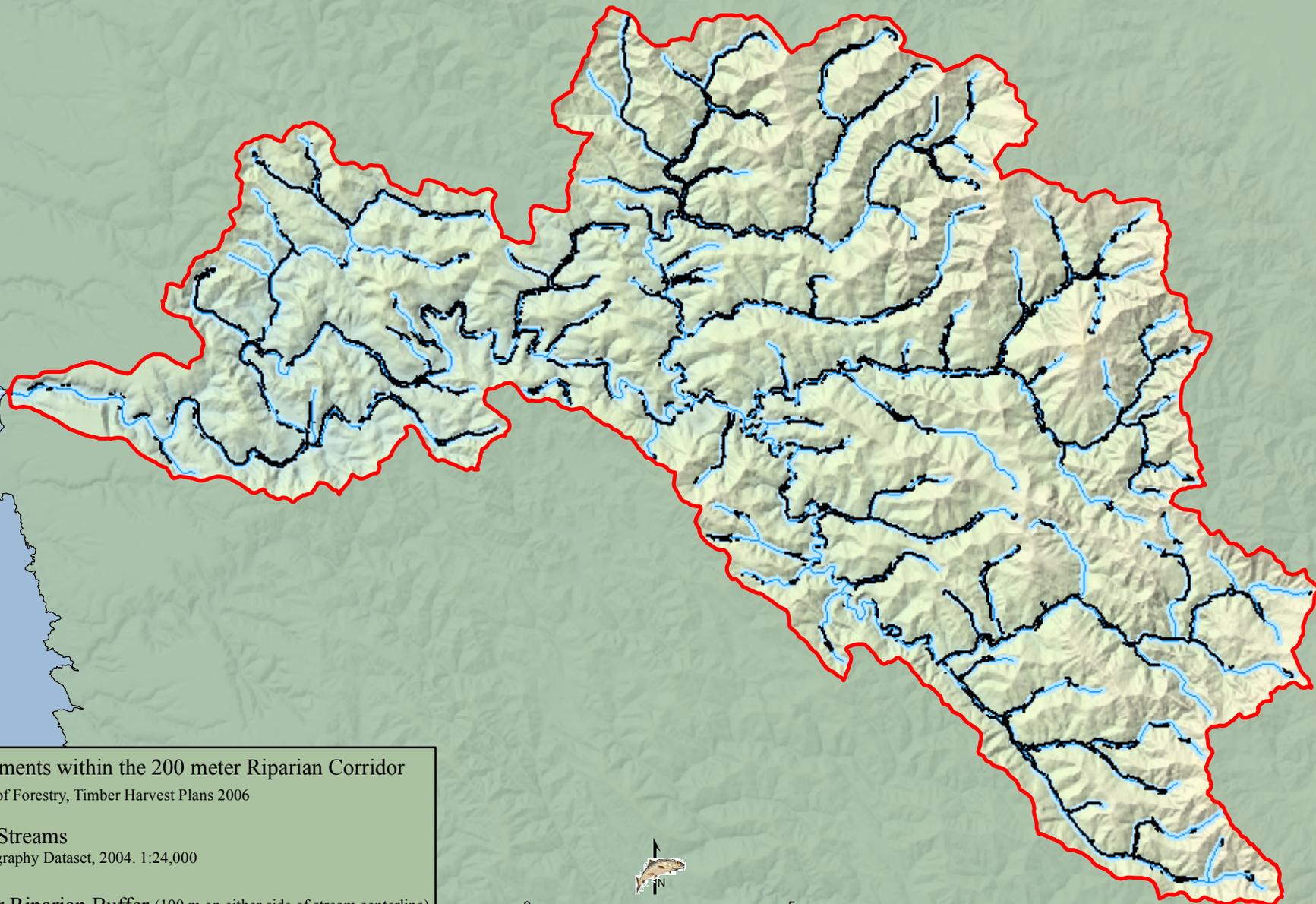




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# Big River Watershed Road Density in the Riparian Corridor per Timber Harvest Plan Roads



 Road Segments within the 200 meter Riparian Corridor

California Department of Forestry, Timber Harvest Plans 2006

 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 = 8.7 Miles / SqMi of Corridor





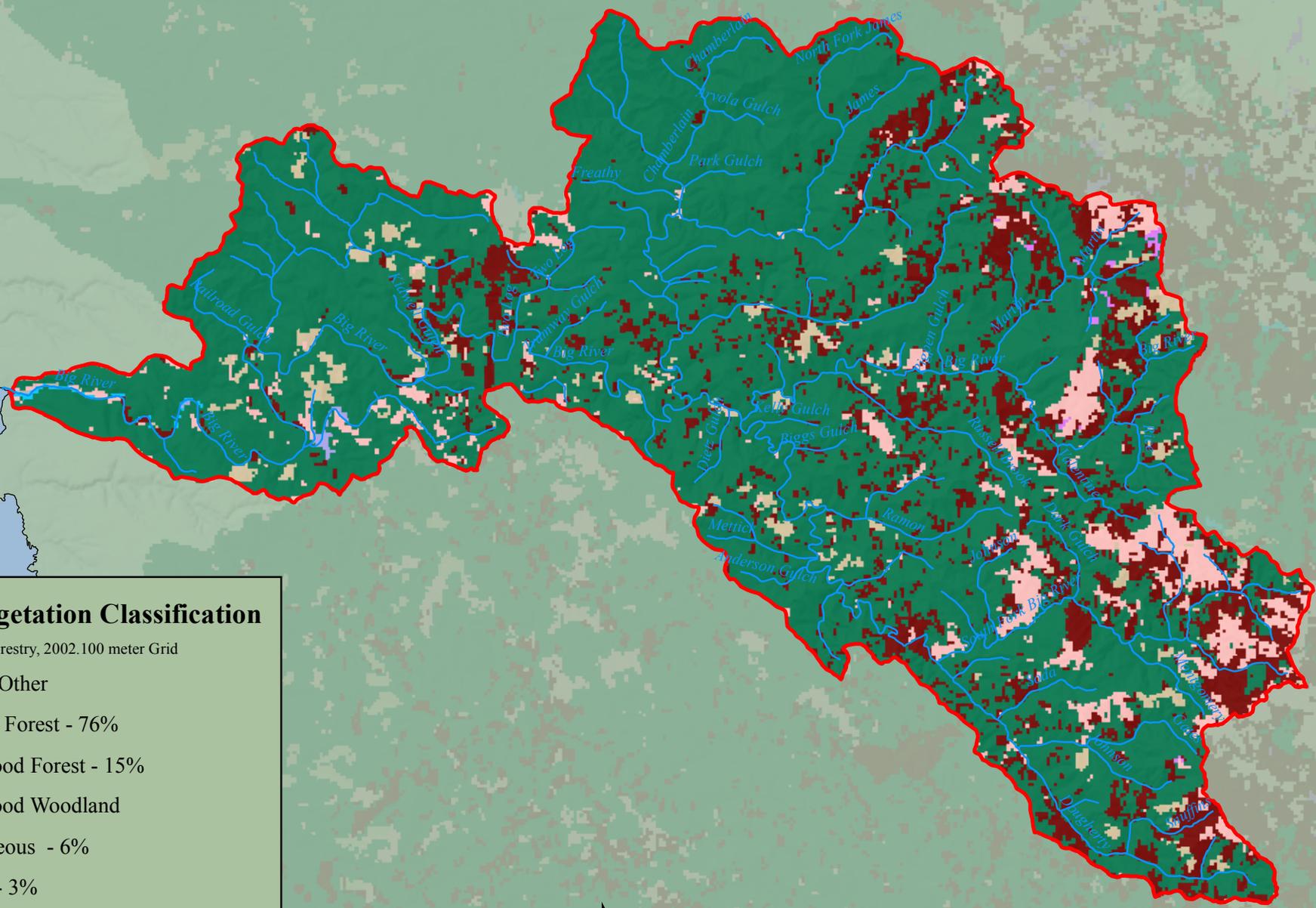
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# Big River Watershed Vegetation

### WHR13 Vegetation Classification

CA Department of Forestry, 2002.100 meter Grid

- Barren/Other
- Conifer Forest - 76%
- Hardwood Forest - 15%
- Hardwood Woodland
- Herbaceous - 6%
- Shrub - 3%
- Water
- Wetland

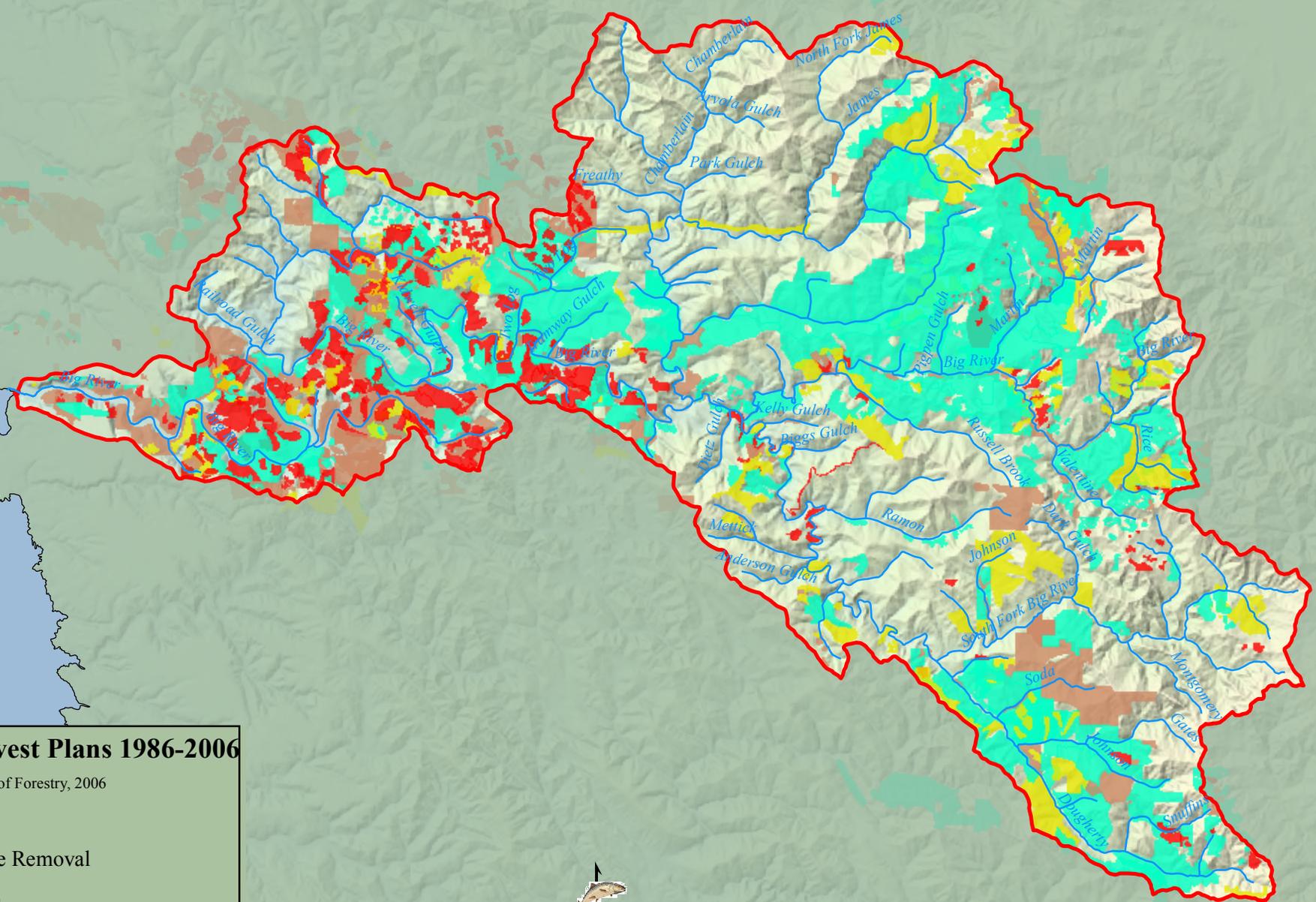




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# Big River Watershed Timber Harvesting 1986-2006



## Timber Harvest Plans 1986-2006

California Department of Forestry, 2006

-  Clearcut
-  Even Age Removal
-  Selection
-  Alternative Prescription

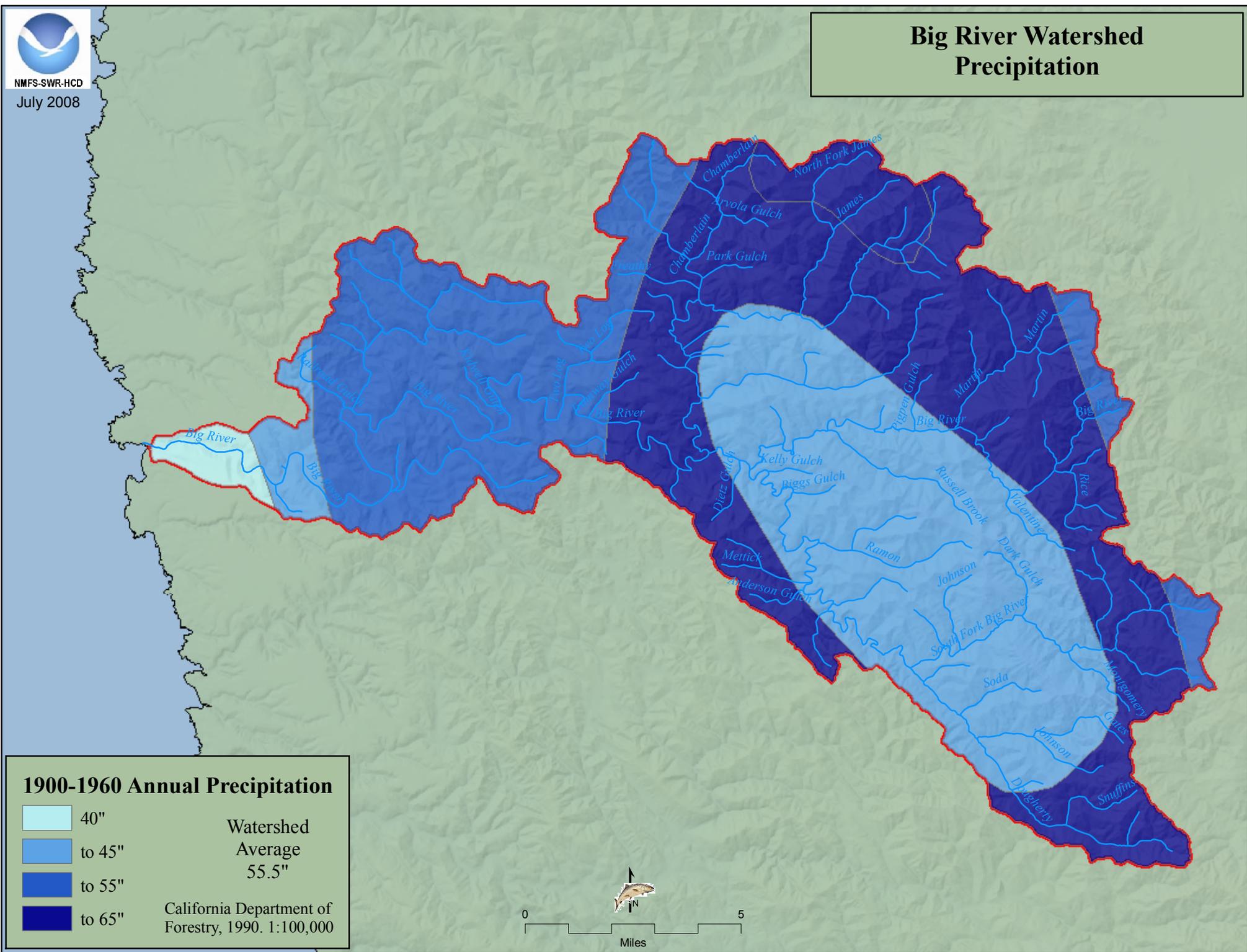




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# Big River Watershed Precipitation





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# Big River Watershed Flood Zone



**FEMA Flood Zones**  
FEMA, 1996. 1:24,000

-  100 Year Flood Zone
-  500 Year Flood Zone

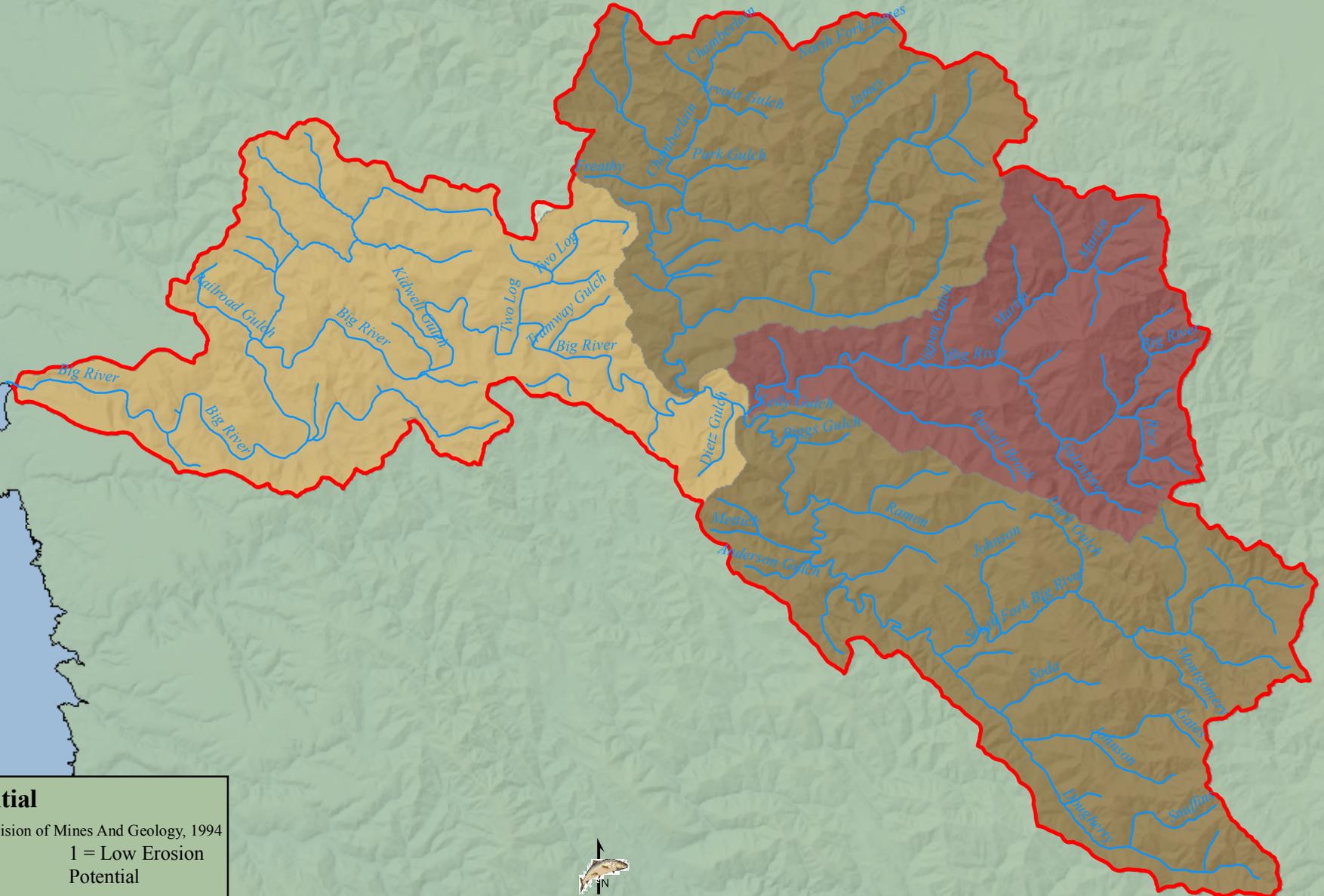




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# Big River Watershed Erosion Potential



## Erosion Potential

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

|  |   |                             |
|--|---|-----------------------------|
|  | 5 | 1 = Low Erosion Potential   |
|  | 8 |                             |
|  | 9 | 10 = High Erosion Potential |

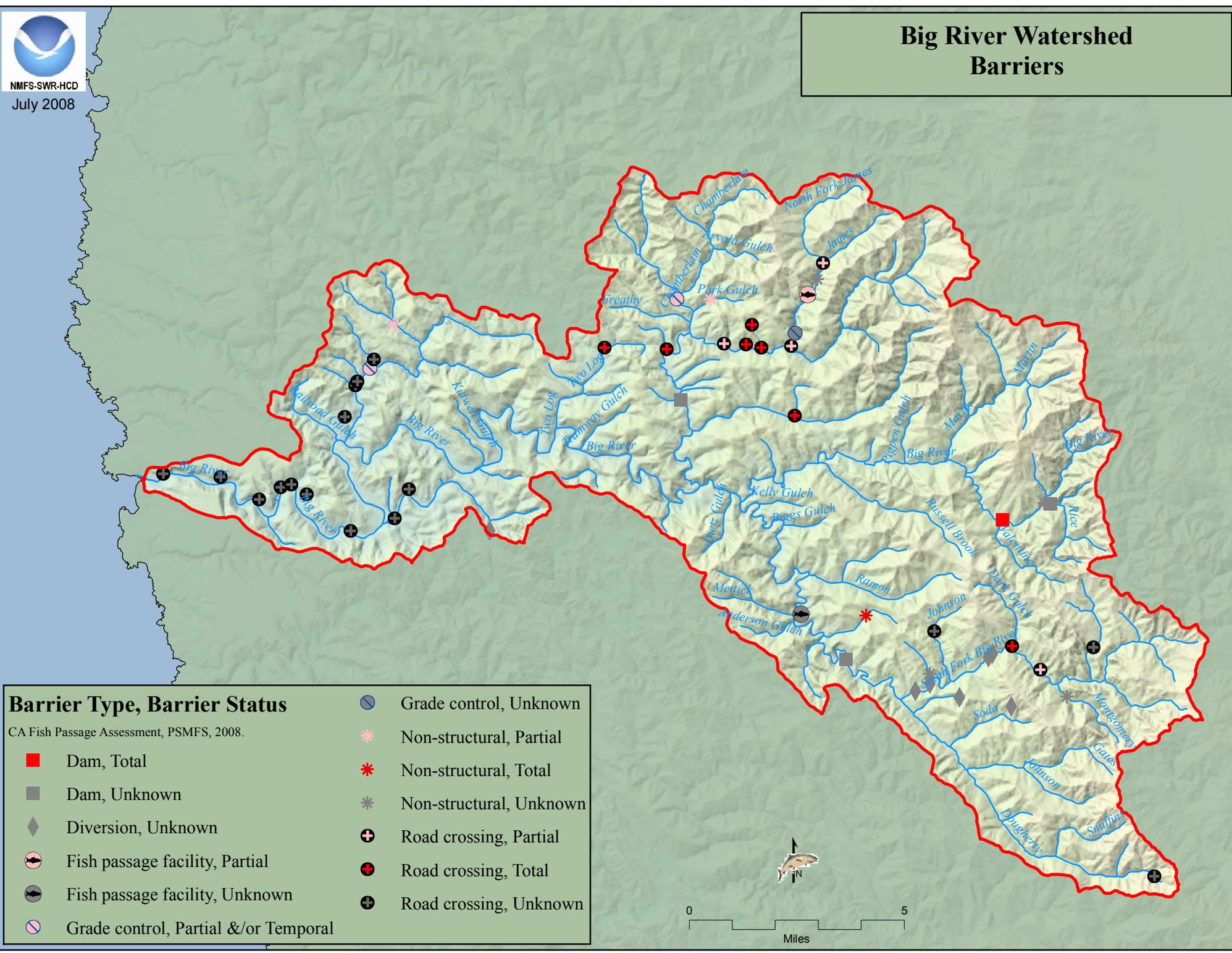






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# Big River Watershed Barriers



| Barrier Type, Barrier Status             |                                      |
|--|--------------------------------------|
| CA Fish Passage Assessment, PSMFS, 2008. |                                      |
| ■  | Dam, Total                           |
| ■  | Dam, Unknown                         |
| ◆  | Diversion, Unknown                   |
| ⊗  | Fish passage facility, Partial       |
| ⊗  | Fish passage facility, Unknown       |
| ⊗  | Grade control, Partial &/or Temporal |
| ⊗  | Grade control, Unknown               |
| *  | Non-structural, Partial              |
| *  | Non-structural, Total                |
| *  | Non-structural, Unknown              |
| ⊕  | Road crossing, Partial               |
| ⊕  | Road crossing, Total                 |
| ⊕  | Road crossing, Unknown               |





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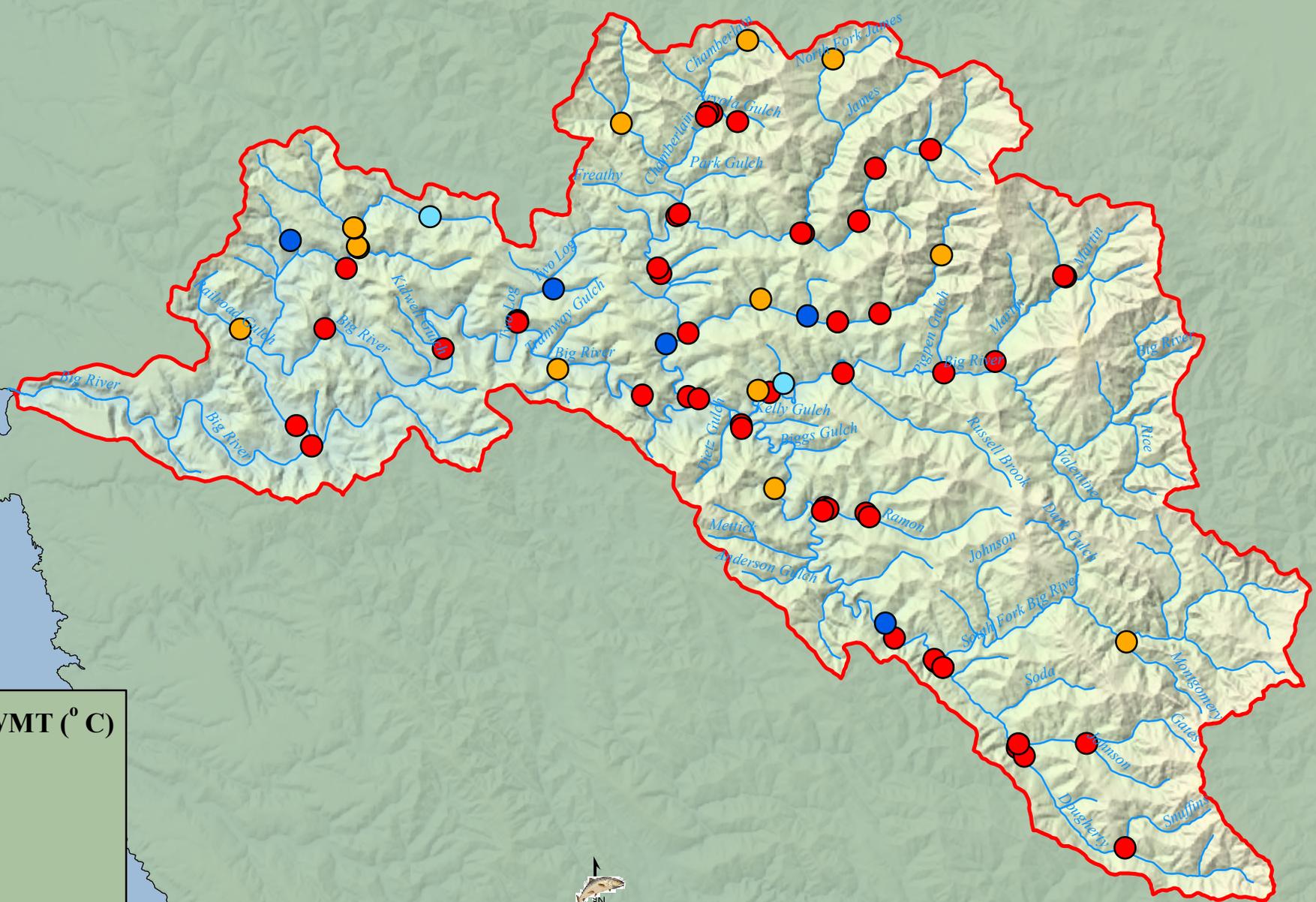
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# Big River Watershed In-stream Temperature

## Average MWMT ( $^{\circ}$ C)

- 0 - 14
- 14 - 15
- 15 - 17
- 17 - 28

Sonoma Ecology Center, 2008.

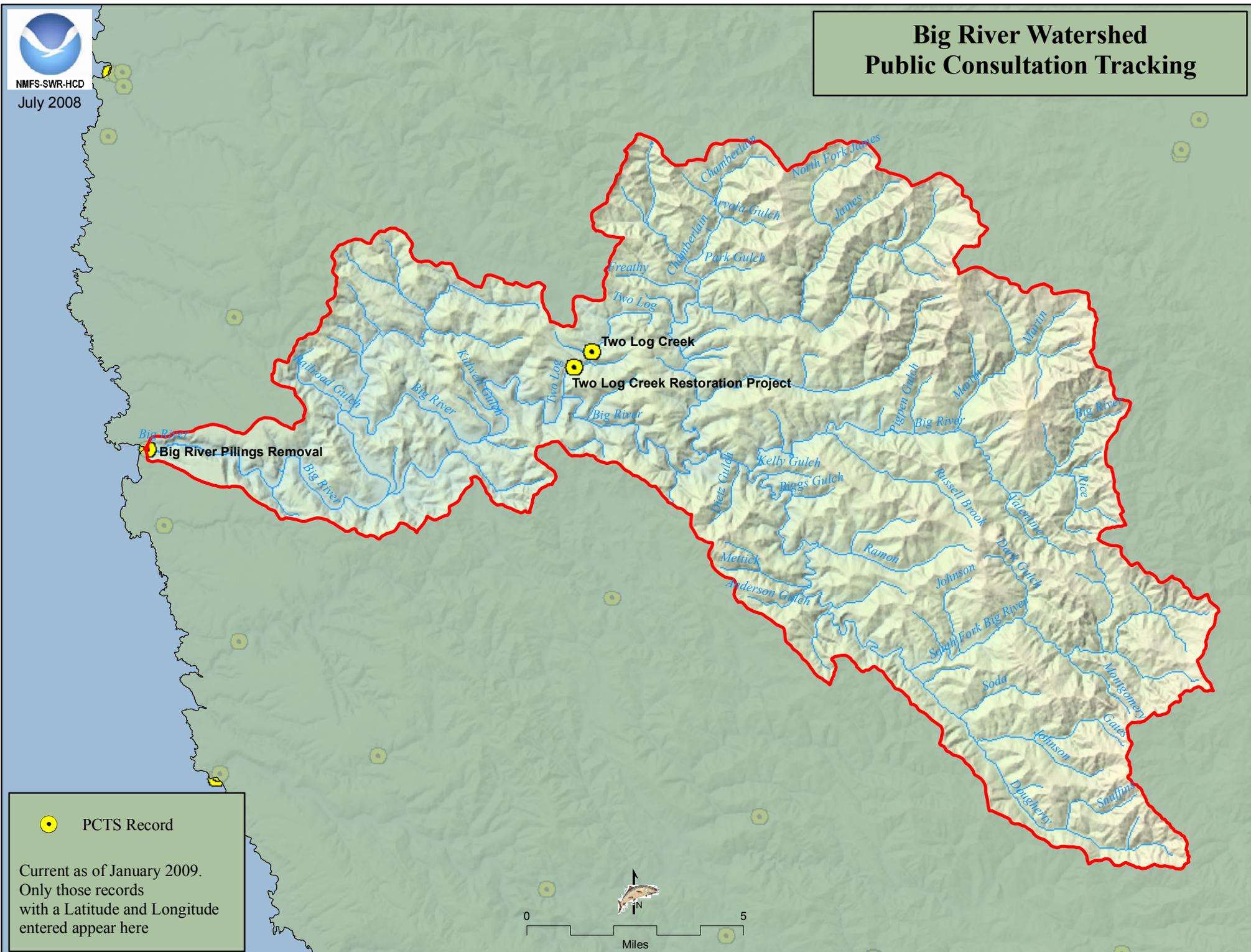




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# Big River Watershed Public Consultation Tracking



 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/>  
  
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>

CC\_Chinook\_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**

CC\_Chinook\_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>

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**

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)**

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**

roads  
vector digital data  
Timber Harvest Plans  
California Department of Forestry and Fire  
Protection  
1:24,000  
2006

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)  
USGS , EROS Data Center  
1999

### **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  
1986-2001

### **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**

naip\_1-1\_2n\_s\_ca045\_2004\_1 (Mendocino)  
remote-sensing image  
raster digital data  
National Agriculture Imagery Program (NAIP)  
USDA-FSA Aerial Photography Field Office  
Salt Lake City, Utah  
2004  
<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

### **Temperature**

MWMT\_20080117\_selected\_watersheds  
Vector digital data  
Sonoma Ecology Center  
2008

### **Geologic Features**

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

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

### **Records Management System (RMS)**

#### **Public Consultation Tracking System (PCTS)**

National Marine Fisheries Service  
Oracle Databases  
2008