

Garcia River Watershed and Sediment TMDL Action Plan

May 5, 2010

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North Coast Regional Water
Quality Control Board

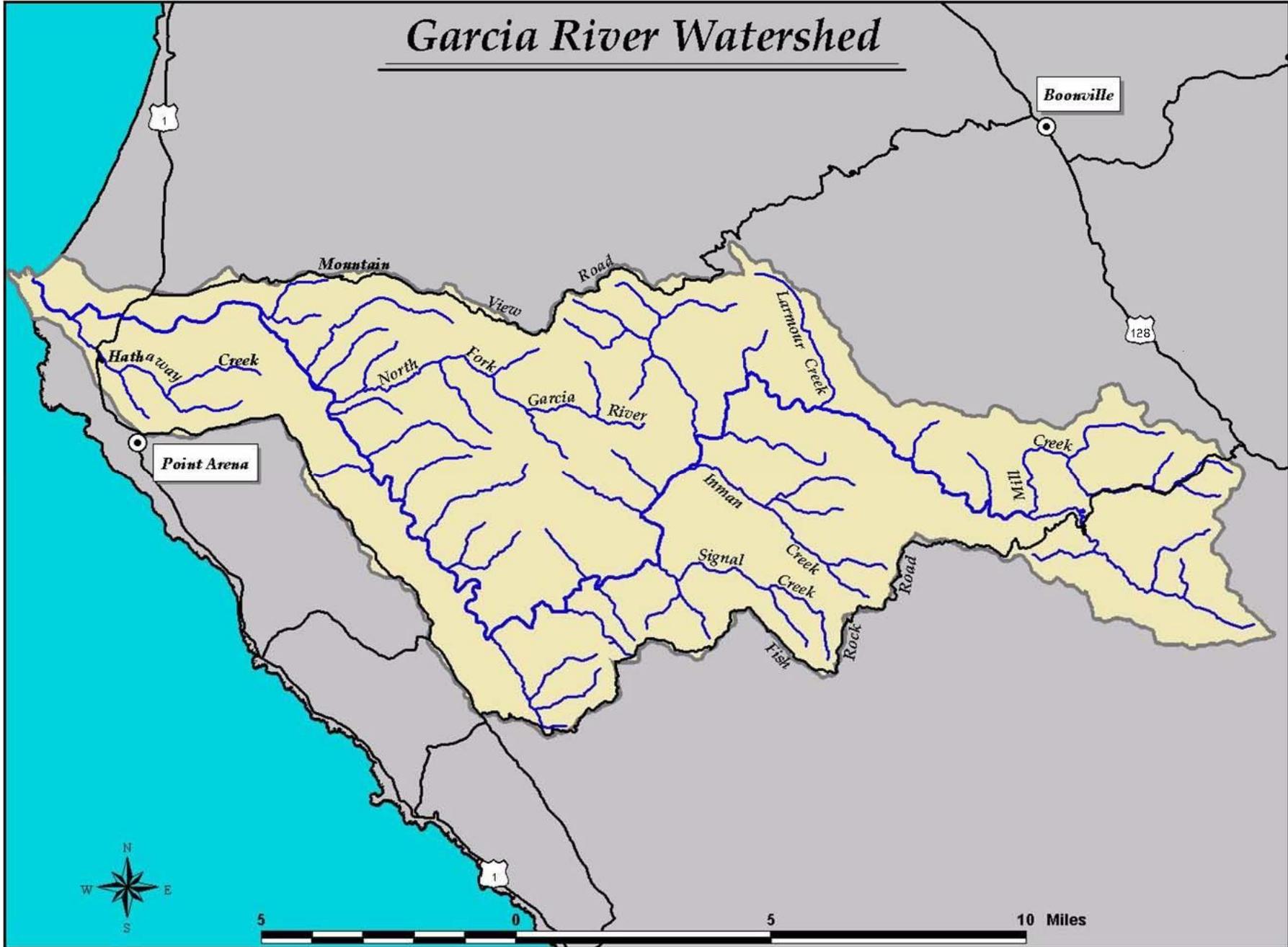


Presentation Topics

- Garcia River History
- Garcia River Sediment TMDL Action Plan
- Other Regional Water Board Activities



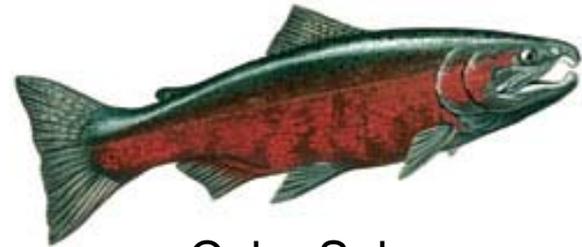
Garcia River Watershed



Original Settlers



Chinook Salmon



Coho Salmon



Steelhead Trout



Pink Salmon

First Humans



- Bokeya Pomo settled ~10,000 years ago
- Small Hunter Gatherer Societies
- Village known as *Pdahau* “river mouth” or *Icheche*

Garcia Land Grant

“Rancho del Norte” 1841-1846



Rafael Garcia



Sketch of a man purported to be Rafael Garcia, by Russian Naturalist, Il'ya Voznesenski - 1841

California Republic

- 1848 – End of Mexican/American War
- 1850 - California becomes the 31st state
- 1866 – Wharf at *Punta Arenas* constructed



Early Logging (1860s-1915)

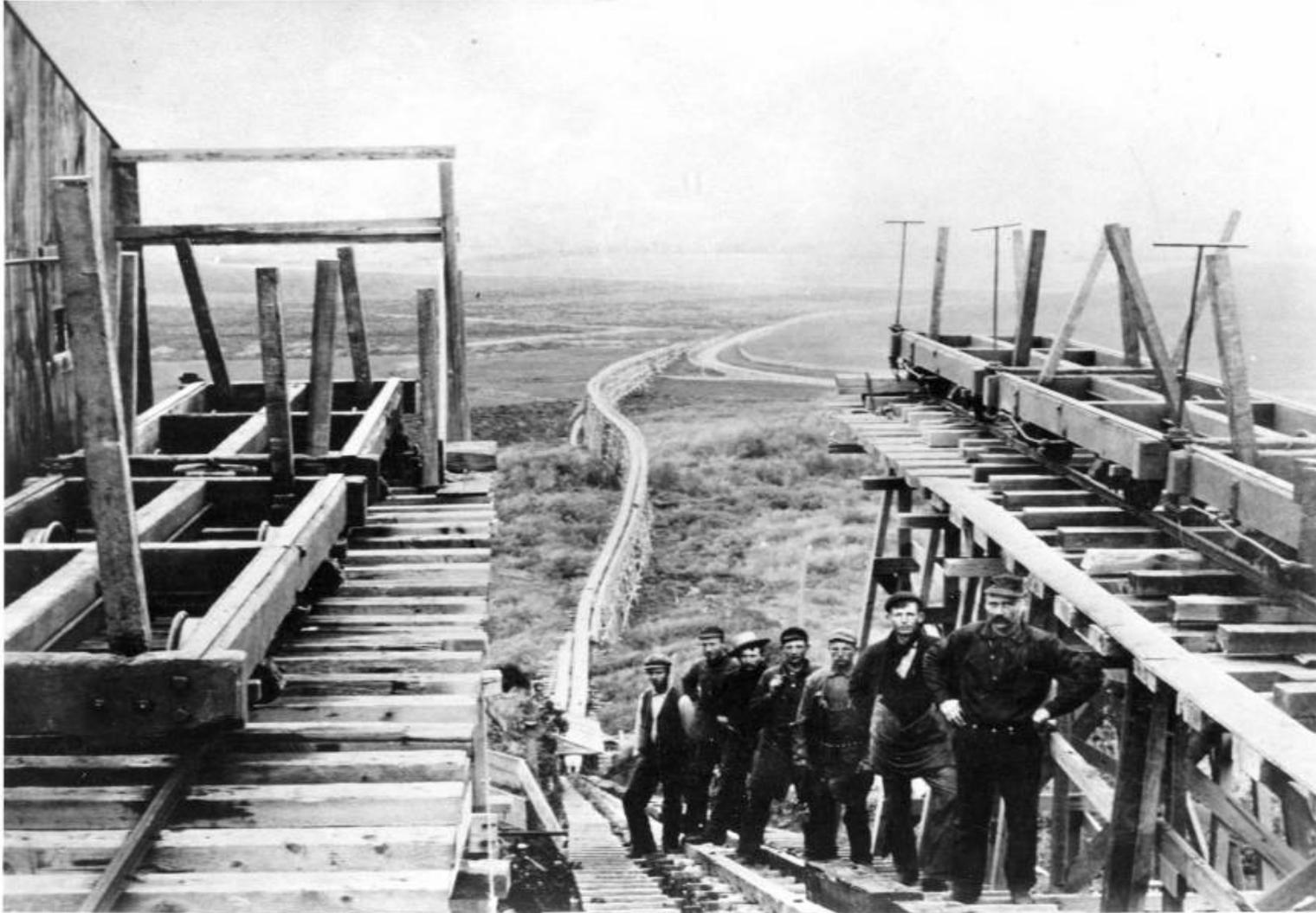


The Garcia Mill (1867-1915)

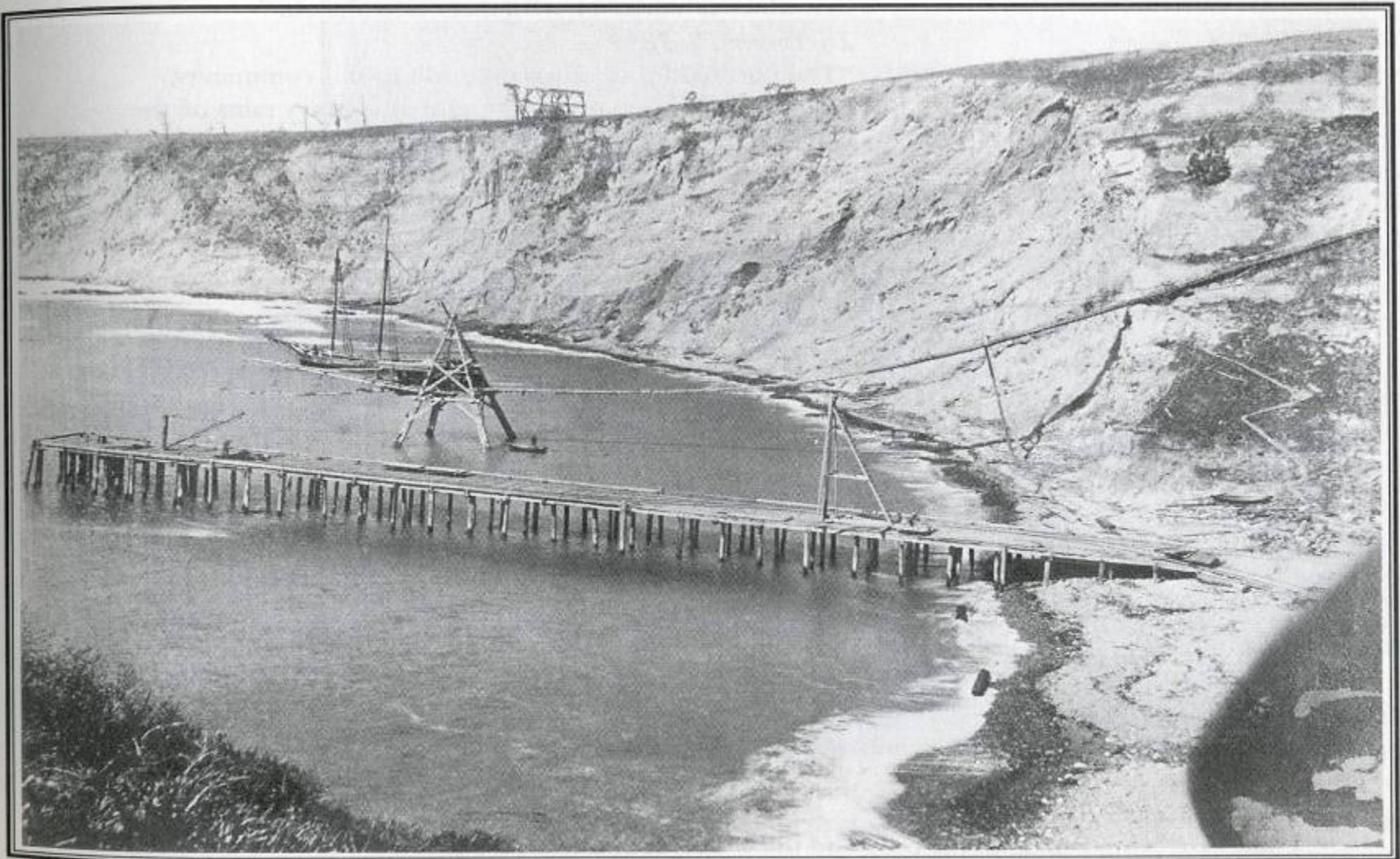
- Located seven miles up river
- 40k board feet per day
- Dammed river 8 months of the year
- Impounded river over one mile upstream
- Flume transported lumber downstream



The Flume at Rollerville



Apron Chutes and Doghole Schooners



“Wm. St Ores is constructing the T K & W wharf and chute.
They are also surveying for the railroad.”

March 31, 1888 Mendocino Beacon

Wharf, looking north - 1888

From *The Early Days of Point Arena*, Oliff and Carlstedt

Early Watershed Effects (?-1915)

- Garcia Mill Dam
 - Migration Barrier
 - Stream diversion
- Sedimentation from logging
 - Splash dams
 - Oxen teams
 - Steam donkeys
- Clearing of riparian trees, vegetation, and large woody debris
- Conversion to grazing after harvest

Watershed Conditions

1920s-1940s

“The river was different in those days. There was no quiet water anywhere...you could always hear it running. The riffles were steeper and it was cleaner...the river fell out into the ocean.”
-Roy Bishop (Born 1919)

“The river was beautiful and clean, very natural. The river was full of fish...trout in every riffle.” -Don Stuart (Born 1910)

“Up on the South Fork those creeks were so full of fish you couldn't believe it...every little riffle, every place there was a hole, there was fish spawning.” -Leonard Craig (Born 1909)

Early Fish Tales

1920s-1940s

“The fishing was unbelievable. I can remember when we were jacklighting the water was so deep you couldn’t see all the fish down there, so we spear blind. It wasn’t unusual to get two fish at a time...go through one fish and get another.” -Lando Franci (Born 1913)

“In old times it was nothing to see 60 or more Chinook, all 3 or more feet long, in this hole at one time.” -Les Stornetta (Born 1916)

“There were lot of 35-40 pound Chinook, but nothing like the numbers of coho. In late November, the Steelhead would start coming in and their runs would last until April when the Spring-run of Bluebacks came.” -Roy Bishop (Born 1919)

The Interior

- Generally inaccessible to early logging
- Dominated by late seral forests
- Largely untouched until 1950s



Mailliard Ranch Cathedral Grove

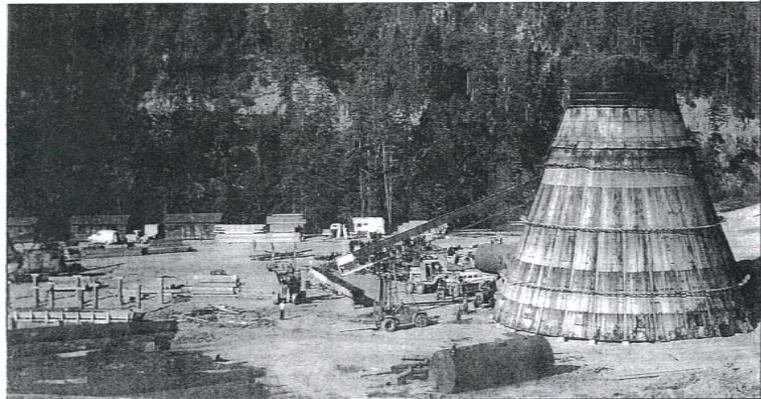
Post WWII Logging 1950s-1960s

- Housing boom demands wood products
- Improved heavy equipment
- Construction of roads/skid trail network
- River no longer used for transport
- No environmental regulations

Hollow Tree Lumber Co. 1962-1973



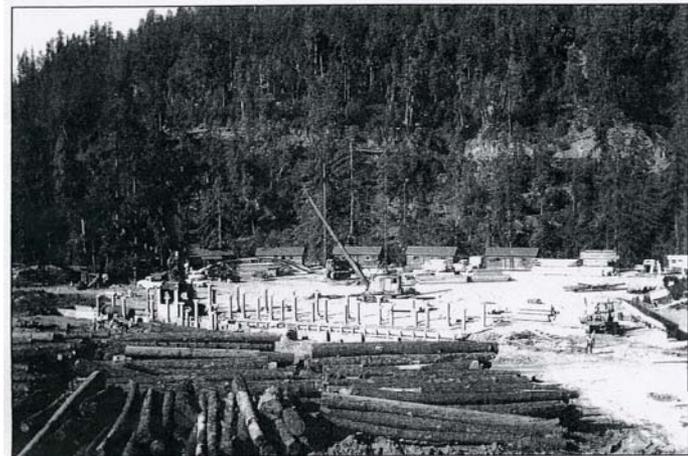
Access to the sawmill site necessitated a major bridge crossing over the Garcia River. After completing the bulkheads and cabling the bridge stringers together, a Cat prepares the approaches to the new bridge. The main bridge stringers were 80 feet long and were 20 feet above the summer water level of the Garcia. Nov. 1962.



The completed teepee burner appears out of place as the rest of the sawmill is still in the early stages of construction, although most of the below surface concrete foundation work is done.



The construction camp is beginning to take shape at the Mill "D" site, more construction equipment is evident, and the piles of sawmill equipment continue to grow.



The log deck begins to grow in anticipation of the completion of the sawmill. The bandmill headrig stands on its foundation, main clean-out conveyor is complete, and the uprights to the mill floor are nearly complete.

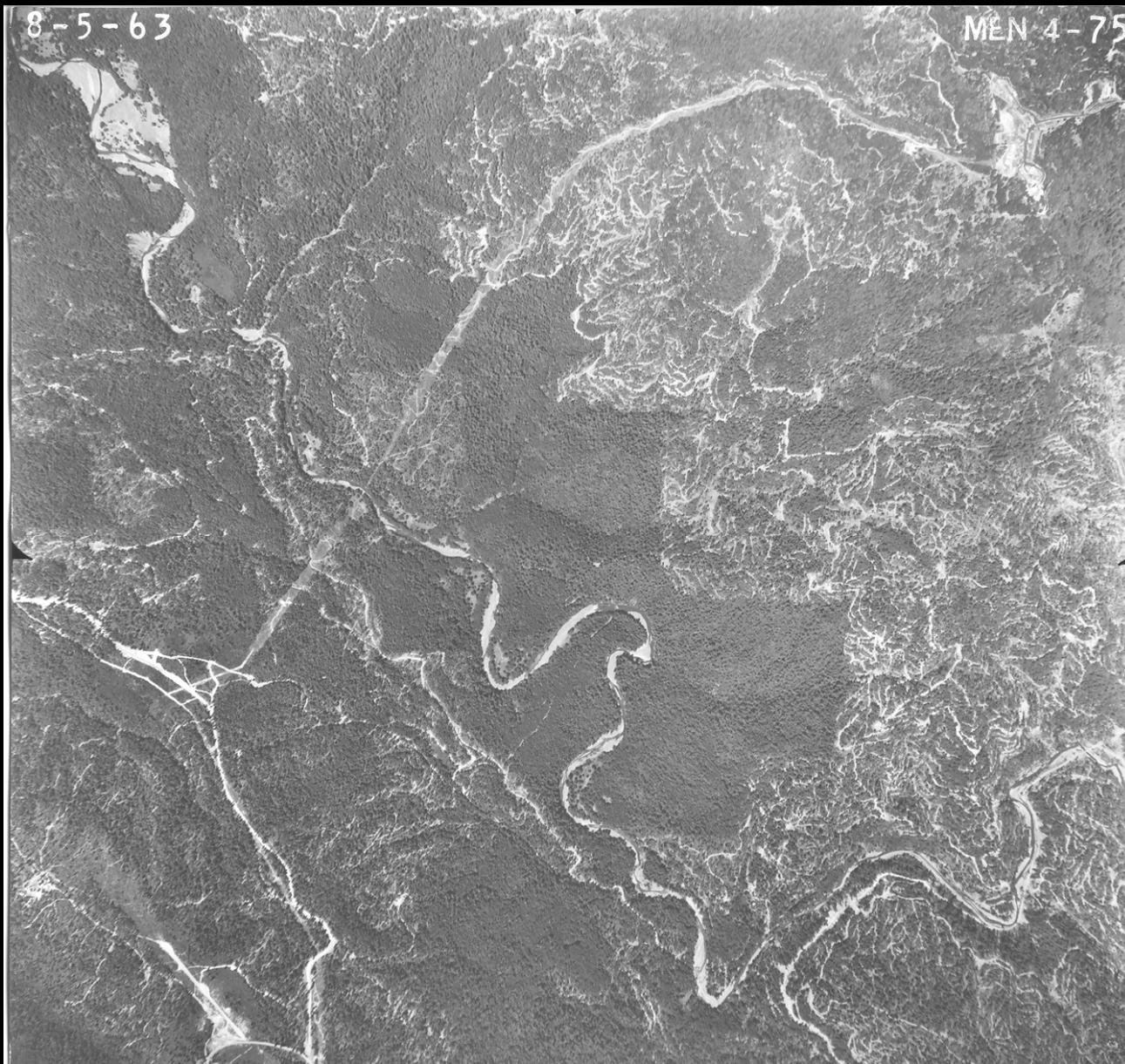
Garcia River Watershed



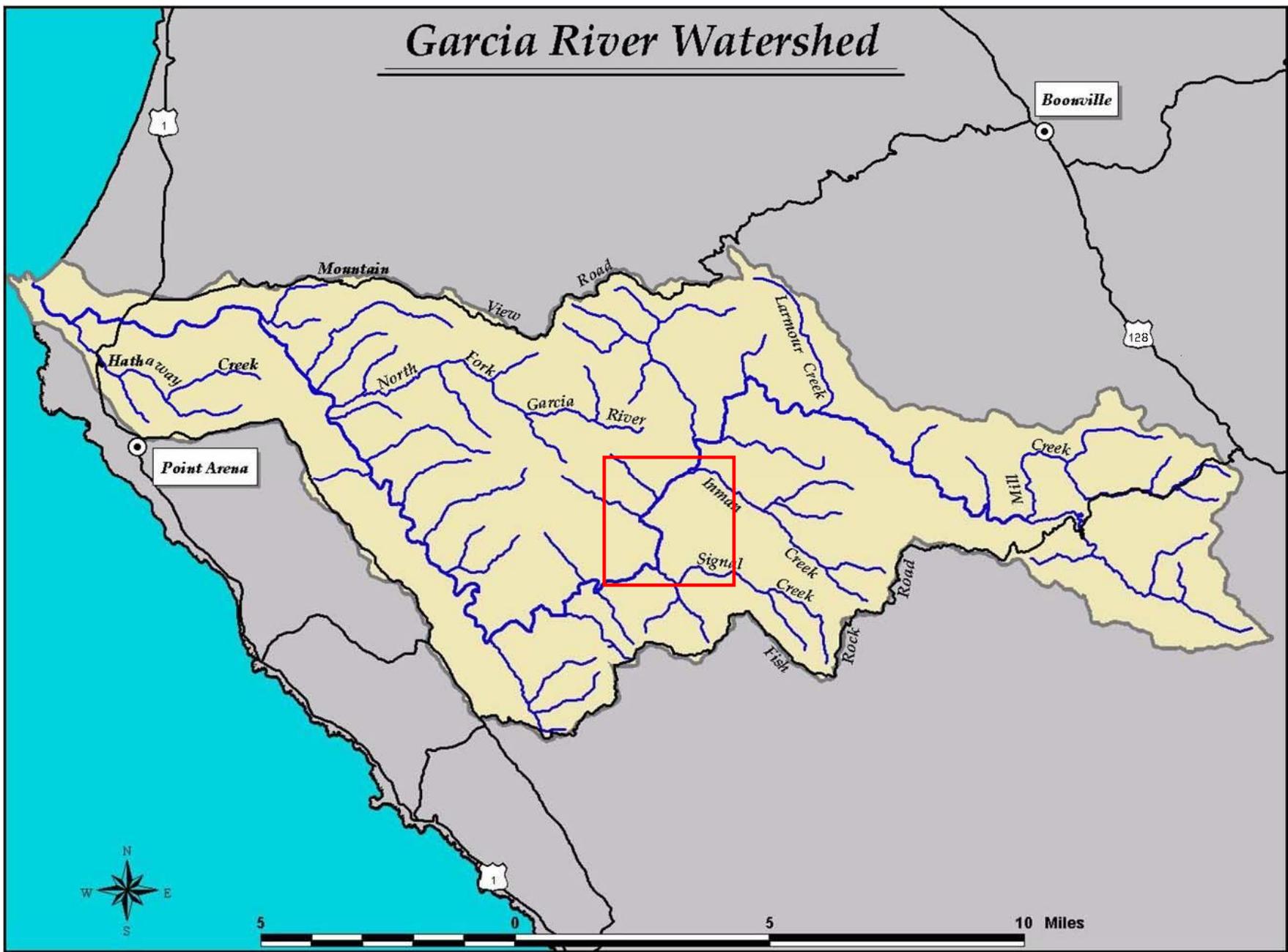
Garcia to South Fork 1952



Garcia to South Fork 1963



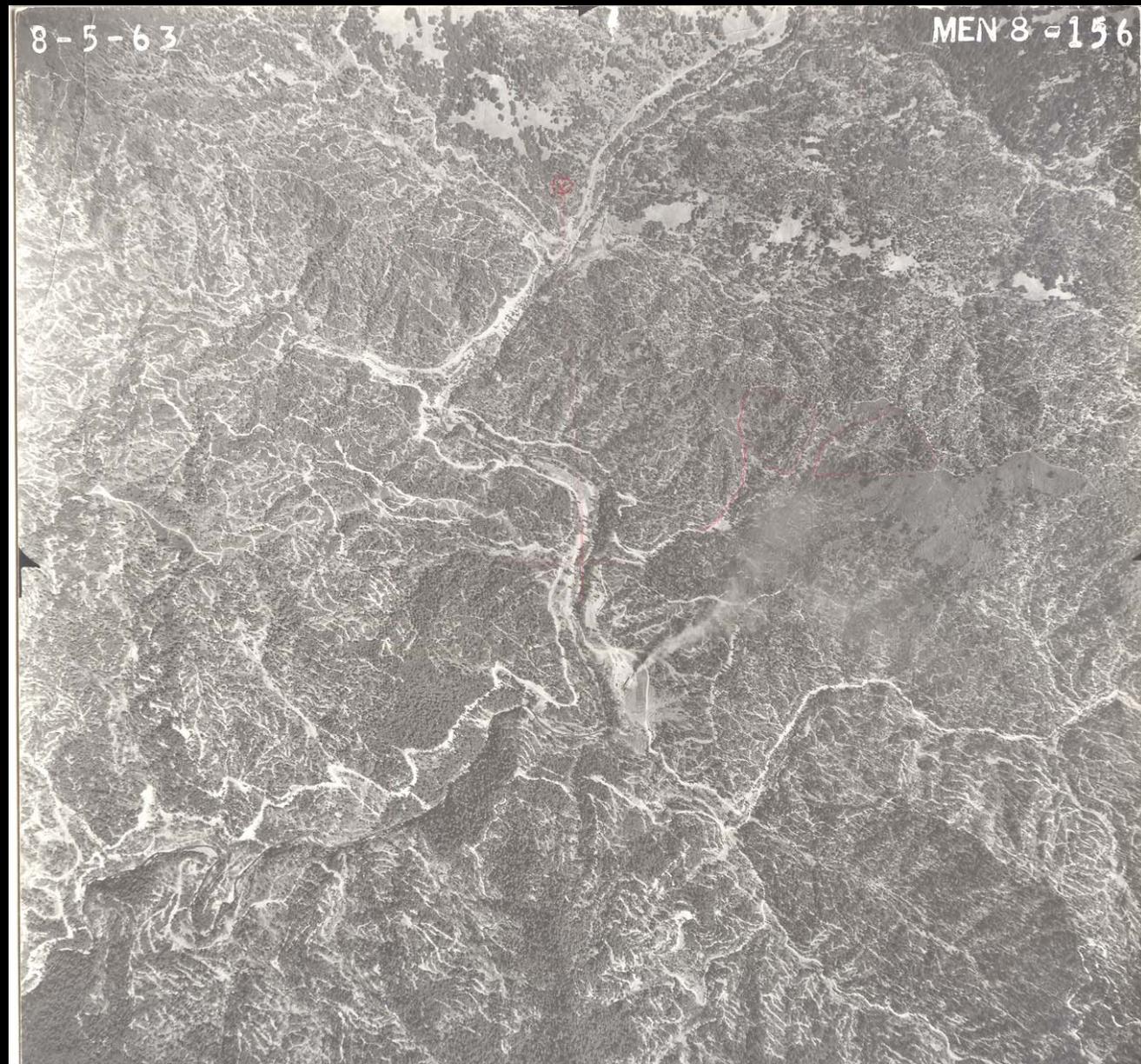
Garcia River Watershed



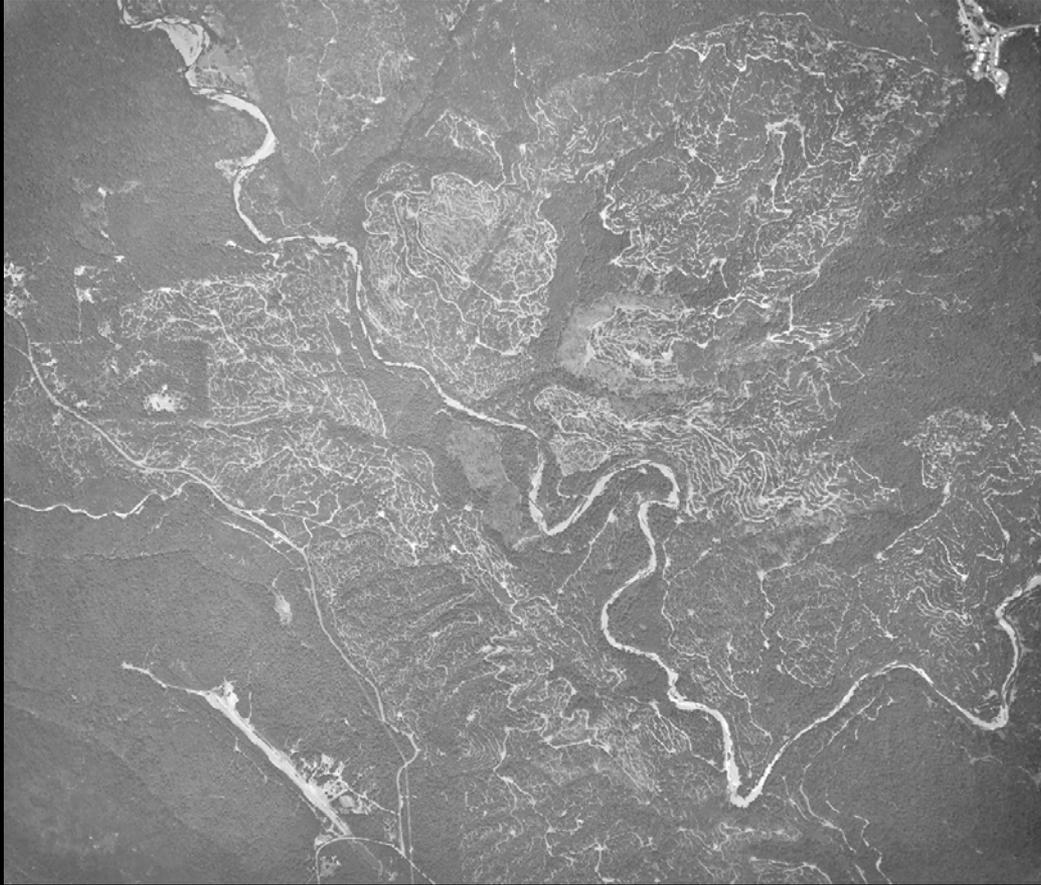
Garcia to Inman 1952



Garcia to Inman 1963



Renewed Logging 1980s-1990s



- Approximately 43% of watershed experienced new logging and road reconstruction between mid-1980s and mid-1990s (EPA, TMDL)

Signal Creek - 1955



Signal Creek - 1955



CDFG, 1955

Instream Effects

- The California Department of Fish and Game assessed the main stem of the Garcia for fisheries habitat in 1966. They found that 37 of 104 miles were classified as severely damaged with no streamside canopy, no in-stream shelter or pools, as well as 75-100% siltation of the gravel substrate (CDFG, 1966).

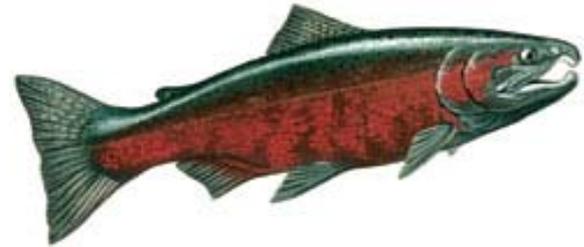
Other Land Use Impacts

- Agricultural Activities
 - Early conversion of forests for grazing
 - Grazing within river and tributaries
 - Crop production on Garcia floodplain (ongoing)
 - Water diversion for crops
- Gravel Mining (1960s - 1990s)
 - Extraction averaged 67,078 tons/year (1966-1993)
 - Caused channel simplification
 - Affects on salmonid spawning and rearing sites
 - Affects on riparian vegetation
 - Changes in hydrology

Current Populations (2000)



Chinook Salmon



Coho Salmon



Steelhead Trout



Pink Salmon

A wide, shallow riverbed with a rocky and gravelly floor, surrounded by dense green trees and a clear blue sky. The river is the central focus, winding through a landscape of lush vegetation. The water is clear and reflects the sky. The surrounding area is filled with various types of trees and shrubs, creating a dense forest. The sky is a uniform, clear blue, suggesting a bright, sunny day. The overall scene is a natural, outdoor setting, likely a river valley or a similar natural environment.

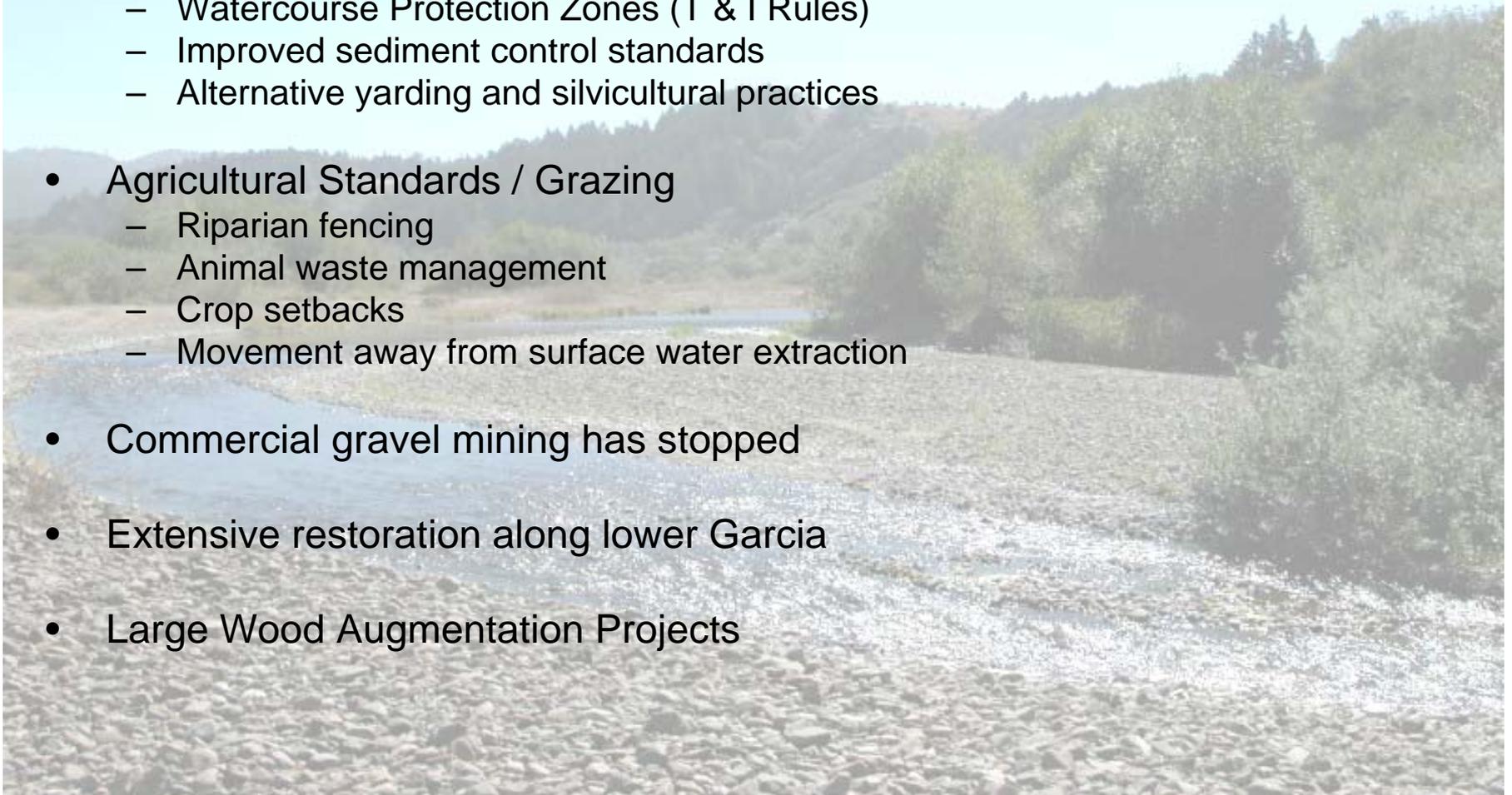
What is being done about it?

New Rules / New Listings

- 1972 - Clean Water Act
- 1973 - Forest Practice Act
- 1976 - Forest Practice Rules
- 1993 - 303d Listing for Sediment and Temperature
- 2000 – Threatened and Impaired Rules (FPR)
- **2002 - Garcia River Watershed Sediment TMDL Action Plan**
- 2010 – Anadromous Salmonid Protection Rules (FPR)

Changing Land Management

- Modernization of Timber Harvest Methods
 - Watercourse Protection Zones (T & I Rules)
 - Improved sediment control standards
 - Alternative yarding and silvicultural practices
- Agricultural Standards / Grazing
 - Riparian fencing
 - Animal waste management
 - Crop setbacks
 - Movement away from surface water extraction
- Commercial gravel mining has stopped
- Extensive restoration along lower Garcia
- Large Wood Augmentation Projects



Action Plan for the Garcia River Watershed Sediment Total Maximum Daily Load

- GOAL: To reduce controllable human-caused sediment delivery to the watershed in order to meet water quality objectives.
- First sediment TMDL with an Implementation Strategy
- Adopted into Basin Plan January 3, 2002



Garcia River Watershed Sediment TMDL: Compliance Options

- Option 1. Waste discharge prohibitions that apply in the Garcia River Watershed
- Option 2. Erosion Control Plan and an approved Site-Specific Management Plan
- Option 3. Erosion Control Plan and the Garcia River Management Plan

Option 2 and Option 3 Requirement: Erosion Control Plan

1. Inventory of Sediment Delivery Sites (>10 yds³ over 40 years)
2. Sediment Reduction Schedule (10 year period)
3. Assessment of Landslides and Unstable Areas
4. Effectiveness Monitoring (Annual)



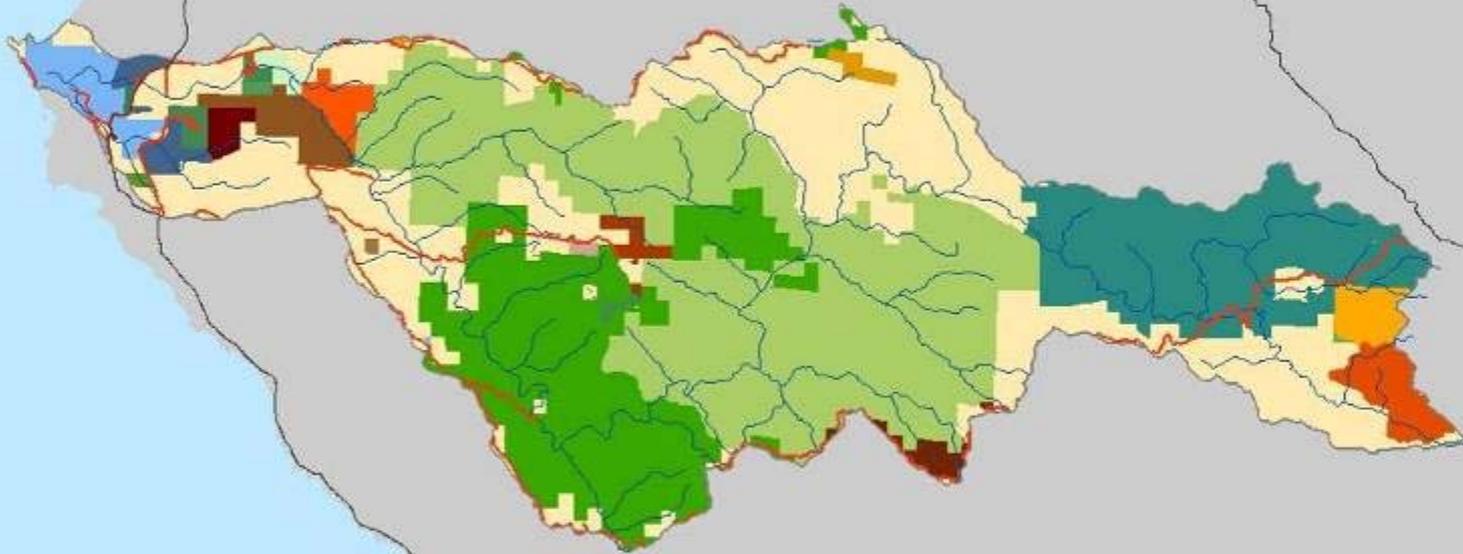
Option 2 and 3 Requirements: **Land Management Plan**

- Landowners follow a set of pre-approved BMPs that are in the TMDL, or;
- Develop “roughly equivalent” BMPs to prevent future sediment discharges.

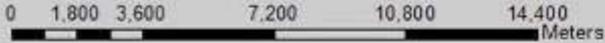


Garcia River Watershed

Sediment TMDL Compliance Distribution



Status: Approximately 2/3 of watershed currently participating in TMDL compliance efforts.



NCRWQCB Grant Management

- ***Garcia Headwaters TMDL Implementation Grant - \$808,822***
Mendocino County Resource Conservation District; 319(h) Grant
- ***Fish Rock Road Sediment Reduction Project - \$787,552***
Mendocino County Department of Transportation; 319(h) Grant -
- ***Garcia River Bank Stabilization - \$55,695***; Bioengineering Assoc.
- ***Garcia River Trend and Effectiveness Monitoring: \$107,485***;
Mendocino County RCD

The Nature Conservancy and NCRWQCB

Garcia River Monitoring

- Physical Habitat Characterization
 - Channel Dimensions
 - Slope, Bearing
 - Thalweg Profile
 - Substrate Size
 - Embeddedness
 - Bank Characteristics
 - Human Influence
 - Debris Torrent
 - Channel Constraint
- Stream Discharge Measurements



TNC and NCRWQCB Garcia River Monitoring

- **Biological Measurements**

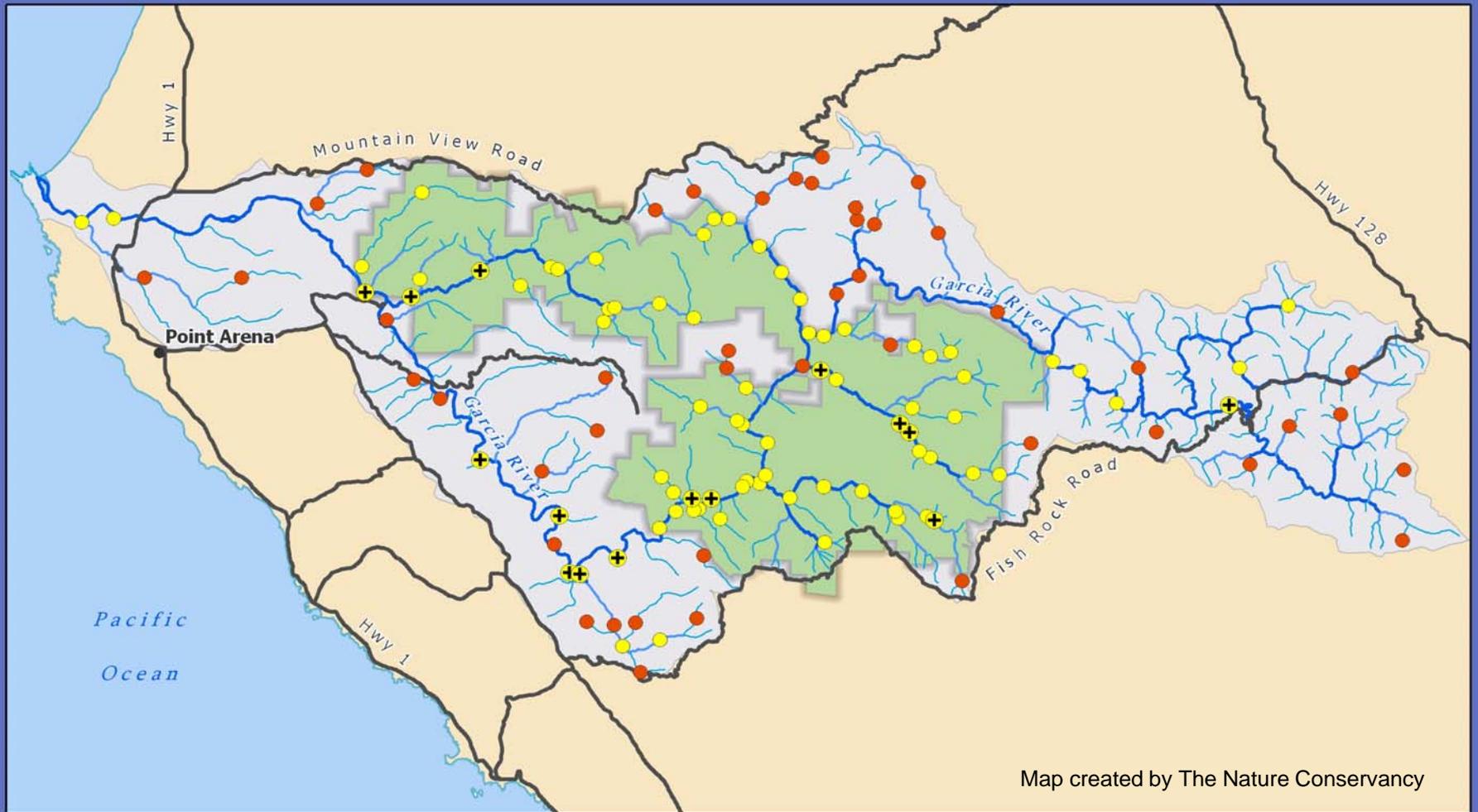
- Large Woody Debris Tally
- Benthic Macroinvertebrates
- Algae and Diatoms
- Canopy Cover Measurements
- Riparian Vegetation Structure
- Legacy Tree Survey
- Instream Fish Cover
- Invasive Plant Survey
- Aquatic Vertebrate Monitoring

- **Ambient Water Quality**

- Dissolved Oxygen
- pH
- Temperature
- Conductivity
- Turbidity
- Nutrients
- Metals



Garcia River EMAP X-Sites



Map created by The Nature Conservancy

- Panel 1
- Panel 1 Unsampld
- Public Roads
- Garcia River Forest
- Garcia River Watershed

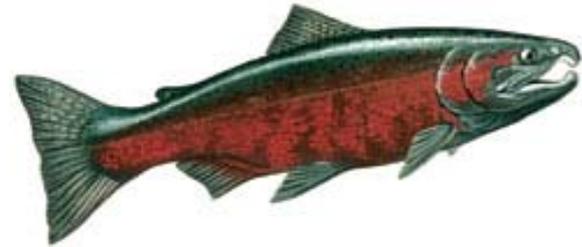
0 1 2 4 Miles



If we restore it, will they come?



Chinook Salmon



Coho Salmon

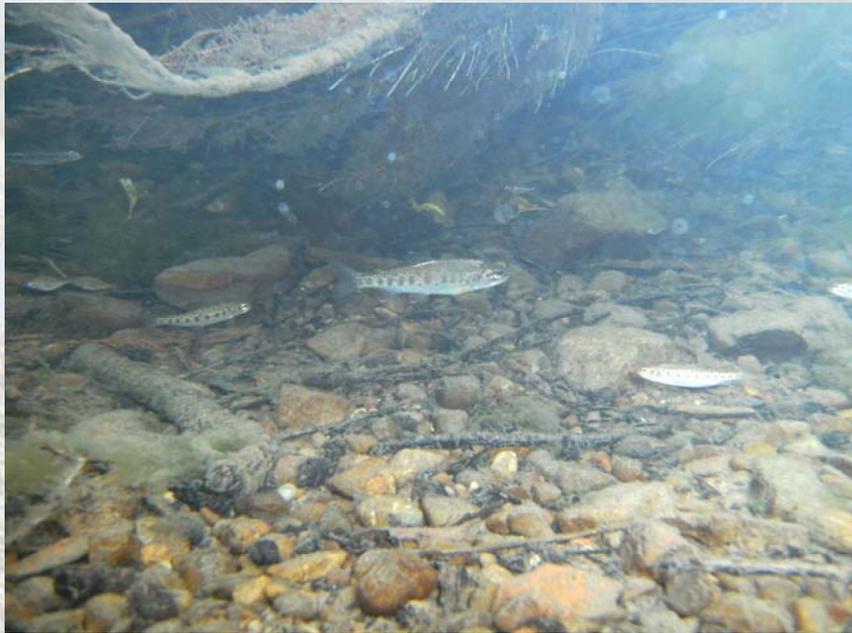


Steelhead Trout



Pink Salmon

Steelhead trout populations are fairing well. Annual returns of approximately 1,000 adults, down from 4,000 in 1960s. Catch and release of winter steelhead permitted.

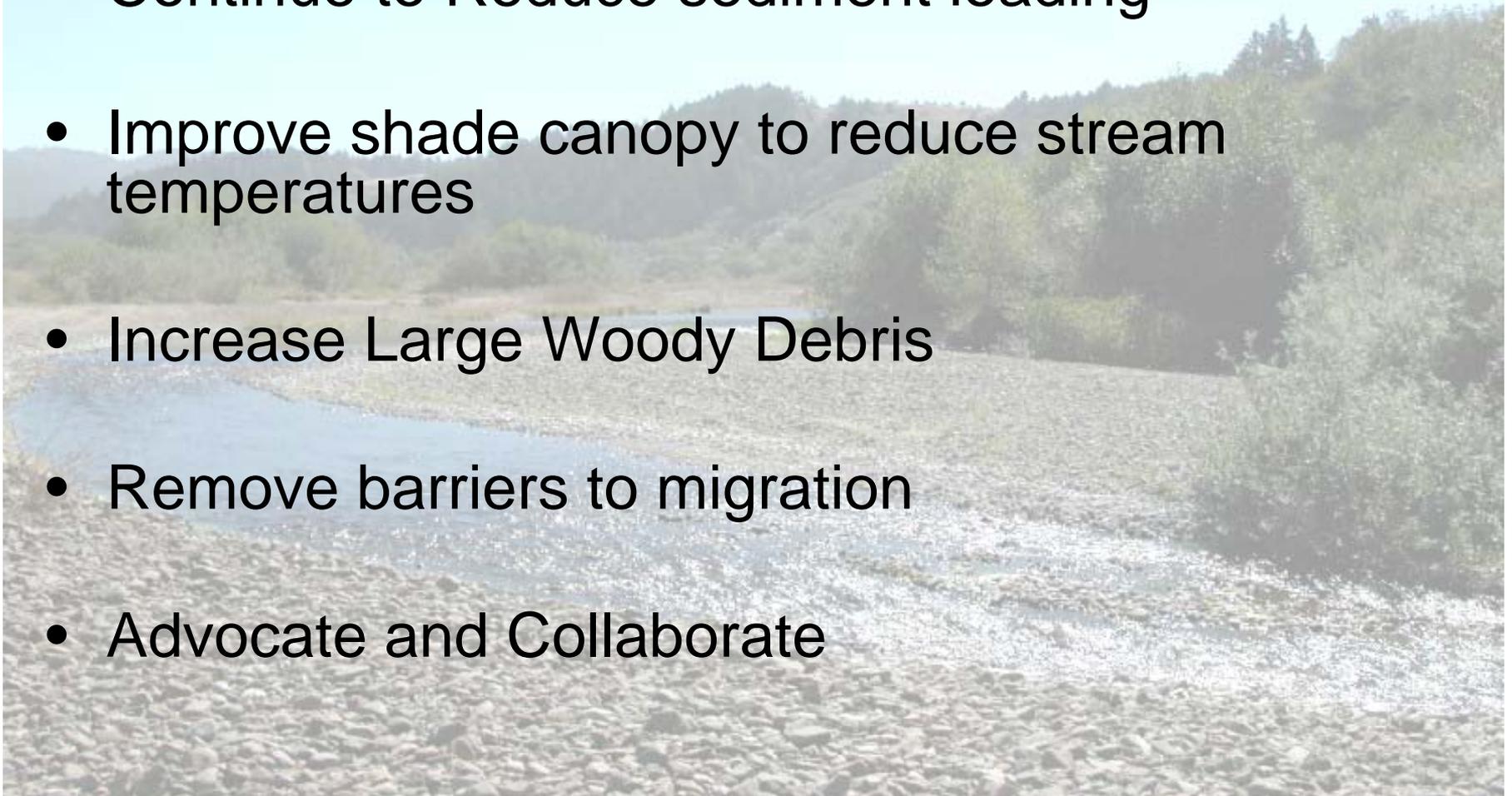


Coho salmon populations are very depressed. However, over the past two years of monitoring we continue to find them in low numbers throughout the watershed.



Priority Recovery Actions

- Continue to Reduce sediment loading
- Improve shade canopy to reduce stream temperatures
- Increase Large Woody Debris
- Remove barriers to migration
- Advocate and Collaborate



THANK YOU!

The ongoing effort to restore the Garcia River watershed and save our pacific salmonids involves numerous landowners, consultants, agencies, NGOs, stakeholders, concerned citizens, and spans back over multiple decades.

Thank you to all who have taken part!