

September 16, 1973

## BIG SULPHUR CREEK

SONOMA

Entire	Mouth	Headwaters	20 miles
Russian River		11 N	10 W 7
None			Russian

## Personal Observations

EXTENT OF OBSERVATION: Big Sulphur Creek was checked at several points on August 8 by B. Finlayson. The creek was completely surveyed by foot and from car from its confluence with the Russian River to its headwaters by B. Finlayson and J. Nelson on September 4, 5, 7 and 13, 1973.

LOCATION: Big Sulphur Creek enters the Russian River two miles north of Cloverdale, California. The creek flows due west from its headwaters near Middletown, California.

RELATION TO OTHER WATERS: Big Sulphur Creek contributes winter and summer flows to the Russian River System, provides passage for both upstream and downstream migration of anadromous salmonids to the creeks tributaries.

## GENERAL DESCRIPTION:

Watershed and Immediate Drainage System- Big Sulphur Creek and its tributaries drain a basin of approximately 60 square miles, most of which is oak-grassland. The creek flows through a narrow and steep canyon, occasionally opening into shallow valleys. The creek is typified by steep walls (750 feet high carved out of outcroppings of bedrock) and bordered by oak, alder, madrone and some pine. Riparian streamside cover is limited along the entire stream.

Altitude- 400 feet at confluence with Russian River: 2400 feet at headwaters.

Gradient- 200 feet/mile overall.

Width- Average: eight feet; range: three to 30 feet.

Depth- One foot average; three inches to six feet range.

Flow- Range from 1.9 c.f.s. near mouth to 0.3 c.f.s. near the headwaters, with an overall average of 0.5 c.f.s.

Velocity- Slow to moderately rapid.

Bottom- In the lower 13 miles, with a few exceptions, the bottom is composed of 50% gravel, 20% rubble, 20% boulder and 10% sand and silt; however, the immediately summer streambed is entirely covered with silt, organic matter and algae. The upper seven miles of stream is typified by a bedrock streambed filled with 60% boulder, 20% rubble, 20% gravel and 10% silt and organic matter.

Spawning Area- In the 13-mile section, from the confluence with the Russian River to the Geysers Resort, spawning gravels are abundant, with about one-half of the streambed suitable for spawning. This is typified by a three-mile section which parallels the H-E Ranch and offers excellent spawning gravels. Suitable spawning areas are limited to one-tenth of the streambed above the Geysers Resort due to large amounts of bedrock outcroppings.

Pools- Over one-half of the creek consists of bedrock pools with an average depth of four feet

Shelter- Excellent shelter is provided by many undercut rocks and banks.

Barriers- (See attached map)

<u>Type Location</u>	<u>Description</u>	<u>Comments</u>
Falls- 1/4 mile u/s Geysers T 11 H, R 8 W, Sec. 19 boulders.	50 feet high; composed of bedrock outcropping and large	Impassable to steelhead trout

<u>Area Location</u>	<u>Description</u>	<u>Comments</u>
Slide Area - 1 mile u/s Russian T 11 N, R 9 W, Sec. 14	250 feet long section. Two 30-foot diameter boulders are emerging into the creek.	During heavy rains this winter the slide will cause problems in steelhead migration.
Slide Area - 1/2 mile d/s Geysers T 11 N, R 9 W, Sec. 14	Slide has covered 250- foot section of the creek with 10 feet of rock. The slide starts at The Geysers Road and goes into the creek at a 60 degree declination 750 feet below.	Will cause siltation problem during winter months. Good possibility of The Geysers Road falling into the creek.

Diversions- Three permanent diversions are located on the creek. (See attached map). Water was also being diverted from the stream two miles above the Geysers Resort with a portable pump believed to be owned by Union Oil (see attached map).

<u>Station Data</u>	<u>Sta. 1</u>	<u>Sta. 2</u>	<u>Sta. 3</u>
Water Temperature	75 - 106°F	70°F	68°F
Air Temperature	64°F	70°F	70°F
Time	0930	1600	1700
Weather	Clear	Clear	Clear
Altitude (ft.)	0900	1200	600
Flow (c.f.s.)	0.5	1.7	1.9

Food- Trichoptera larvae were abundant, especially below The Geysers, for three miles downstream (250/sq. ft.). Diptera, Hemiptera, Plecontera and Odonata also were present la that order of abundance.

Aquatic Plants- Sedge, algae and cattails.

Winter Conditions- Six feet above summer level.

Pollution- With the exception of the smell of H<sub>2</sub>S in the air, no observable pollution was noticed from the geothermal activity in the vicinity of the Geysers Resort at the time of the survey. Several hot springs are entering the creek above the Geysers Resort. There is heavy runoff from livestock grazing areas downstream from The Geysers.

Springs- Most of the hot springs are concentrated around the area of The Geysers. In one case, the effluent from a hot springs which bubbles up in a large pool, changed the upstream water temperature from 66°F to 75°F downstream. This undoubtedly has some effect on the steelhead fishery.

FISHES PRESENT AND SUCCESS: A few steelhead trout (three inches in length) were noted in the lower 17 miles of the creek (1/1000 ft. of stream). Rainbow trout were noted from three miles above the Geysers to the headwaters (25/106 ft. of stream) and ranged from two to eight inches in length. No fish were seen in a one-half mile section from the Geysers Resort downstream. Sacramento squawfish were noted up to the 50-foot falls [?] above the Geysers (35/100 ft. of stream). Suckers were noted almost all the way to the headwaters (35/100 ft. of stream) as were roach (50/100 ft. of stream).

OTHER VERTEBRATES: Snakes, salamanders and frogs. There is an over-abundance of frogs in a one-mile section from the Geysers Resort downstream.

FISHING INTENSITY AND OTHER RECREATIONAL USE: None.

ACCESSIBILITY: Access may be gained to lower 14 miles through The Geysers Road which parallels the creek. The Geysers Road is two miles north of Cloverdale off of U.S. Highway 101. Access to the upper reaches may be gained through the use of a private dirt road, owed by Union Oil Company. This road starts at the Geysers Resort.

OWNERSHIP: Lower 8 miles is owned by P. C. Hale residing at the H-E Ranch located on the Geysers Road. From the end of Hale's land to the Geysers Resort, access is controlled by The Geysers Cattle Company. The land above the Geysers Resort is owned by Union Oil Company.

POSTED OR OPEN: Posted.

IMPROVEMENTS: The slide area approximately one mile above the confluence with the Russian River should be removed and Maintained to assure passage for steelhead trout into the upper tributaries. The second slide area, one-half mile downstream from The Geysers should be removed to prevent the appearance of a fish barrier, and the possible siltation which will result during the winter months. A cement embankment placed on the south slope of the slide could stop future damage to the stream.

PAST STOCKING: Unknown.

GENERAL ESTIMATE: Apparently, anadromous salmonids do not presently utilize this stream for spawning or summer nursery areas to any degree, even though suitable spawning and available nursery areas exist. This may be due to: (1) adverse or unfavorable water quality; (2) competition for food and space with other fish species, and (3) predation by abundant Sacramento squawfish. The unfavorable water quality is a result of both historical natural pollution resulting from several hot springs entering the creek and the impact that has resulted from geothermal activity in the vicinity of the Geysers Resort. The creek does provide a passage for the migration of steelhead trout into the tributaries such as Squaw Creek and Frasier Creek. Stream surveys on these creeks have also recently been conducted and can be found in the files under those names.

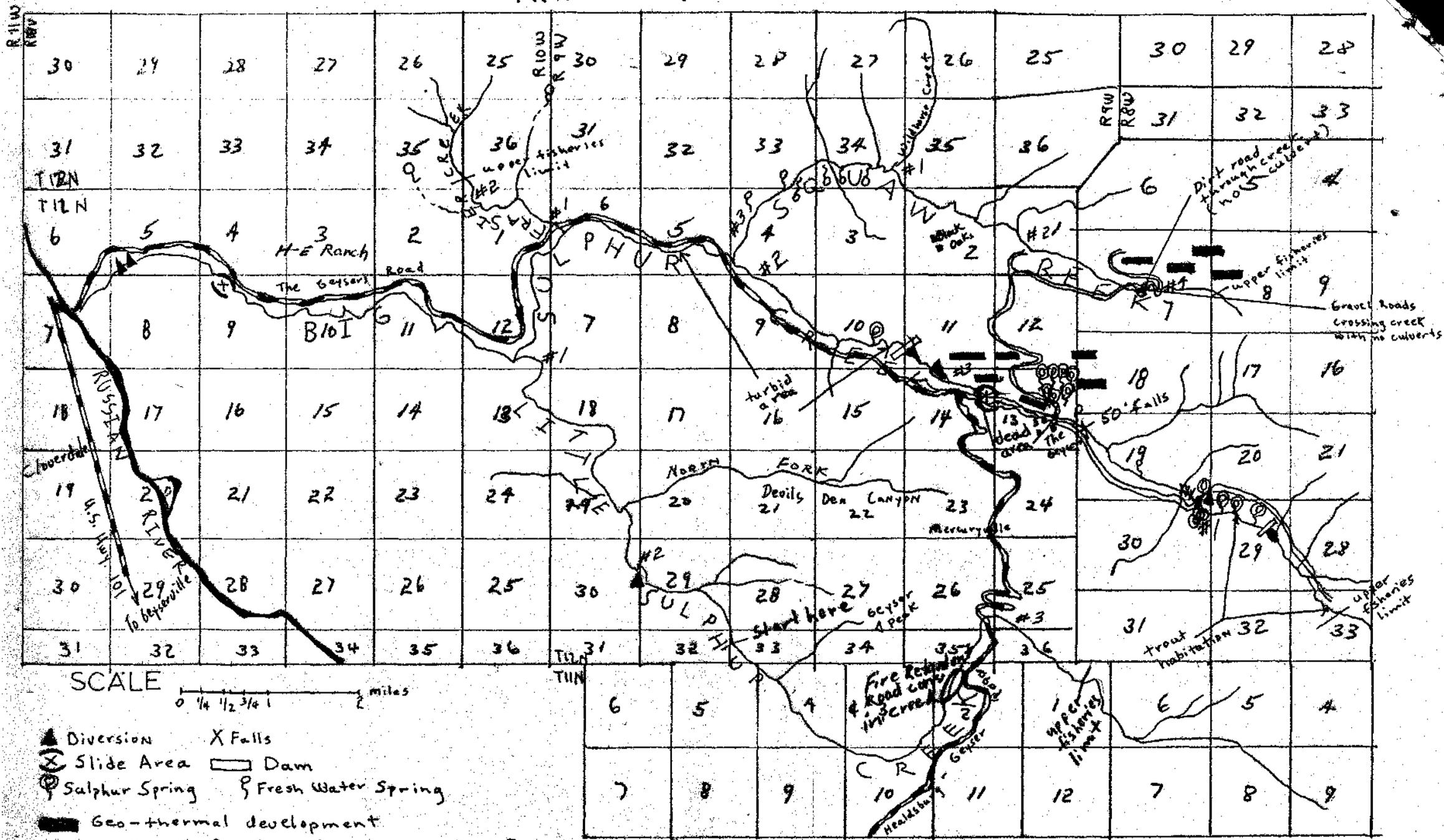
RECOMMENDED MANAGEMENT: Chemically treating the stream to eliminate non-game fish species would be desirable. This should alleviate some of the competition and predation in the nursery areas during the summer. Particular attention should be made to determine the effects of the geothermal development upon the surrounding aquatic environment.

SKETCH MAP: Attached.

REFERENCES: U.S.G.S. 15 minute series (Kelseyville Quad) 1959. Scale 1:62,500

# BIG SULPHUR CREEK SONOMA COUNTY

T11N R10W Sec 7



SCALE 0 1/4 1/2 3/4 1 2 miles

- ▲ Diversion
- ⊗ Slide Area
- ⊙ Sulphur Spring
- Geo-thermal development
- X Falls
- Dam
- ⊕ Fresh Water Spring

— Paved road    - - - - - Dirt Road