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THE RESOURCES AGENCY OF CALIFORNIA
Department of Fish and Game

STREAM SURVEY

Date: August 21, 1975

NAME: BIG SULPHUR CREEK **COUNTY:** Sonoma

STREAM SECTION: Partial **FROM:** NW 1/4 of Sec.19 **TO:** Concrete bridge Bridge near powerplant, **LENGTH:** 1.5 mi.

TRIBUTARY TO: Russian River **TWP:** 11 N **R:** 10 W **SEC:** 7 1.5 mi. upstream, SE 1/r of Sec. 19

OTHER NAMES: None **RIVER SYSTEM:** Russian River

SOURCES OF DATA Personal observations of Gene Geary and Mark Coleman and past surveys done by Bruce Thomson (1968) and B. Finlayson (1973)

EXTENT OF OBSERVATION: The partial section of Big Sulphur Creek was walked on August 21, 1975 by Mark Coleman and Gene Geary. Several pools were examined with snorkel gear. The identification of fish species is positive. The estimate of abundances is based on snorkel-diving and visual observations as stream was walked.

RELATION TO OTHER WATERS: Big Sulphur Creek contributes summer and winter flow to the Russian River and provides spawning and nursery area for steelhead. Big Sulphur Creek is one of the larger tributaries to the Russian River.

GENERAL DESCRIPTION:

Watershed and Immediate Drainage Basin: Big Sulphur Creek and its tributaries drain approximately 85 square miles of rugged mountainous terrain on the east side of the Russian River drainage. The stream heads from the northwest slope of Pine Mountain near the Sonoma-Lake County line and flows about 20 miles in a northwesterly direction toward its confluence with the Russian River about 1 mile northeast of the town of Cloverdale. The creek flows through a steep and narrow canyon, occasionally opening into shallow valleys. Vegetative cover includes oak-grassland, dense stands of chaparral and some conifer on protected slopes in the headwater region. The sparse riparian vegetation is composed of willow, alder, maple, wild grape and buckeye. The streambed is generally wide and flat with extensive deposits of gravel found along most of the mid-canyon and lower stream channels. Some parts of the stream, particularly in the upper canyon, were very rugged with numerous bedrock falls. The Pacific Gas and Electric Company and Union Oil Company are active in utilizing the geothermal resources in the area. Mercury mining operations are also evident.

Altitude: 300 feet near the mouth and 3,200 feet in the headwater. Altitude where surveyed was 1,800 feet at the upstream boundary, and 1,520 feet at the downstream boundary.

Gradient: About 1 to 2 feet per 100 feet of stream throughout most of the mid and lower drainage. The gradient in the headwater region is about 5 to 10 feet per 100. In the stream section surveyed the average gradient was 7 feet per 100 feet of stream.

Width: Pools—average 12 feet, range 4-30 feet; riffles—average 10 feet, range 3-30 feet.

Depth: Pools—average 5 feet, range 1-12 feet; riffles—average 5 inches, range 1-12 inches.

Flow: Flow was estimated by the floating chip method to be approximately 2.5 cfs at upper extent of the survey section and 4.5 cfs at the lower extent of survey.

Velocity: In the upper half of the section surveyed the velocity was very rapid, approximately 1.5 ft/sec., flowing through many small falls and bedrock chutes. In the lower section surveyed the velocity is slow to rapid, averaging 6 ft/sec.

Bottom: The upper mile of the survey section the bottom is composed of 20% bedrock, 20% boulders, 20% rubble, 30% gravel and 10% sand, silt, and detritus. The lower 1/2 mile of the stream section contains approximately 10% bedrock, 20% boulders, 30% rubble, 30% gravel, and 10% sand, silt and detritus.

Spawning Areas: Suitable spawning areas are limited to about 20% of the streambed. In the upper mile of the stream section only about 10% of the streambed is suitable for spawning salmonids due to an abundance of bedrock outcropping and lack of gravel riffles with moderate velocities.
Pools: Over half of the stream section contained bedrock and boulder pools which averaged 12 feet wide, 30 feet long and 5 feet deep.
Shelter: Excellent shelter is provided by undercut rocks and banks. Canopy cover was approximately 20% with alder and willow being the major cover types.
Barriers: The section surveyed contained numerous complete and partial barriers to upstream steelhead migration. Sketch map #1 lists the sizes and location of the major barriers to fish migration.
Barriers (or hazards) to upstream migration of adult steelhead: (1) Bedrock chute, 12 feet drop in 10 feet, with series of smaller falls (<2 feet average) upstream. Downstream is a pool approximately 10 feet x 30 feet x 4 feet deep. (2) Five-foot falls approximately 30 feet downstream from Hot Springs Creek, falling into a pool approximately 20 feet x 30 feet. The bottom of this pool was covered with algae, and had a light scum on the surface. (3) Seven-foot falls, passable at high flows because of a chute going around falls. Downstream is a pool approximately 10 ft. x 20 ft. Temperature station #8 was taken below the pool. (4) Seven-foot falls, going into a pool approximately 25 feet x 200 feet. This was temperature station #9. (5) Two falls—the upper one is 12 feet high in the main channel and 4 feet high in a dry channel on the south side. The lower one is approximately 10 feet high. These falls have been listed as a complete barrier to upstream migration in both the 1968 and 1973 stream surveys of Big Sulphur Creek.
Diversions: None.
Temperatures: Temperatures in the creek ranged from 73°F to 78°F, except where small hot springs raise the temperature locally to the mid 80°'s (sketch map #2).
Food: Caddisfly larva of the genus Helicopsyche and Leptocella were very abundant. Water bugs (Pelocoris) were also abundant. Mayfly, stonefly, damselfly and dragonfly nymphs were also present in that order of abundance. Other aquatic organisms observed were planarians, water pennys, water striders and snails.
Aquatic Plants: Swordgrass, horsetail, filamentous algae, cattails, and rushes (Cyperus and Juncus). Swordgrass, horsetail and filamentous algae were abundant throughout the survey section.
Winter Conditions: Approximately six feet above summer flow levels.
Pollution: Several springs enter the creek and add minerals which may have an influence on salmonids. Some of the springs are very warm and have an effect on the temperature of the creek. PG&E and Union Oil Company have constructed numerous dirt roads which appear to add to the siltation of the streambed. The lower 1/2 mile of the section surveyed is used by grazing livestock and their droppings were observed in close proximity to the flowing stream.
Springs: (See sketch map #1.) (1) Located approximately 50 feet up Hot Springs Creek. This spring is warm (102°F) but has no effect on the downstream temperature (77°F above Hot Springs Creek, 77°F below). (2) Small hot spring (no effect on stream temperature). (3) Cold spring which adds only a trickle to the creek. (4) Small hot spring which has no effect on the downstream water temperatures.
FISHES PRESENT AND SUCCESS: Roach, sucker, RT/SH were present. Roach and suckers were very abundant in pool areas. Rainbow trout and/or steelhead were found from Cobb Creek to the end of the survey section. Rainbow trout were also seen in Section 33, T 11 N, R 8 W, where road crosses creek. Roach—abundance 300/100 feet, average size 3 inches, range of sizes 1 1/2-6 inches. Sucker—80/100 feet abundance, 6 inches average, 2-14 inches range. RT/SH—60/100 feet abundance, 3 inches average, 2-10 inches range. Many of the trout were very lightly pigmented which contrasted against the dark creekbed.
OTHER VERTEBRATES: Dippers, aquatic garter snake, jays, Western skinks, Western fence lizards, cattle.
FISHING INTENSITY: Unknown.

OTHER RECREATIONAL USES: Camping and swimming.
ACCESSIBILITY: Geysers Road follows Big Sulphur Creek up to The Geysers Resort. Access to the upper reaches may be gained through the use of private dirt roads owned by Union Oil Company.
OWNERSHIP: Section surveyed is owned by Union Oil Company.
POSTED OR OPEN: Posted.
IMPROVEMENTS: None needed. Barrier removal would be too extensive to be practical.
PAST STOCKING: None in the past twenty years.
GENERAL ESTIMATE: The stream section surveyed appears to be a fairly poor trout stream. Trout distribution is probably limited by natural geothermal activity to the portion of stream below Cobb Creek. Apparently Cobb Creek contributes enough cool water to compensate for the effects that natural geothermal warming has on Big Sulphur Creek making it tolerable for trout below that point. The rugged terrain above barrier #5 would block the passage of salmon and steelhead and restrict the stream to resident fish.
RECOMMENDED MANAGEMENT: There is a large population of non-game fishes throughout the section surveyed, but due to warm summer temperatures and natural geothermal activity it is doubtful if rough fish control would significantly increase the trout population. Geothermal activities should be monitored for further incidents of erosion or pollution of the creek.
SKETCH MAP: See attached maps.
REFERENCES: USGS 7.5 minute series, The Geysers (1959).

Temperatures, Big Sulphur Creek, August 20, 1975.

#1 Pool below concrete bridge—air temp 75°F, surface temp near hot springs 84°F, temp at 3 inches (thermocline) 76°F, temp at 12 inches 74°F, temp at 8 feet 73°F.

#2 Pool below chute, 100 yards downstream—air temp 74°F, water temp 78°F.

#3 Pool directly above Hot Springs Creek—air temp 75°F, water temp 77°F.

#4 Mouth of Hot Springs Creek—air temp 82°F, water temp 82°F.

#5 Temp at hot springs 105°F.

#6 Temp of Big Sulphur Creek below Hot Springs Creek 77°F.

#7 Below dry unnamed trib downstream from Hot Creek—air temp 74°F, water temp 74°F.

#8 Air temp 79°F, water temp 73°F.

#9 Pool below 7-foot falls—air temp 80°F, surface temp 73°F, temp at 6 ft. 70°F.

#10 At colored algae, evidence of sulphur seepage—temp at seep 73°F, temp directly above, in current 72°F.

#11 Cobb Creek—air temp 79°F, water temp at mouth 69°F, water temp 100 ft. above mouth (unknown).

#12 Big Sulphur Creek directly below Cobb Creek—water temp 71°F.

#13 Water temp directly above lower falls—75°F.

#14 Water temp below falls—72°F.

#15 Hot springs on side of creek—temp in spring 119°F, temp below spring 74° F.

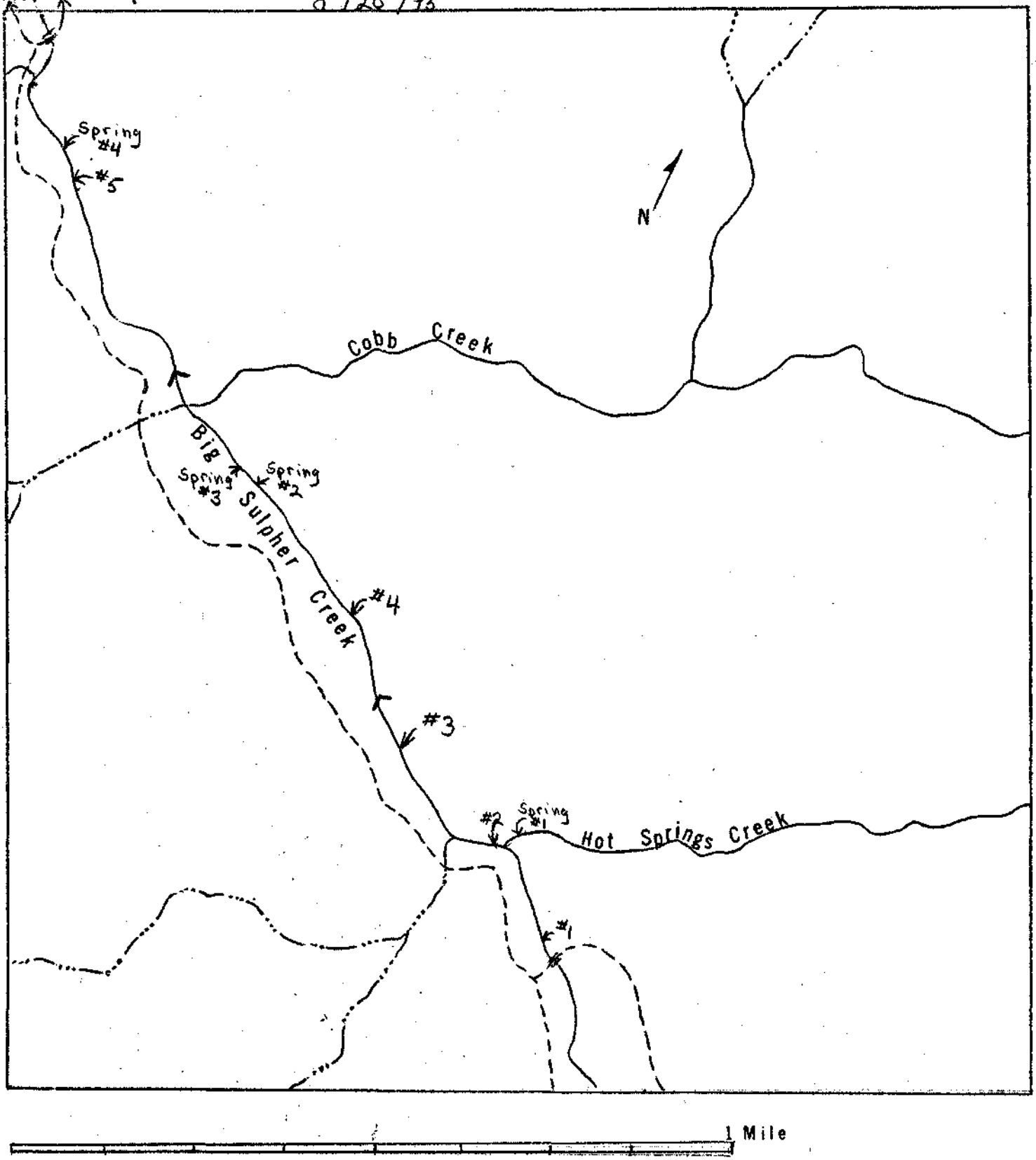
to Russian River

To Geysers Resort

To Powerplant

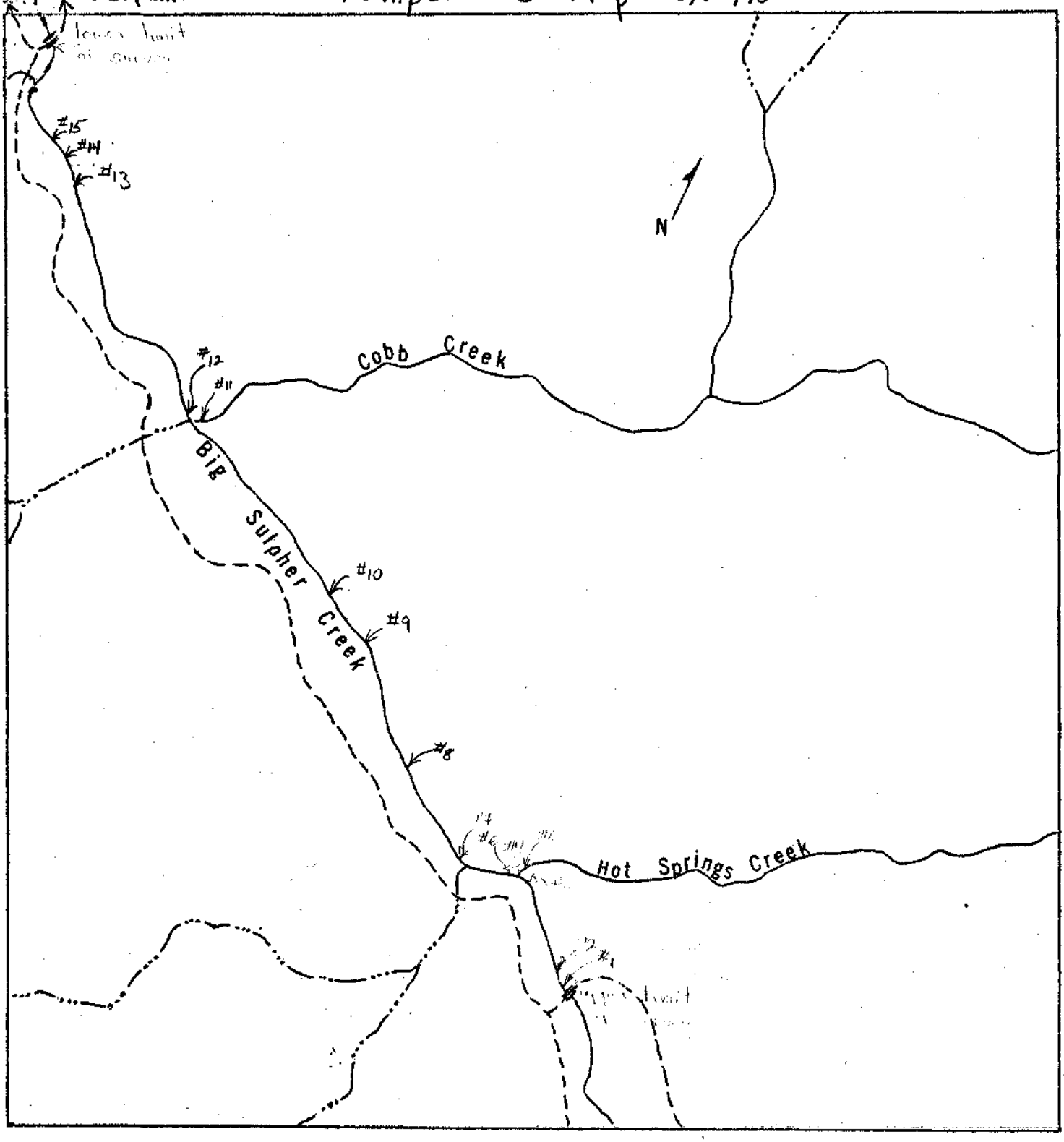
Migration Barrier and Spring Map

8/20/75



Big Sulpher Creek

T11N R8W S19



Big Sulpher Creek

T11N R8W S19