

POPULATION SAMPLING ON THREE NORTH COASTAL STREAMS
CLOSED
TO SUMMER TROUT FISHING - 1952 SEASON.
FIRST PROGRESS REPORT.¹

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INTRODUCTION

Most of the coastal streams of Sonoma and Mendocino counties have been closed to summer "trout fishing" largely at the request of various sportsmen organizations in the area. It appeared to these anglers that

¹ Submitted August 20, 1953.

we could not long crop our steelhead and salmon at the present rate by fishing them virtually continuously throughout their life cycle. They were taken as trout during the first year of their life in fresh water. They were fished both by commercial (salmon only) and sport (salmon and steelhead) fishermen when in the ocean and they were again fished in the lower reaches of the stream when they returned to spawn. All of this was going on at a very intensive rate. Since there is much more satisfaction in catching the large active adults they felt the logical place to protect the fish would be during the so-called trout stage. As they were discouraged on size restrictions, they believed a complete closure should be effected. The Department of Fish and Game was only too happy to acquiesce.

As the closure continued some individuals, who were probably quite not in favor of the closure in the first place, began to press for a summer trout season on the whole stream, and then, if not, on just a portion. They maintained among other things that a large resident population was being fostered at the expense of the anadromous fingerling population.

It was the purpose of this electric shocking survey to determine, if possible, just what the summer population composition was. The month of August was selected because most of the fish that were going to sea that spring would probably be out of the stream and we could have a true summer population picture.

METHOD

A Model 20A Homelite 60-cycle electric generator was used with an output of 1,000 watts (115V, 8.7A). The electrodes were wooden frames covered with a copper wire web and left much to be desired in the way of maneuverability.

Stations were selected on each of three rivers; the Gualala River which forms a boundary between Mendocino and Sonoma counties, and the Garcia and Navarro rivers in Mendocino County. The stations were selected as they gave representative sections of pools and riffles.

Because it might be profitable to make another check next season of the sections shocked in 1952, the stations were carefully photographed and sketched. This material is included in the Appendix.

DESCRIPTION

Navarro River

Station No. 1, as shown in figures 1 and 10 (Appendix), is a wide quiet shallow pool above a logging bridge at the junction of the Navarro River and Flume Gulch. The only cover in this pool was in a deeper hole (1.8 feet) under the bridge and under the roots of a stump which had been placed so as to prevent the bridge from being washed out. The only streamside vegetation was a clump of bunch grass and dwarfed willow in the southeast corner of the pool. The bottom was uniform sand and gravel with larger cobbles under the bridge.

Numerous minnows were in evidence along with an occasional four- or six-inch trout. The average angler would have passed the area up entirely or would have fished under the bridge.

Station No. 2, as shown in Figures 2, 3, and 11 (Appendix), is located about 150 feet downstream from Station No. 1. The head of this pool was a constricted riffle area with a small gravel bar in the center. The riffle flowed into a deep run under the bank and then

TABLE 1
NAVARRO RIVER, MENDOCINO COUNTY
August 12, 1952
STATION NO. 1

Length Frequencies - Steelhead

<u>Inches</u>	<u>Number</u>
2.0-2.5	2
2.5-3.0	8
3.0-3.5	7
3.5-4.0	0
4.0-4.5	1
4.5-5.0	<u>2</u>
Total	20

Physical Data

Surface area	3,472 sq. ft.
Mean depth	0.95 ft.
Volume	3,298.4 cu. ft.
Flow	15 cfs

Catch by Species

	<u>No.</u>	<u>Wt. in lbs.</u>
Cottids	271	1.41
<u>Gasterosteus</u>	213	0.167
<u>Hesperoleucus</u>	500	0.93
Lampreys	70	
Steelhead	20	0.248
Frogs	4	
<u>Triturus</u>	3	

TABLE 2
 NAVARRO RIVER, MENDOCINO COUNTY

August 12, 1952

STATION NO. 2

Length Frequencies - Steelhead

<u>Inches</u>	<u>Number</u>
2.0-2.5	3
2.5-3.0	18
3.0-3.5	13
3.5-4.0	6
4.0-4.5	6
4.5-5.0	11
5.0-5.5	9
5.5-6.0	2
6.0-6.5	3
6.5-7.0	0
7.0-7.5	0
7.5-8.0	0
8.0-8.5	0
8.5-9.0	1
9.0-9.5	0
9.5-10.0	0
10.0-10.5	0
10.5-11.0	0
11.0-11.5	0
11.5-12.0	1
Total	73

Physical Data

Surface area	3,008 sq. ft.
Mean depth	1.8 ft.
Volume	5,414 cu. ft.
Flow	15 cfs

Catch by Species

	<u>No.</u>	<u>Wt. in lbs.</u>
Cottids	69	1.15
<u>Gasterosteus</u>	126	0.119
<u>Hesperoleuces</u>	116	0.738
Lampreys	12(incl . 1 adult)	
Steelhead	73	2.66
Silver salmon	2	

over a submerged log into a pool with several large rocks along the south shore. The pool then widened out and began to shallow until the deepest point near the shore at the lower end was about two feet. The bottom graded from gravel and cobbles at the head of the pool to a rather uniform sand bottom at the tail. Several sunken logs were in the center. The south shore was all wooded and brushy. Roots and stumps projected into the pool from that side. The north side was a gravel bank with no significant plant growth.

This area would be heavily fished by any angler. No fish were observed but the cover and general appearance would lead one to suspect a large number of trout available.

Garcia River

Station No. 1, as shown in Figures 4 and 12 (Appendix), is located about 100 yards above Highway 1 crossing and is a wide shallow pool with gravel bottom and no stream side vegetation except for some willow growth at the head of it. The head of the pool constricts to about 20 foot wide and the foot constricts to about 15 feet. There are no large rocks on bottom and no place for fish to hide except under a piece of old tractor fender in the center of the pool.

Numerous small salmonids were noted along the margins and in the eddies. A school of sticklebacks was noted in one quiet section. The flow was calculated by the jump stick method as being 31.75 cubic feet per second. The water was clear and unruffled over most of the surface. Most fishermen would not have bothered fishing this pool as it appeared very unproductive.

Station No. 2, as shown in Figures 5 and 13 (Appendix), is located just above Station No. 1 and has a common boundary with it on

TABLE 3
GARCIA RIVER, MENDOCINO COUNTY
August 13, 1952
STATION NO.1

Length Frequencies - Steelhead -

<u>Inches</u>	<u>Number</u>
1.5-2.0	2
2.0-2.5	13
2.5-3.0	19
3.0-3.5	24
3.5-4.0	18
4.0-4.5	6
4.5-5.0	7
5.0-5.5	1
5.5-6.0	2
6.0-6.5	2
6.5-7.0	1
7.0-7.5	<u>1</u>
Total	96

Physical Data

Surface area	2,734.8 sq. ft.
Mean depth	1.54 ft.
Volume	4,211.6 cu. ft.
Flow	31.75 cfs

Catch by Species

	No.	Wt. in lbs.
Cottids	31	0.795
Lampreys (ammocetes)	12	
<u>Gasterosteus</u>	173	0.745
Trout	96	1.61

the lower end. The south side of this section was heavily overgrown with willow. The limbs and roots projected into the stream sufficiently to make efficient seining virtually impossible. The general effect was to have a long gravel bottom pool fairly uniform in width and depth and with excellent cover and shade. The north shore was a gravel bank and bordered on an old gravel pit. In addition to the cover provided by the roots and limbs projecting into the water from the south side, some roots and old limbs were on the bottom. The surface was not as placid as that of Station No. 1 but an occasional six-inch trout could be observed. A fisherman would have considered this pool as having possibilities for a good catch of five or six fish. Several fishing leaders were noted hanging in the streamside cover but were believed from their size to be from winter steelhead anglers and not closed season poachers. The area was too close to the highway and the shore too open to encourage illegal angling.

Station No. 3, as shown in Figures 6, 7, and 14 (Appendix A), is located about 200 yards downstream from the end of the Buckridge Lodge road less than a half mile downstream from the confluence of the North Fork Garcia River and the main stream. The north shore was steep and wooded while the south shore was wide gravel flat. The pool was slightly constricted in the middle, with a riffle at the head end, and shallowing out to a shallow, wide gravel bottomed run at the downstream end. The bottom was partially composed of large boulders and cobbles on the north upper side and gravel and cobbles on the north lower side and whole south side. It was well shaded and had abundant cover in the form of projecting roots and crannies between the boulders.

Due to the shade and riffle area at the head only an occasional

TABLE 4
GARCIA RIVER, SONOMA COUNTY
August 13, 1952
STATION No. 2

Length Frequencies - Steelhead

<u>Inches</u>	<u>Number</u>
1.5-2.0	0
2.0-2.5	3
2.5-3.0	2
3.0-3.5	12
3.5-4.0	20
4.0-4.5	11
4.5-5.0	8
5.0-5.5	10
5.5-6.0	16
6.0-6.5	12
6.5-7.0	7
7.0-7.5	4
7.5-8.0	2
8.0-8.5	<u>.....0</u>

Total 107

Physical Data

Surface area	2,120.4 sq. ft	•
Mean depth	1.93 ft.	
Volume	4,092.4 cu. ft	*
Flow	31.75 cfs	

Catch by Species

	<u>No.</u>	<u>Wt. in lbs.</u>
Cottids	216	9.95
<u>Gasterosteus</u>	40	0.38
Steelhead	107	6.11
Silver salmon	3	0.053

TABLE 5
 GARCIA RIVER, MENDOCINO COUNTY
 August 14, 1952
 STATION NO. 3

Length Frequencies-Steelhead-Silver Salmon

<u>Inches</u>	<u>No. Steelhead</u>	<u>No. Silver Salmon</u>
1.0-1.5	5	0
1.5-2.0	35	0
2.0-2.5	19	1
2.5-3.0	17	21
3.0-3.5	15	14
3.5-4.0	5	0
4.0-4.5	0	36
4.5-5.0	3	
5.0-5.5	1	
5.5-6.0	1	
6.0-6.5	0	
6.5-7.0	1	
7.0-7.5	1	
7.5-8.0	1	
8.0-8.5	0	
8.5-9.0	0	
9.0-9.5	1	
9.5-10.0	0	
10.0-10.5	0	
10.5-11.0	0	
11.0-11.5	0	
11.5-12.0	0	
12.0-12.5	0	
12.5-13.0	1	
13.0-13.5	1	
13.5-14.0	<u>0</u>	
Total	107	

Physical Data

Surface area	1,249.5 sq. ft.
Mean depth	1.34 ft.
Volume	1,674.3 cu. ft.
Flow	30 cfs (est.)

Catch by Species

	<u>No.</u>	<u>Wt. in lbs.</u>
Cottids	33	1.59
<u>Gasterosteus</u>	6	0.025
Steelhead	109	3.70
Silver salmon	36	0.32

small fish was observed in the quiet eddies. It would be a pool where an angler would expect to catch some good trout. Evidence in the way of picnic trash indicates people are acquainted with the pool and may fish it during the closed season.

Gualala River

Station No. 1, as shown in Figures 8, 9, and 15 (Appendix A), is about 20 yards below the confluence of the North Fork Gualala and the South Fork Gualala. It was the largest section shocked. The upstream half was a riffle area that gradually widened into a fairly shallow wide area. The lower section was deep and had good cover on the northwest bank in the form of a well-branched willow tree. This section was difficult to chock because of the depth of the water and the rate of flow. The bottom in the riffle area was gravel and cobble while the rest of the section was largely fine sand or gravel.

An angler would have fished the riffle and the area under the willow tree expecting to take fish.

DISCUSSION

From such limited data as were here obtained it is difficult to do more than draw a few tentative conclusions and to point out certain phases requiring investigation.

As there has been considerable agitation to remove this closure the first part of this discussion will center around that question. The four general reasons that have been put forth for removing the closures are as follows: (1) By not allowing angling a population

TABLE 6

GUALALA RIVER, MENDOCINO/SONOMA
COUNTY
August 15, 1952

STATION NO. 1

Length Frequencies — Steelhead

Inches	Number
1.0-1.5	0
1.5-2.0	2
2.0-2.5	5
2.5-3.0	12
3.0-3.5	46
3.5-4.0	39
4.0-4.5	17
4.5-5.0	13
5.0-5.5	10
5.5-6.0	2
6.0-6.5	2
6.5-7.0	0
7.0-7.5	1
Total	<hr/> 149

Physical Data

Surface area	4,075 sq. ft.
Mean depth	1.67 ft.
Volume	6,805 cu. ft.
Flow	54 cfs

Catch by Species

	<u>No.</u>	<u>Wt. in lbs.</u>
Cottids	49	1.26
<u>Gasterosteus</u>	47	0.127
<u>Hesperoleucus</u>	37	0.504
Steelhead	150	1.91

of large resident trout, which would otherwise **be** removed is maintained at the expense of the migrant fish of the year. Most of the fish that will migrate to the sea will do so before the fishing season opens. (2) Following the reasoning in (1), anglers would, if the stream were open crop this resident population, and since the average size of the migrant fish of the year is so small they would be left by the anglers thereby not harming the run of adult steelhead. (3) There has been no increase in the size of the adult steelhead run into these rivers since the closure. (4) The regulation is unenforceable.

In reference to (1) it was not found that a resident population of large fish was being fostered. In the one upstream section shocked on the Garcia River only 6 out of 107 steelhead obtained were suspected of being resident. Five others were probably not fish of the year.¹ In addition to the 96 steelhead of the year there were 36 fingerling silver salmon ranging from 2 to 3.5 inches in length or a total of 132 (92 percent) fish which were considered to be migrants.

The two lower stations on the Garcia River present a much different picture. A total of 203 steelhead was taken of which 130 or 64 percent were fish of the year.

Of the steelhead taken at the two stations on the lower Navarro River 52 percent were fish of the year. A comparable station on the Gualala produced 81 percent fish of the year.

There is an indication that yearling steelhead tend to concentrate during the summer in the lower reaches of the rivers while fish of the year tend to remain in upstream areas.

Of the 588 trout and salmon taken in this study five could be called resident fish (fish over the 8.0-8.5 size).

¹ All trout and salmon under 4 inches were assumed to be fish of the year.

The idea advanced in (2) that anglers will not take fish of the year is not valid. A creel check on the Mattole River on August 20, 1952 produced three salmon egg anglers who had the following catch:

<u>Size in inches</u>	<u>Number</u>
2.5-3.0	1
3.0 - 3.5	1
3.5-4.0	3
4.0-4.5	5
4.5-5.0	4
5.0 - 5.5	4
5.5 - 6.0	3
6.0 - 6.5	0
6.5 - 7.0	<u>2</u>
	23

In reference to argument (3) no check was made before the closure on the numbers of adults and no check has been made since. Opinions are notoriously exaggerated and unreliable unless the change has been spectacular. No valid statement can be made in reference to whether or not the adult run has increased. The closure has not been in effect long enough to affect the adult fishery significantly.

The fourth reason is of a law enforcement nature and will not be discussed here.

RECOMMENDATIONS

The area under discussion has probably the best set of regulations of any steelhead area along the coast. The open and closed areas are well defined and in the light of our present knowledge the regulations are biologically sound. The information secured during 1952 and reported here does not indicate this closure should be removed. One season of

intensive sampling along the lines already started would probably give more complete information which could be used to either modify the closure or to continue it in its present form.

Some of the questions which must be answered before the regulations can be intelligently changed are as follows:

1. When do the yearling steelhead and silver salmon migrate to the sea?
2. Are yearlings concentrated in the lower reaches of the rivers during the summer? If so, what is the upstream limit of the concentration?
3. What is the situation on opening day re: position of yearlings?
4. What proportion of the population is considered resident?

A good series of stations on one river such as the Garcia would give data which could be reasonably applied to the other waters. A crew consisting of one permanent or experienced biologist plus three seasonal aids would be sufficient.



Figure 1. Station 1 on the Navarro River. The inked line indicates the position of the upstream barrier. The lower barrier was placed at the downstream edge of the bridge. Flume Gulch Creek enters at the left.

August 12, 1952



Figure 2. Station 2 on the Navarro River looking downstream. The arrows indicate the position of the barrier nets.

August 12, 1952



Figure 3. The upper section Station 2 on the Navarro River.
The arrow indicates the position of the upper net.
August 12, 1952



Figure 4. Station 1 on the Garcia River.
August 13, 1952



Figure 5. Station 2 on the Garcia River. Note the excellent cover on the south bank.

August 13, 1952

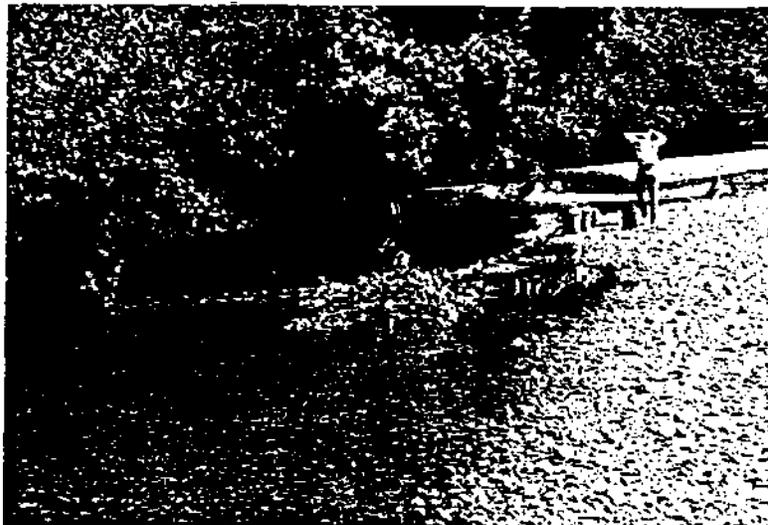


Figure 6. Station 3 on the Garcia River during the test shocking.

August 14, 1952

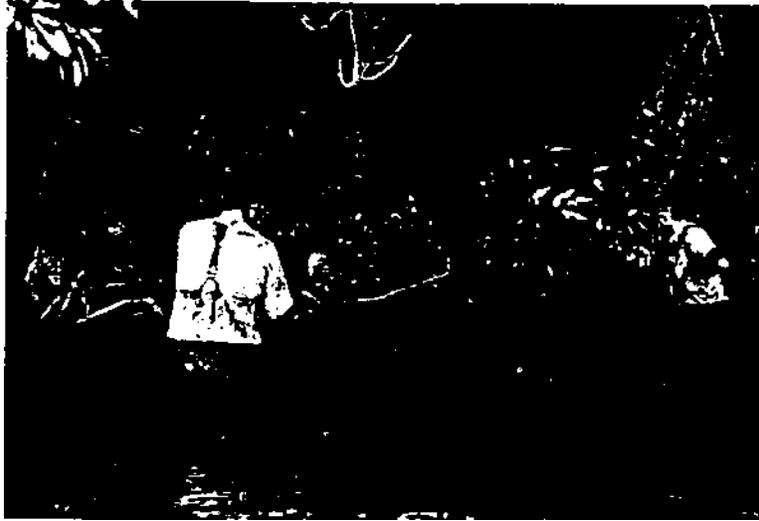


Figure 7. Station 3 on the Garcia River showing the depth of water and the abundant cover on the north side of the section.

August 14, 1952

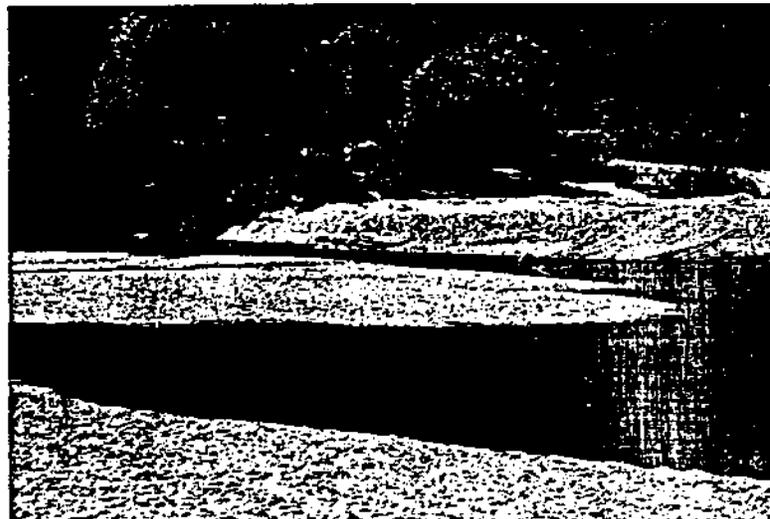


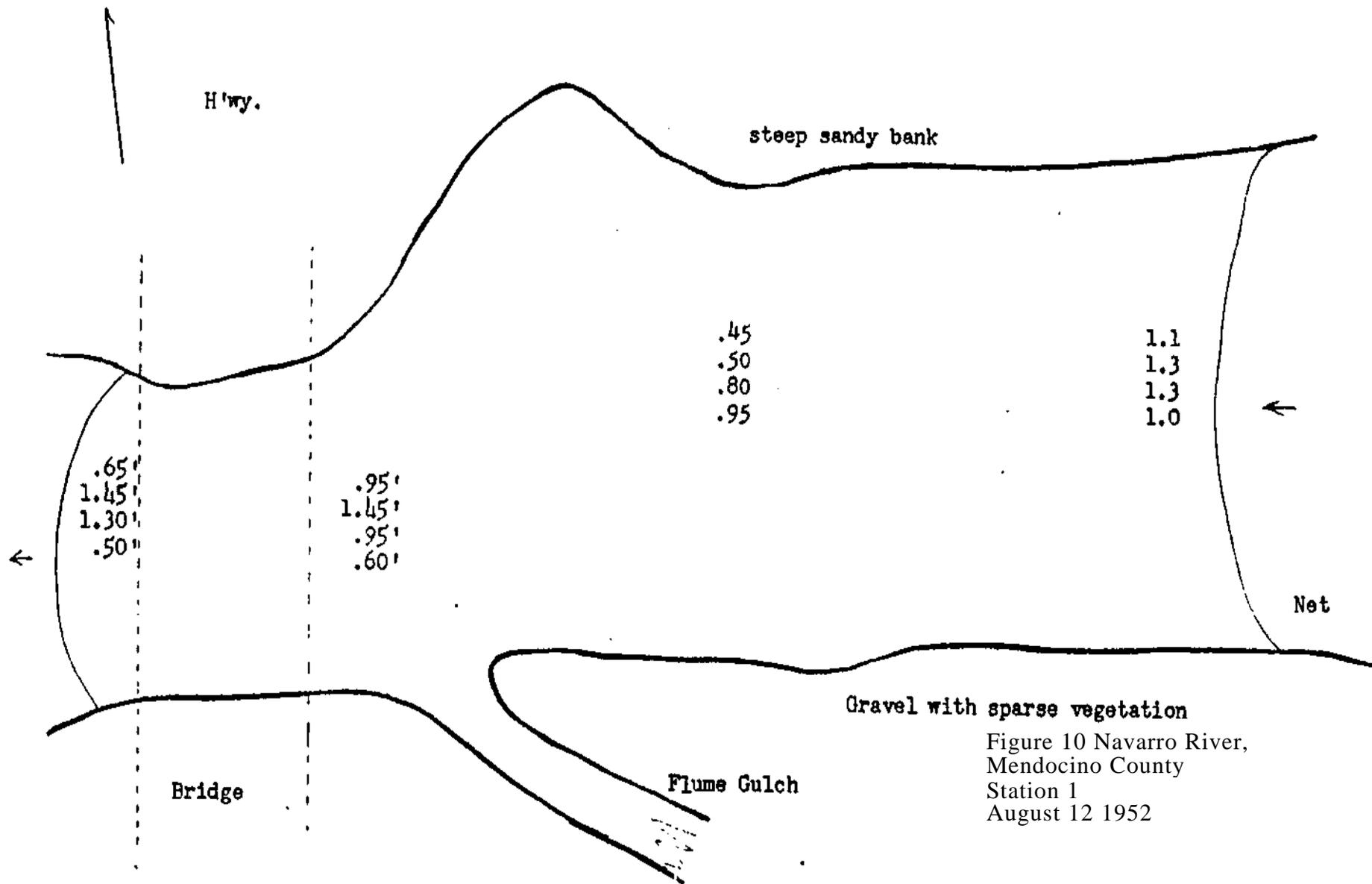
Figure 8. The upper riffle section of Station 1 on the Gualala River. The North Fork Gualala River joins the main stream a few yards upstream.

August 15, 1952



Figure 9. The lower section of Station 1 on the Gualala River. This was the deep pool area.

August 15, 1952



Gravel with sparse vegetation
 Figure 10 Navarro River,
 Mendocino County
 Station 1
 August 12 1952

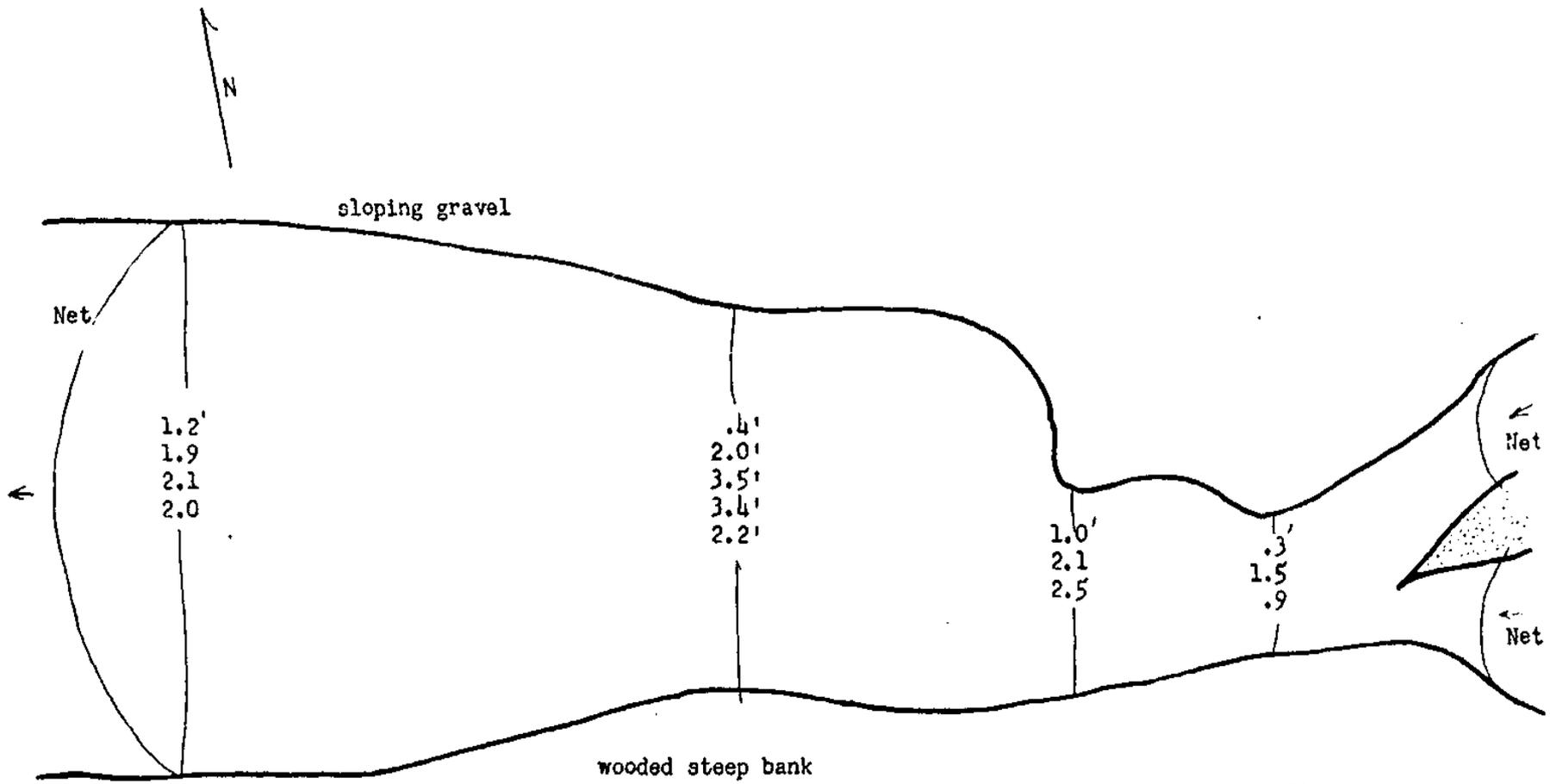


Figure 11
 Navarro River, Mendocino County
 Station 2
 August 12, 1952

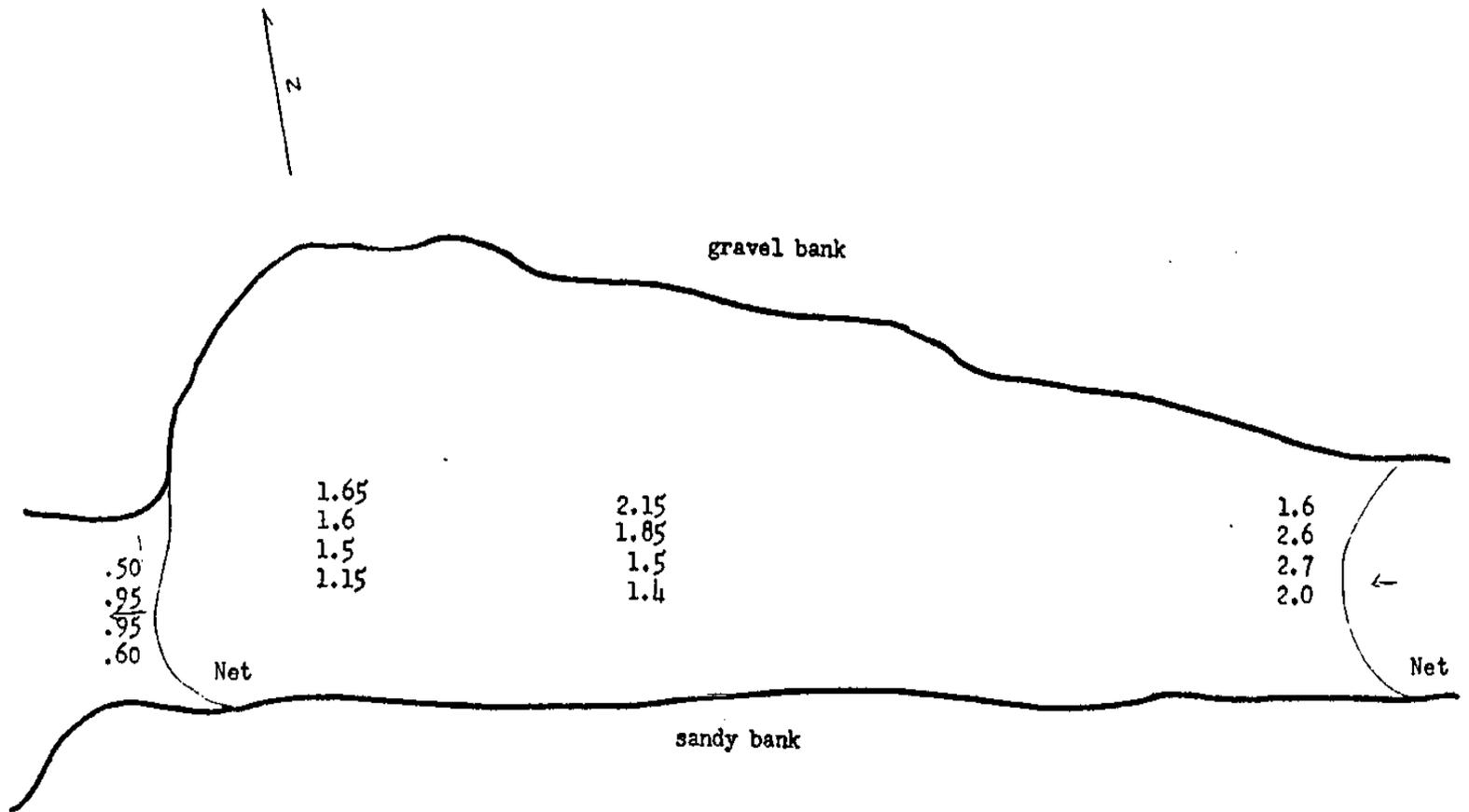


Figure 12 Garcia River, Mendocino County
 Station 1 August 13, 1952

200 yds. upstream from State Highway 1 Crossing

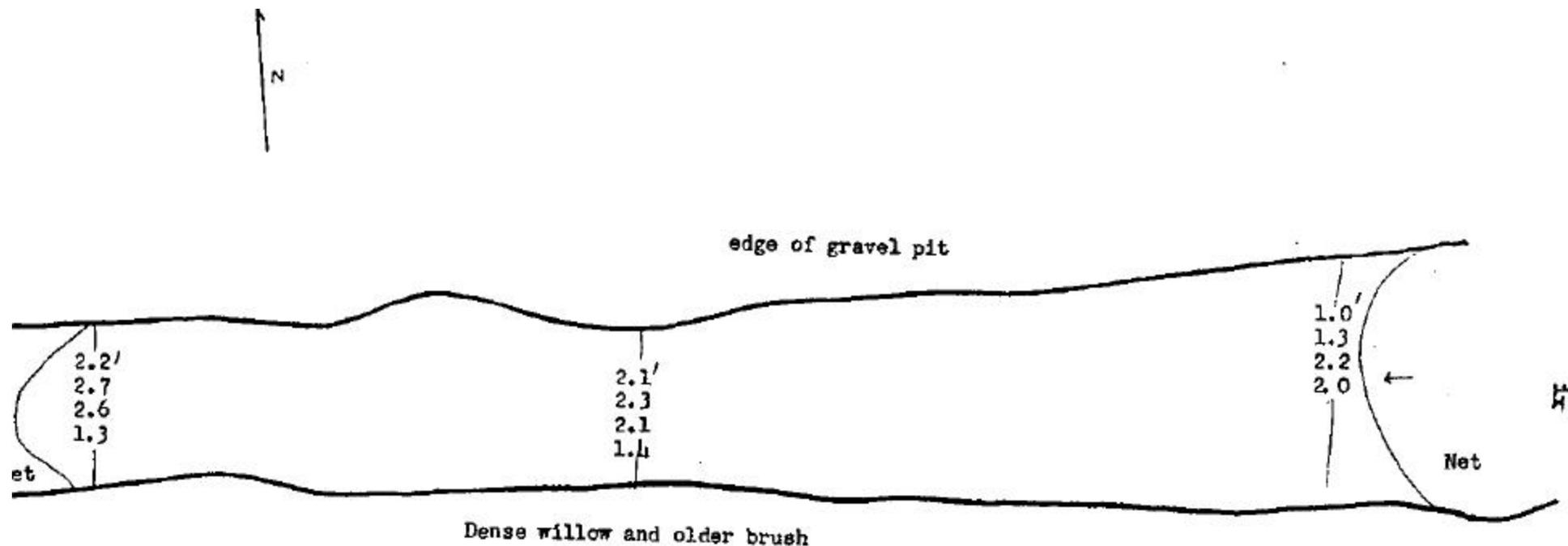


Figure 13
 Garcia River, Mendocino County
 Station 2
 August 13, 1952

250 yds. upstream from
 State Highway 1 crossing

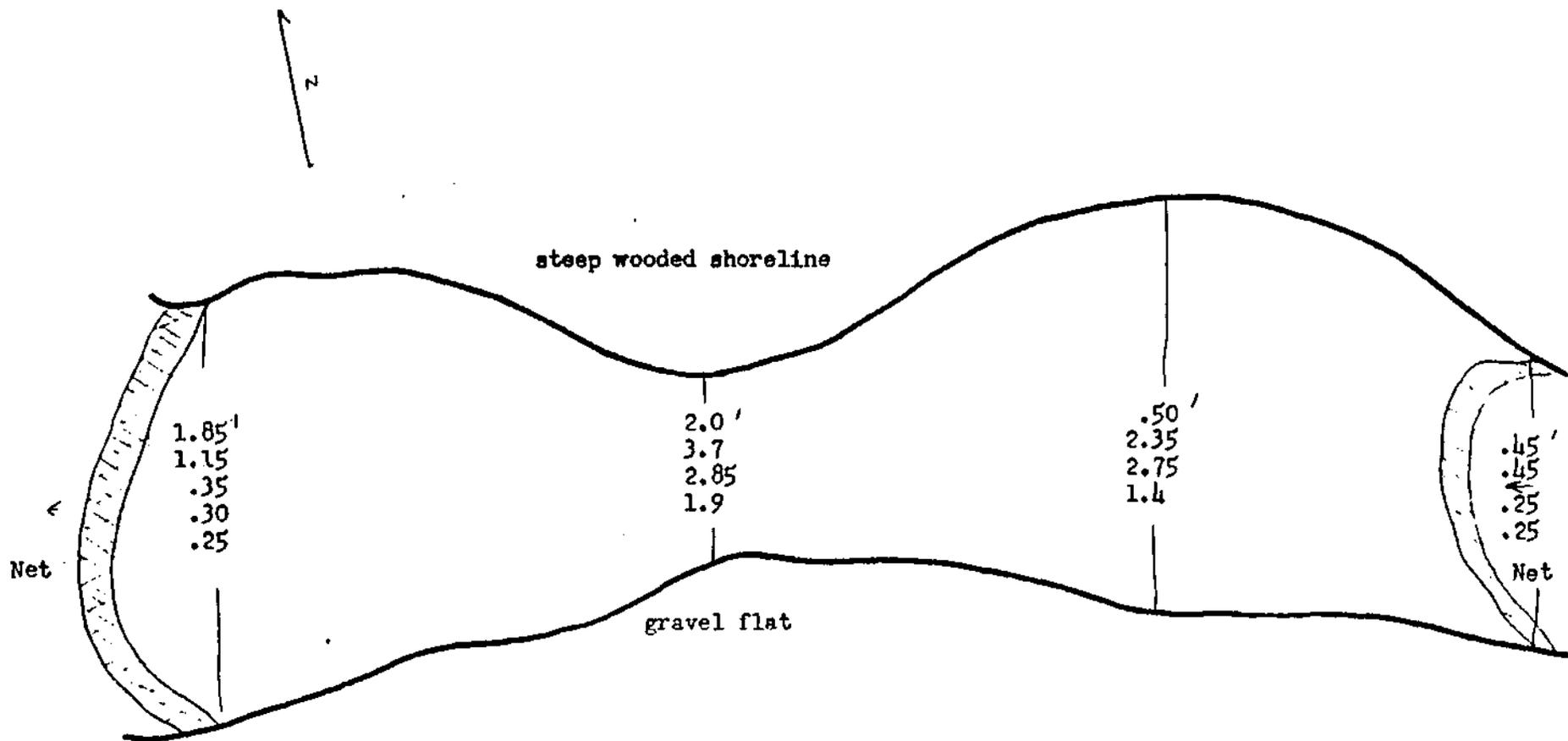


Figure 14
 Garcia River, Mendocino County
 Station 3
 August 14, 1952

Just below confluence of N. Fk. at end of
 Buckridge Lodge road.

NW 1/4, Sec. 10, T 12 N, R 16 W, M D & B

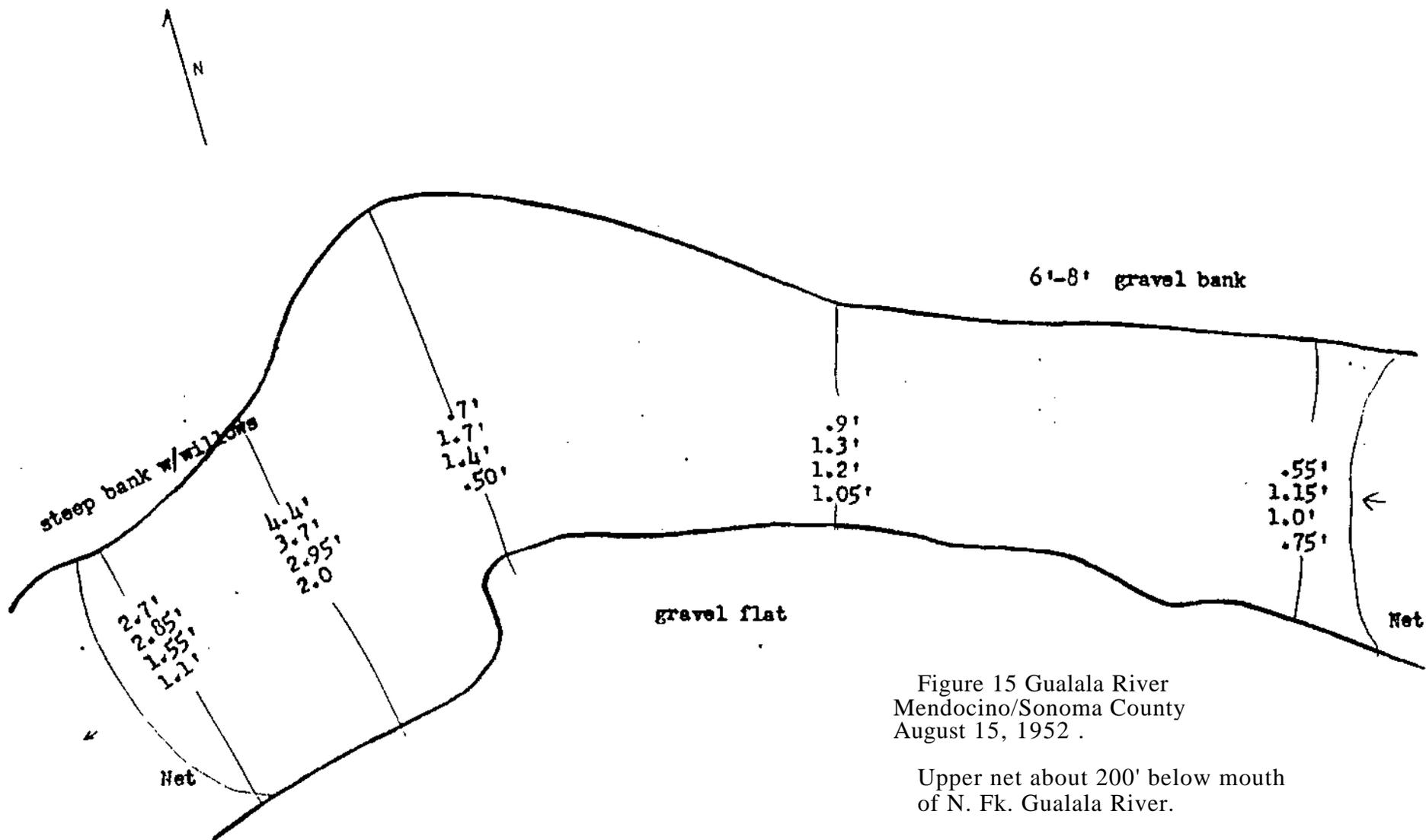


Figure 15 Gualala River
Mendocino/Sonoma County
August 15, 1952 .

Upper net about 200' below mouth
of N. Fk. Gualala River.

Log of Fish Species Collected

Navarro River

Cottids (2 species)	<u>Cottus sp.</u>
Stickleback	<u>Gasterosteus aculeatus</u>
Navarro Roach	<u>Hesperoleucus navarroensis</u>
Pacific Lamprey (ammocetes)	<u>Entosphenus tridentatus</u>
Steelhead Rainbow Trout	<u>Salmo g. gairdneri</u>
Silver Salmon (Station 2)	<u>Oncorhynchus kisutch</u>

Garcia River

Cottids (2 species)	<u>Cottus sp.</u>
Stickleback	<u>Gasterosteus aculeatus</u>
Pacific Lamprey (ammocetes)	<u>Entosphenus tridentatus</u>
Steelhead Rainbow Trout	<u>Salmo g. gairdneri</u>
Silver Salmon (Stations 2, 3)	<u>Oncorhynchus kisutch</u>

Gualala River

Cottids (2 species)	<u>Cottus sp.</u>
Stickleback	<u>Gasterosteus aculeatus</u>
Short-finned Roach	<u>Hesperoleucus parvipinnis</u>
Steelhead Rainbow Trout	<u>Salmo g. gairdneri</u>

GARCIA RIVER

TOTAL WATERSHED ACRES 72.636

MAJOR SUBBASINS WITH APPROX. ACREAGES

PARDALOE CREEK	6,765
REDWOOD & CORAL CREEK	960
MILL CREEK	2,750
INMAN CREEK	5,525
SIGNAL CREEK	4,060
LARMOUR CREEK	1,565
SOUTH FORK GARCIA RIVER	2,800
NORTH FORK GARCIA RIVER	6,430

DOMINANT LANDOWNER

MAILLIARD, BARR, WHEELER, ALDEN
MAILLIARD
MAILLIARD
R & J
R & J
HANES
LP
R & J

MAJOR LANDOWNERS WITH APPROX. ACREAGES

LP	11,400
R & J	24,000
STORNETTA	6,500
ALDEN	1,300
MAILLIARD	8,700
HANES	<u>3,000</u>
	54,900

75% of the land is held by 6 owners