8-144

Santiago Creek

261

1992

ASSOCIATED LABORATORIES
806 North Batavia - Orange, California 92668 - 714/771-6900 FAX 714/538-1209

CLIENT

California Regional Water Quality Control Board (1079)
Attn: Nancy Martin
2010 Iowa Ave. Suite 100
Riverside, CA 92507

LAB NO. G35694-01
REPORTED 09/10/92

SAMPLE IDENTIFICATION: Wastewater - H.S.
Santiago Creek - Water Quality Assessment
Date Collected 08/11/92 @ 1055 Hrs.
As Submitted

RECEIVED 08/11/92

BASED ON SAMPLE

STANDARD MINERAL ANALYSIS

Constituent	Method	Results	
Alkalinity	SM 403	296	mg/l
Ammonia	EPA 350.2	ND <0.1	mg/l
Bicarbonates	SM 403	361	mg/l
Boron	SM 200.7	0.16	mg/l
Calcium	EPA 200.7	96	mg/l
Carbonates	SM 403	ND <1	mg/l
Chloride	A1000	23	mg/l
Electrical Conductivity	EPA 120.1	849	µmhos/cm
Fluoride	EPA 200.7	0.01	mg/l
Iron	EPA 200.7	ND <0.007	mg/l
Magnesium	EPA 200.7	29	mg/l
Nitrate Nitrogen	B1011	0.02	mg/l
pH	EPA 150.1	7.93	
Potassium	EPA 200.7	ND <0.3	mg/l
Sodium	EPA 200.7	40	mg/l
Sulfate	A1000	142	mg/l
Total Anions	Calculated	9.52	meq/l
Total Cations	Calcutated	8.91	meq/l
Total Dissolved Solids	EPA 160.1	564	mg/l
Total Hardness	Calculation	153	mg/l
Total Phosphate	EPA 365.2	0.09	mg/l

Continued on Page 2

SAWPA DES
001006069

:-1 10M

Client : California Regional Water
Quality Control Board
Lab No.: G35694-01

COMBINED NUTRIENT ANALYSIS

Constituent	Method	Results	
Ammonia Nitrogen	EPA 350.2	ND <0.1	mg/l
Kjeldahl Nitrogen	EPA 351.3	0.3	mg/l
Nitrate Nitrogen	B1011	ND <0.02	mg/l
Nitrite Nitrogen	B1011	ND <0.03	mg/l
Organic Nitrogen	Calculation	0.3	mg/l
Total Nitrogen	EPA 350.2	0.3	mg/l
Orthophosphate Phosphorus	EPA 365.2	ND <0.01	mg/l
Total Phosphorus	EPA 365.2	0.09	mg/l

Constituent	Method	Results
MBAS	EPA 425.1	ND <0.05 mg/l
Total Coliform		2,200 MPN/100mls
Fecal Coliform		260 MPN/100mls
Fecal Strep.		110 MPN/100mls
Enterococcus		9 Col/100mls

ASSOCIATED LABORATORIES: by:

Robert A. Webber
Vice President

RAW/jaw

SAWPA DES
001006070

PURPOSE

The purpose of sampling Santiago and Silverado Creek was to evaluate if the use of septic systems in the mountain communities is having an adverse impact on surface waters designated as MUN. Sampling was performed to evaluate whether the Basin Plan Objectives and/or primary drinking water standards for nitrate, MBAS, and Coliform bacteria are being met and if these streams are able to fully support the designated MUN and other beneficial uses (GWR,REC-1,REC-2,COLD,WILD). The data will also be used to evaluate whether there is a significant difference in the water quality data of stations located upstream of housing areas and stations located downstream of housing areas. Additionally, the data will be used to determine if the concentration of water quality parameters increase downstream. This data will also be compared to previous data taken at Santiago and Silverado Creeks on 3/20/85 in order to evaluate if trends in water quality parameters are ocurring.

DISCUSSION

SANTIAGO CREEK

Santiago Creek could only be sampled at one station, due to lack of water throughouut most of the creek. This station was not sampled previously and could only be compared to stations sampled in 1985 in close proximity of it. Of the three constituents mentioned previously, only coliform exceeded objectives significantly. Compared to 1985 results total Coliform increased, while fecal coliform decreased. All other constituents which were tested for in 1985 increased in 1992, except hardness (Table 1). These increases may be due to sampling this creek in the late summer months as opposed to the spring when the whole stream is running. This creek may need more testing in the spring to determine if housing septic systems are causing an increased total coliform count. No comparison could be made between upstream and downstream samples due to the lack of water at this time of year.

SILVERADO CREEK

Silverado Creek was also dry throughout most of its length, the only part which was running was that upstream from Ladd Creek confluence. This part of the creek was not sampled in previous years and thus could only be compared to data taken at stations downstream of those stations sampled in 1992. The three samples which were taken in 1992 were spread out to include at the beginning of the running water (#4), in the middle of town (#3), and at the edge of town downstream (#2). Station #4, unfortunately could not be taken before housing started due to the lack of running water further upstream.

Of the three constituents stated earlier, MBAS and Nitrate do not show significant levels present, but total coliform was exceedingly high in station 2 and 3 (16000 MPN), while station 4 was also high (3000 MPN) it was not as extreme as 2 and 3. This

trend in coliform shows extremely high amounts through the middle of towm and going downstream. By looking at fecal coliform a trend is also seen with the smallest amount (23 MPN) upstream before the largest amount of housing is present while the middle of town has the highest levels (16000 MPN) and further downstream shows a decrease to 3000 MPN. By looking at this trend in the data, septic tanks could be having an impact on the water quality of this creek, but more data is needed to evaluate this conclusion.

Several other constituents with objectives in the basin plan also show levels wich are exceeding the objectives. Also, those constituents measured in 1985 show increases when compared to 1992 data. As with Santiago Creek these high levels may be due to the late sampling performed in 1992. Due to the high levels of the 1992 constituents, especially coliform, this creek needs to be investigated further when the whole creek is flowing.

Santiago/Silverado Creek
8/11/92

Constituent	Method	Sant. Ck	MUN BPO	Results Sil/Ladd	Sil/fire	Sil. RD	MUN BP Obj.
Alkalinity	SM 403	296		230	294	302	
Ammonia	EPA 350.2	ND		ND	ND	ND	
Bicarbonates	SM403	361		281	359	368	
Boron	SM 200.7	0.16	0.75	0.43	0.35	0.11	0.75
Calcium	EPA 200.7	96		127	140	168	
Carbonates	SM 403	ND		ND	ND	ND	
Chloride	A1000	23	12	38	27	23	20
EC	EPA 120.1	849		1260	1210	1230	
Flouride	EPA 200.7	0.01	1	0.03	0.03	0.02	1
Iron	EPA 200.7	ND	0.3	ND	ND	ND	0.3
Magnesium	EPA 200.7	29		45	44	46	
Nitrate-N	B1011	0.02		0.75	0.15	0.3	
pH	EPA 150.1	7.93		8.12	7.84	7.31	
Potassium	EPA 200.7	ND		1.5	1.3	0.8	
Sodium	EPA 200.7	40	20	79	65	38	30
Sulfate	A1000	142	80	351	362	363	275
Tl. Anions	Calc.	9.52		13.03	14.19	14.24	
Tl. *Cations*	*Calc.*	*8.91*		*13.51*	*13.46*	*13.84*	
TDS	EPA 160.1	564	350	888	916	873	650
Tl. Hardness	Calc.	153	260	502	530	608	450
Tl. Phosphate	EPA 365.2	0.09		0.02	ND	ND	
Ammonia-N	EPA 350.2	ND	0.03	ND	ND	ND	0.025
Kjeldahl-N	EPA 351.3	0.3		0.6	0.1	0.7	
Nitrate-N	B1011	ND	10	0.75	0.16	0.06	10
Nitrite-N	B1011	ND		ND	ND	ND	
Organic-N	Calc.	0.3		0.6	0.1	0.7	
Tl. Nitrogen	EPA 350.2	0.3		1.4	0.3	0.8	
Ortho-phos	EPA 365.2	ND		ND	ND	ND	
Tl. Phos	EPA 365.2	0.09		0.02	ND	ND	
MBAS	EPA 425.1	ND	0.5	ND	ND	ND	0.5
Tl. Coliform		2200	100	16000	16000	3000	100
Fec. Coliform		260		3000	16000	23	
Fecal Strep		110		3000	260	27	
Enterococcus		9		280	161	16	
Temp.		23.1		23.1	22.6		
pH		8.04		8.3	7.93		
EC		700		1100	1100		

WQA
FIELD FORM

DATE: 8/11/92 AIR TEMP: 88-92° F

SAMPLER(S): HMS, MMS

WATER BODY: Santiago + Silverado Creeks

SAMPLE LOCATION
#1: Santiago Creek @ Modjeska Cyn (1055)

#2: Silverado @ Ladd Ck confluence (1130)

#3: (1145) Silverado - .8mi upstream from Shady Brook fire station

#4: (1205) Silverado - @ end of Silverado Rd

H_2O TEMP: #1	23.1	pH: #1	8.04	EC: #1	700 (24)
#2	23.1	#2	8.3	#2	1100 (25)
#3	22.6 ~~(22)~~	#3	7.93	#3	1100 (24)
#4	22.4	#4	7.45	#4	1000 (24)

LAB ANALYSIS:

MBAS	Fecal strep	Enterococcus
Minerals	Fecal Coli	
Nutrients	Total coli.	

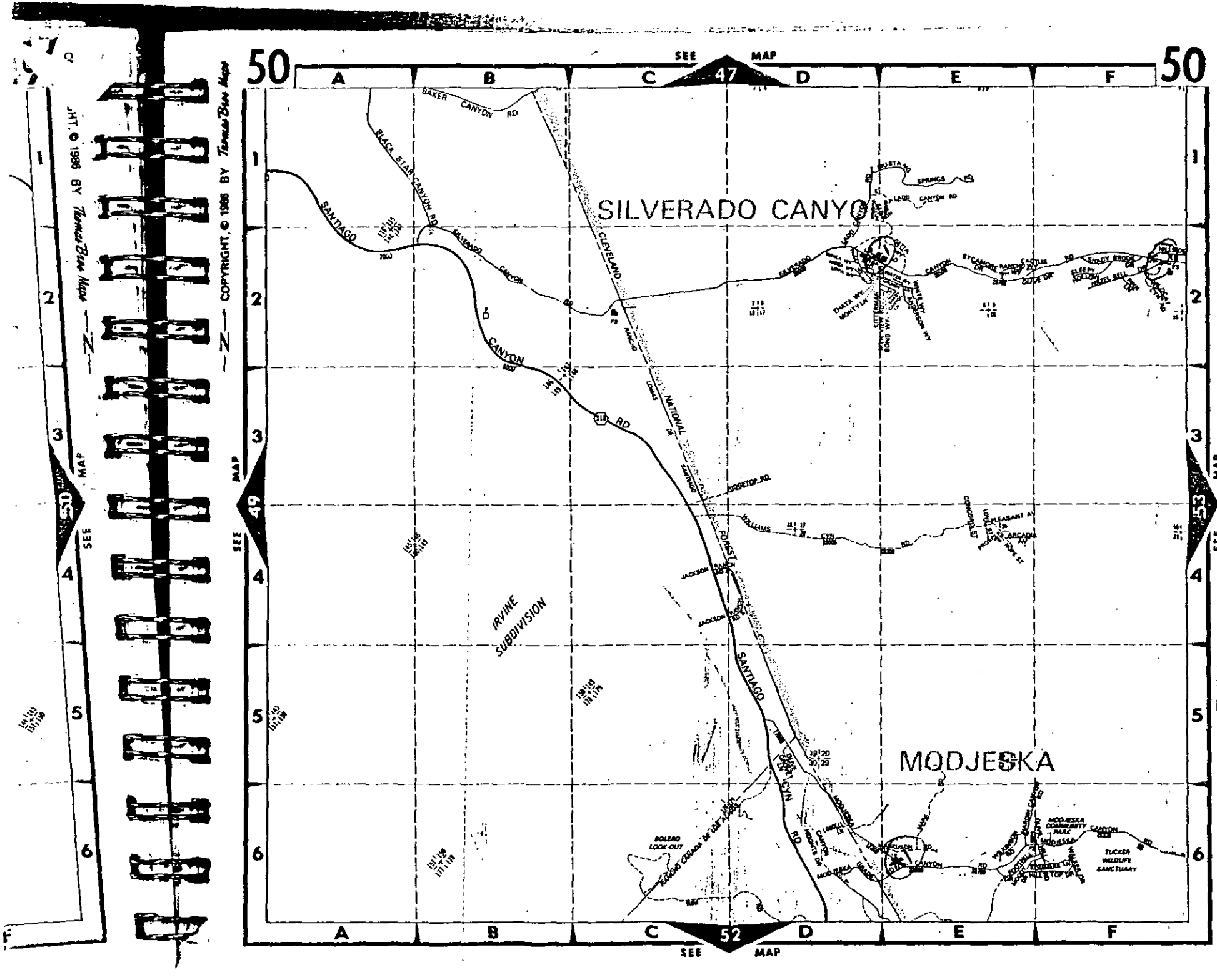
COMMENTS: - most of streams were dry at this time of year

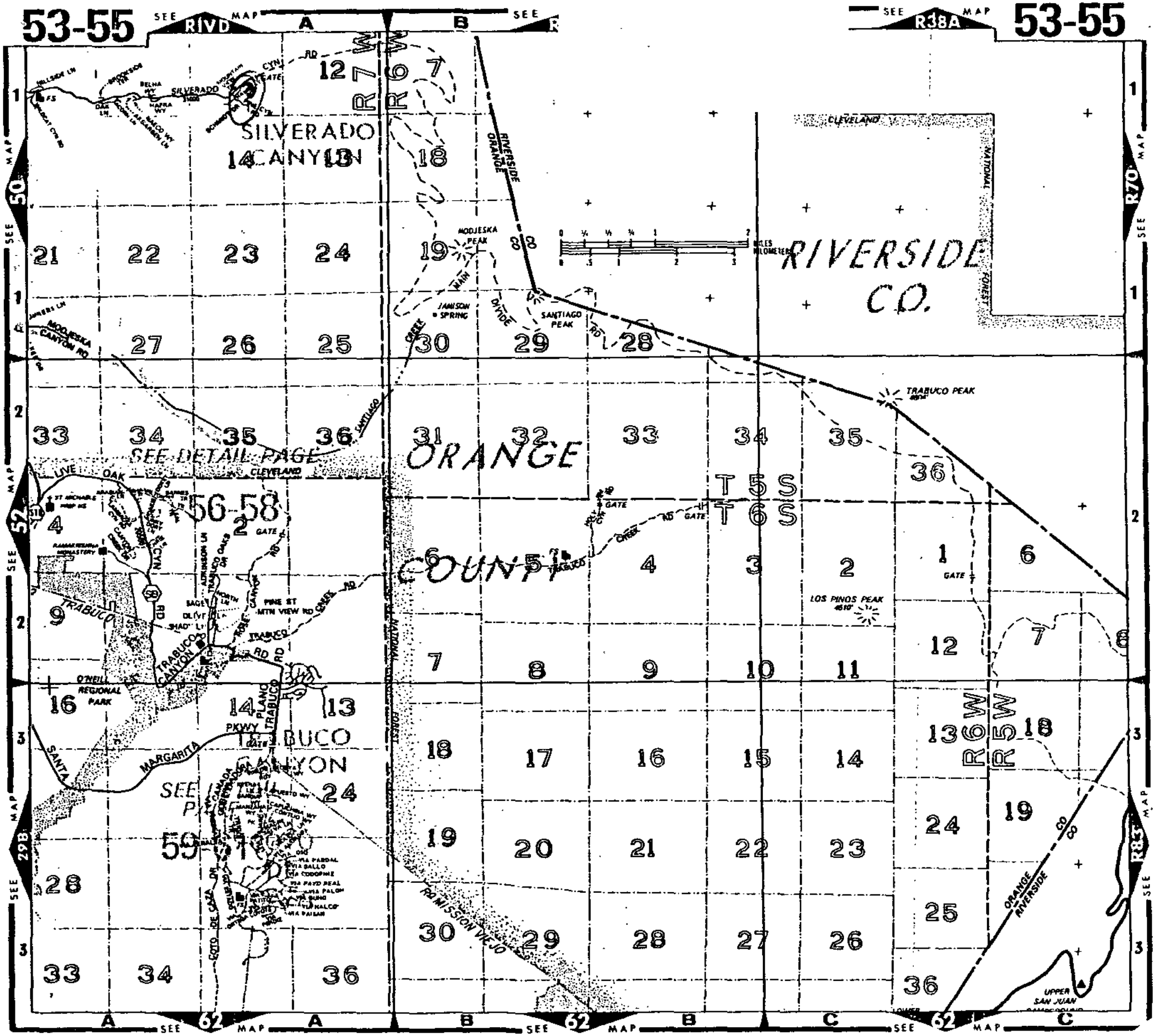
Table 1

Santiago Creek
1992 vs. 1985

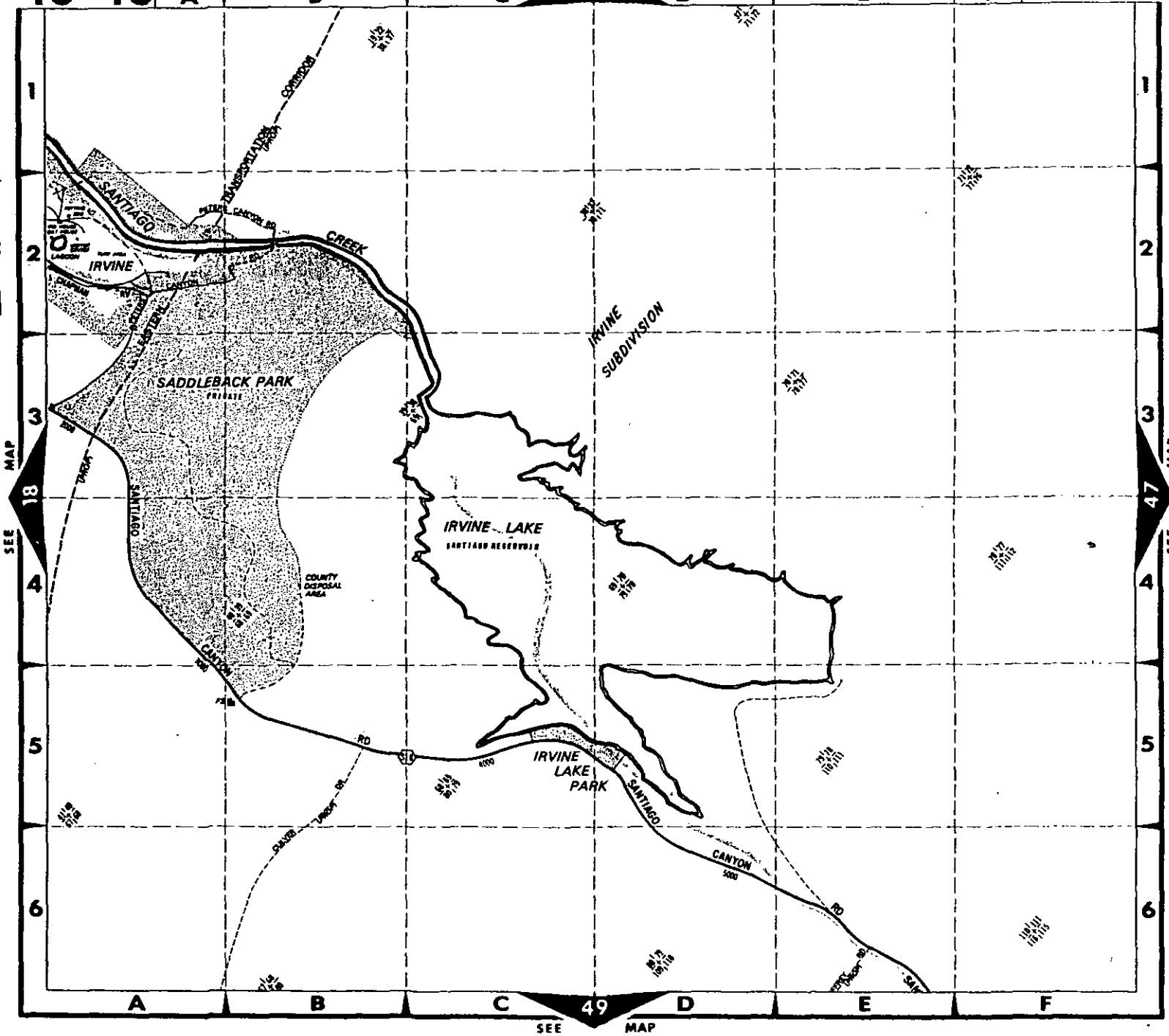
Constituent	1992 #1		1985 #9	1985 #10
Chloride	23		9	11
Sodium	40		21	25
Sulfate	142		79	96
TDS	564		350	380
Hardness	153		285	295
Nitrate	ND		ND	ND
Tl. Phosphorous	0.09		ND	ND
Tl. Coliform	2200		1600	500
Fecal Coliform	260		300	500
Temperature	23.1		16	18

* Site 1 1992, Santiago Creek @ Modjeska Canyon
* Site 9 1985, Santiago Creek @ Wildlife Sanctuary
* Site 10 1985, Santiago Creek @ USGS Gaging station


50
SEE MAP 47
A
B
C
D
E
F
BAKER CANYON RD
BLACK STAR CANYON RD
SANTIAGO
SILVERADO CANYON
CLEVELAND
NATIONAL FOREST
SANTIAGO CANYON RD
IRVINE SUBDIVISION
SANTIAGO
MODJESKA
SEE MAP 49
SEE MAP 51
SEE MAP 52
ORANGE CO.
1
2
3
4
5
6


SEE RIVD MAP
SEE R38A MAP
SILVERADO CANYON
R7W
R6W
RIVERSIDE
ORANGE
MODJESKA PEAK
MAIN DIVIDE
JAMISON SPRING
SANTIAGO PEAK
RIVERSIDE CO.
CLEVELAND
NATIONAL
FOREST
TRABUCO PEAK
SEE DETAIL PAGE
56-58
ORANGE
COUNTY
T5S
T6S
LOS PINOS PEAK
MODJESKA CANYON RD
LIVE OAK
CLEVELAND
TRABUCO CANYON
O'NEILL REGIONAL PARK
SANTA MARGARITA PKWY
PLANO TRABUCO
TRABUCO CANYON
59-61
R6W
R5W
RD MISSION VIEJO
ORANGE RIVERSIDE
UPPER SAN JUAN
SEE 50 MAP
SEE 52 MAP
SEE 29B MAP
SEE R70 MAP
SEE R83 MAP
SEE 62 MAP

ORANGE CO.



46-48

ORANGE CO

Draft

Santiago/Silverado Creek
8/11/92

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Nitrite-N	B1011	ND		ND	ND	ND	
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Tl. Nitrogen	EPA 350.2	0.3		1.4	0.3	0.8	
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Tl. Phos	EPA 365.2	0.09		0.02	ND	ND	
MBAS	EPA 425.1	ND	0.5	ND	ND	ND	0.5
Tl. Coliform		2200	100	16000	16000	3000	100
Fec. Coliform		260		3000	16000	23	
Fecal Strep		110		3000	260	27	
Enterococcus		9		280	161	16	
Temp.		23.1		23.1	22.6		
pH		8.04		8.3	7.93		
EC		700		1100	1100		

It's interesting that TDS and the parameters which make up TDS (Ca, Na) exceed the objectives.

generally objectives are more stringent in Santiago Cr,

are these actually > 16,000?
no

8/11/92 -

Silverado / Santiago Creeks (5 each site)

MBAS / Minerals - 10 Gallon Plastic

Nutrients 5 H_2SO_4 preservative

5 plain

Fecal strep / Coli / Total / Entero coccus 20 bacti

Temp - ~~23.1~~ 23.0

pH - 8.04 Santiago @ Modjeska Cyn

Ec - 700 (24.0) 1055

grab samples outside temp ~88-9

Silverado ck upstream from
Ladd ck confluence

plt 8.3 Silverado #1 1130

temp 23.1 (25°C)

Ec 1,100

10.2 Silverado ck upstream from
Shady brook fire Station (.8 mi

plt 7.93 Silverado #2 1145

temp 22.6 (24°)

Ec 1,100

CHAIN OF CUSTODY RECORD

Date 8/11/92 Page 1 of 1

SANTA ANA REGION
RIVERSIDE, CA 92507-2409
PHONE (714) 782-4130

LABORATORY: Associated	PROJECT MANAGER: Hope Smythe
SECTION: Planning	PHONE NUMBER: 782-4493
PROJECT NAME: Water Quality Assessment	SAMPLERS: (Signature) Michelle Shaughnessy

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	WATER Comp.	WATER Grab	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
1	Santiago Ck	8/11	1055		✓				Nutrients, Minerals, MBAS,
									Fecal Coli, Fecal strep, Total Coli
									Enterococcus
2	Silverado Ck #1	8/11	1130		✓				"
3	Silverado Ck #2	8/11	1145		✓				"
4	Silverado Ck #3	8/11	1205		✓				"

Relinquished by: (Signature) Michelle Shaughnessy	Received by: (Signature) [signature]	Date/Time 8/11/92 1205
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) — Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment		
Special Instructions:		TASK CODE 156-01

ESTIMATED COST $934.00