10-3-84

Dear Bob -

Am sending you some graphs which summarize various water quality parameters on Rio San Jose, including results of the intensive survey in June 1984. Note the large diel swings in O_2 & pH below Horace Springs — DO was as low as 2.9 mg/l & pH as high as 9.2. d'd appreciate your comments on the data — anything you might be able to say re unionized ammonia toxicity would be helpful.

Have also enclosed Frank Halfmoon's report on fish live box experiment. Essentially, all fish survived except for those in first box (ie, ½ mile below STP). Apparently, the pH & DO extremes do not last long enough (ie, 2-3 hrs) to cause direct mortality. Comments?

temp

We still have several aspects of the study to complete -- algal report and a special study of soil leaching at Acoma farms. Everything should be finished by early November. We anticipate a session in Albuq. with attorneys for mid- to late-November.

Regards,
Walt

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : *Files*

DATE: *August 9, 1984*

FROM : *Fishery Management Biologist,*
Gallup FAO

SUBJECT: *Survial Study of Rainbow Fingerling in Rio San Jose*

BACKGROUND

An intensive field study of Rio San Jose was conducted early in June by tribal consultants; Walt Hines, Don Porcella, Bob Behnke and associates towards a better evaluation of the stream, its inhabitants, and the downstream impacts associated with discharges of the Grants Sewage Treatment Plant. A schedule conflict arose between the consultant and the FAO which prevented this survival study to be conducted simulatenously. The survival of rainbow fingerling was to be evaluated in terms of changes in water quality parameters as identified by the consultants.

METHODS

Live wells were made from four inch diameter polyvinyl chloride irrigation pipes cut into sixteen inch lengths and capped at both ends with s-lid PVC caps. A small door, 3"x8", was cut in the cylinder, secured by 2 small brass hinges and kept closed by a small brass hasp. Holes 1/8" in diameter were drilled at the rate of 25-30 per square inch in both end caps and the door. An anchor rope was tied around the cylinder to an anchor point. Fish used in the study were fingerling sized rainbow (2"-3") from Mescalero National Fish Hatchery. The fish were in good condition upon arrival at Rio San Jose. The non-clorinated water used to haul them came from the Gottlieb ranch. Temperature of the FAO tank water directly from the Gottlieb outlet was 59°F. No ice was used to cool the water. Oxygenation was provided by an agitator operated by a 12v car battery. When the fish reached the study site, the temperature of the water in the tank was 68°F - compatible with Rio San Jose temperature.

Live wells were placed according to the study areas of Messrs. Hines, Porcells et al. At least 10 rainbow were placed inside each live well at each of the seven stations.

Station No. 1 - Downstream from Grants Sewage Treatment Plant - 0.5 miles, at cement crossing.

Station No. 2 - Above Horace Springs at stream bend, approximately 20 yds. from fence & about 50 yds. above Horace Springs.

Station No. 3 - Horace Springs. Live well secured to north bank in one of the springs discharging from the north bank.

Station No. 4 - US Geological Gaging Station. The live well was placed immediately downstream of the cement structure located below the gaging station.

Station No. 5 - Main Anzac. Upstream from confluence with Anzac ditch approximately 40 yards near an adjacent and unused fence post.

Station No. 6 - Anzac Ditch. Started out at a location beneath a foot-bridge downstream from the ditch headgate. After the second day, this live well was moved upstream of the headgate approximately 25 yards. (The open headgate diverted ditch water back to the mainstream channel, reducing water levels at original live well site.)

Station No. 7 - Beaver tree. Next to the old cottonwood tree girdled by beavers.

Fish were placed in the live wells on Monday 6/19/84 and monitored for mortality approximately the same time on Tuesday, Wednesday and Thursday of that week. A complication prevented the fish from being checked on Friday, Saturday and Sunday, however on Monday 6/25/84, the fish were checked and subsequently released at their respective sites.

RESULTS

STATION NO.		DATE	TIME	H_2O TEMP	NO. OF FISH	NO. OF MORT.	REMARKS
1	MON	06-18-84	1600 HRS	75°F	10	0	
	TUE	06-19-84	1705 "	73°F	0	10	All fish ruptured & many external parasites; more paper debris since yesterday
	WED	06-20-84	N/A	N/A	N/A	N/A	No more fish available, live well (LW) pulled Tue. evening.
	THU	06-21-84	"	"	"	"	
	FRI	06-22-84	"	"	"	"	
	SAT	06-23-84	"	"	"	"	
	SUN	06-24-84	"	"	"	"	
	MON	06-25-84	"	"	"	"	
					SUB-TOTAL MORT.	10	SURVIVAL = 0%
2	MON	06-18-84	1800 HRS	68°F	21	0	
	TUE	06-19-84	1735 "	69°F	20	1	Body cavity ruptured
	WED	06-20-84	1640 "	71°F	20	0	
	THU	06-21-84	1625 "	73°F	20	0	
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "				
	SUN	06-24-84	" "		No Data		
	MON	06-25-84					
					SUB-TOTAL MORT.	1	SURVIVAL = 95%

STATION		DATE	TIME	H_2O TEMP	NO. OF FISH	NO. OF MORT.	REMARKS
3	MON	06-18-84	1805 HRS	56°F	21	0	
	TUE	06-19-84	1740 "	56°F	21	0	
	WED	06-20-84	1645 "	56°F	21	0	
	THU	06-21-84	1630 "	56°F	21	0	
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "		No Data		
	SUN	06-24-84	" "				
	MON	06-25-84	1855 HRS	56°F	21	0	
				SUB-TOTAL MORT.		0	SURVIVAL = 100%
4	MON	06-18-84	1730 HRS	69°F	11	0	
	TUE	06-19-84	1750 "	63°F	11	0	
	WED	06-20-84	1620 "	65°F	11	0	
	THU	06-21-84	1645 "	66°F	11	0	
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "		No Data		
	SUN	06-24-84	" "				
	MON	06-25-84	1830 HRS	62°F	11	0	
				SUB-TOTAL MORT.		0	SURVIVAL = 100%
5	MON	06-18-84	1705 HRS	67°F	12	0	
	TUE	06-19-84	1805 "	66°F	10	2	
	WED	06-20-84	1610 "	67°F	10	0	
	THU	06-21-84	1700 "	68°F	10	0	
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "		No Data		
	SUN	06-24-84	" "				
	MON	06-25-84	1810 HRS	65°F	10	0	3 crayfish entangled in fi. algae around LW
				SUB-TOTAL MORT.		2	SURVIVAL = 83%
6	MON	06-18-84	1700 HRS	67°F	10	0	
	TUE	06-19-84	1810 "	67°F	10	0	Gage = 8.85
	WED	06-20-84	1600 "	70°F	10	0	Gage = 7.62; moved LW upstream
	THU	06-21-84	1710 "	71°F	10	0	Gage = 7.62
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "		No Data		
	SUN	06-24-84	" "				
	MON	06-25-84	1800 HRS	65°F	9	1	Gage = 7.62; fil. algae covers LW
				SUB-TOTAL MORT.		1	SURVIVAL = 90%
7	MON	06-18-84	1600 HRS	71°F	10	0	
	TUE	06-19-84	1818 "	68°F	10	0	Gage = 3.93
	WED	06-20-84	1555 "	70°F	10	0	
	THU	06-21-84	1715 "	71°F	10	0	Gage = 4.05
	FRI	06-22-84	No Data				
	SAT	06-23-84	" "		No Data		
	SUN	06-24-84	" "				
	MON	06-25-84	1745 HRS	67°F	10	0	Gage = 4.04
				SUB-TOTAL MORT.		0	SURVIVAL = 100%

TOTAL FISH (ALL STATIONS) = 95
TOTAL MORTALITY (ALL STATIONS) = 14
TOTAL SURVIVAL (ALL STATIONS) = 85%

DISCUSSION

The uppermost station experienced a total mortality, probably due to its proximity to the Sewage Treatment Plant outlet. Chlorine could have been above lethal levels in the Sewage Treatment Plant discharge sometime during the first 24 hour period. These fish carcasses when examined were not much more than some skin and bones.

In Station #5, two mortality were observed within the first 24 hour period. The live wells were not disturbed in any of the sites, however cows and sheep grazed the area in and around Station #5.

Fish in many of the live wells did have some access to natural foods of the stream: diptera, odonata, hemiptera and gastropoda. Upon release the fish were generally robust and vigorous. An interesting occurrence in Main Anzac leads me to believe that some big fish, probably brown trout (species of most recent stocking - 1981) still exist. When I completed my examination of the rainbow and returned it to the stream a big splash was made at the spot where the fish was dropped. The existence of fish released in 1981 would have to be verified by further surveys.

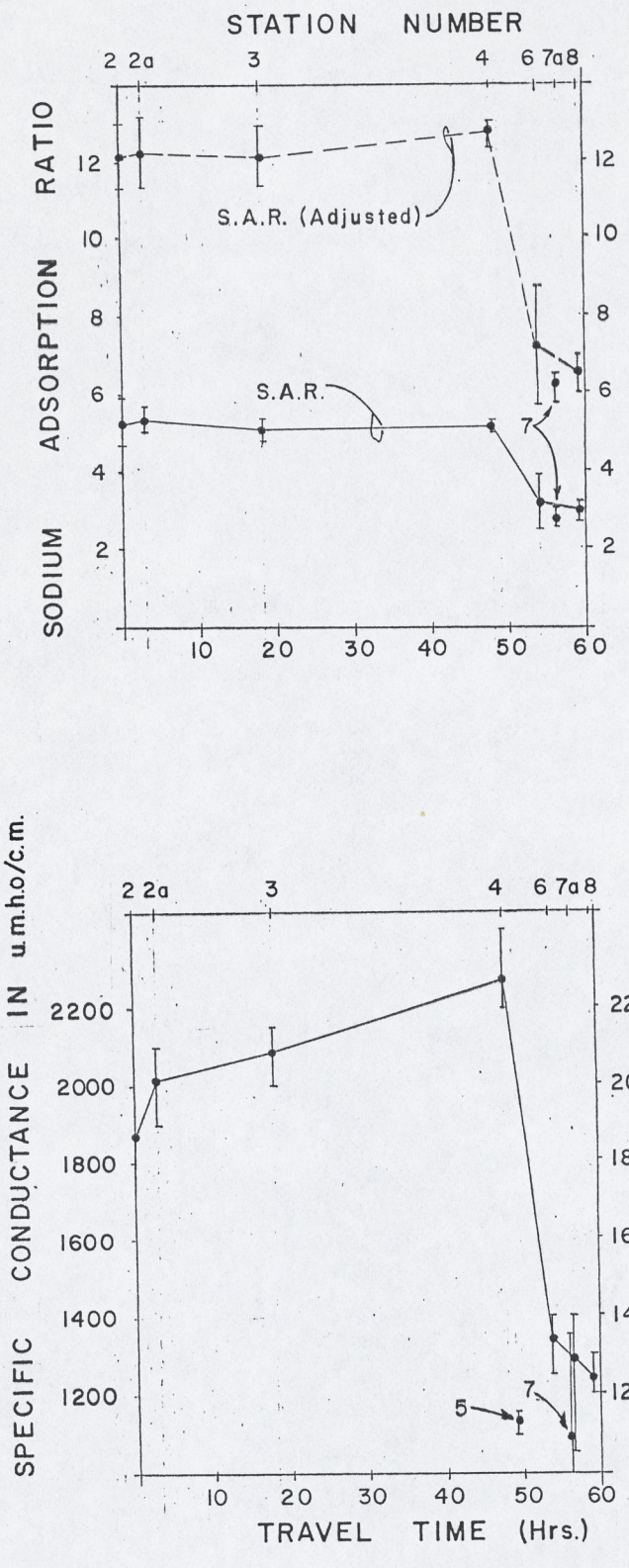
Frank

Frank L. Halfmoon

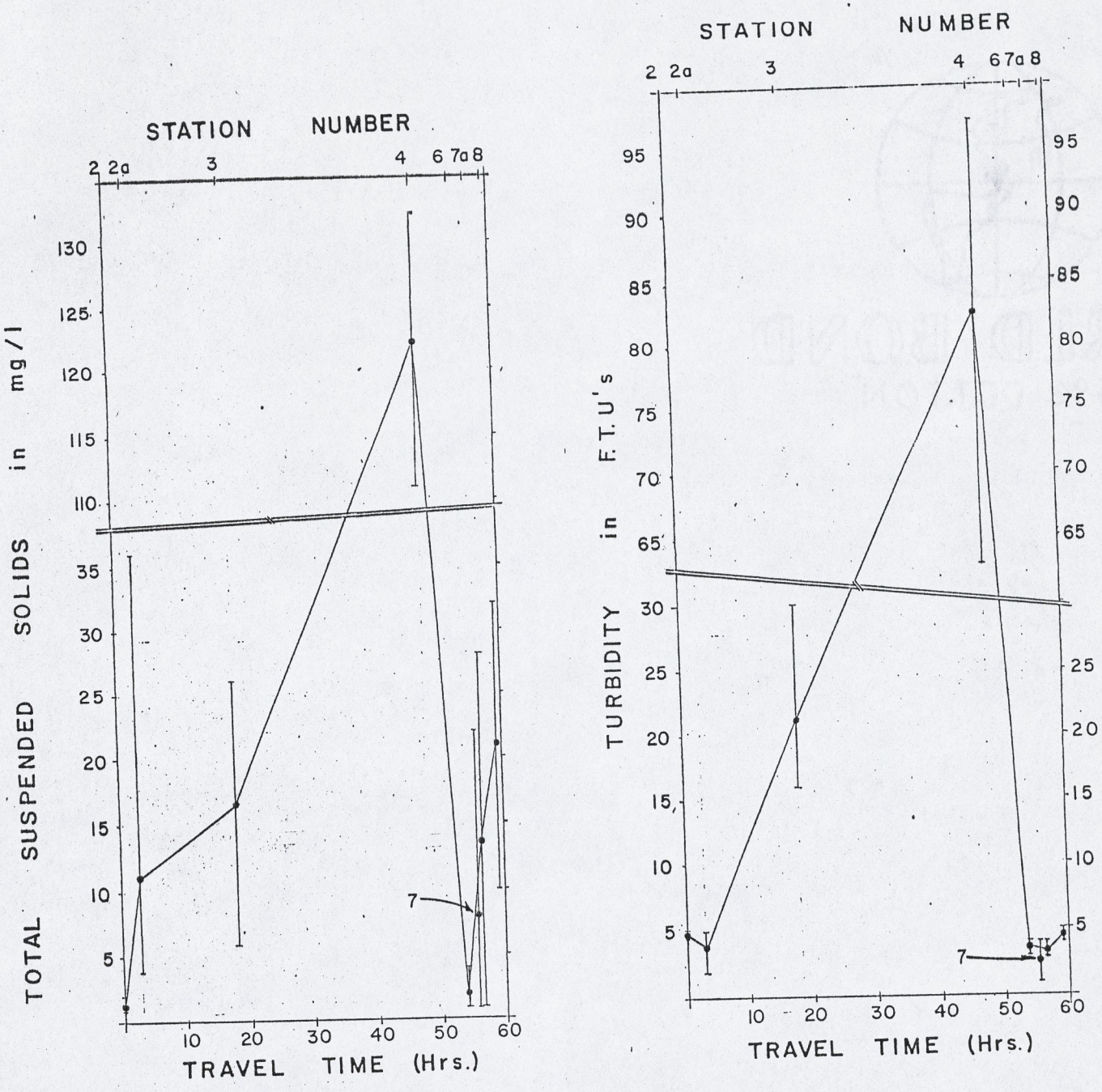
8/17/84

Rio San Jose Water Balance

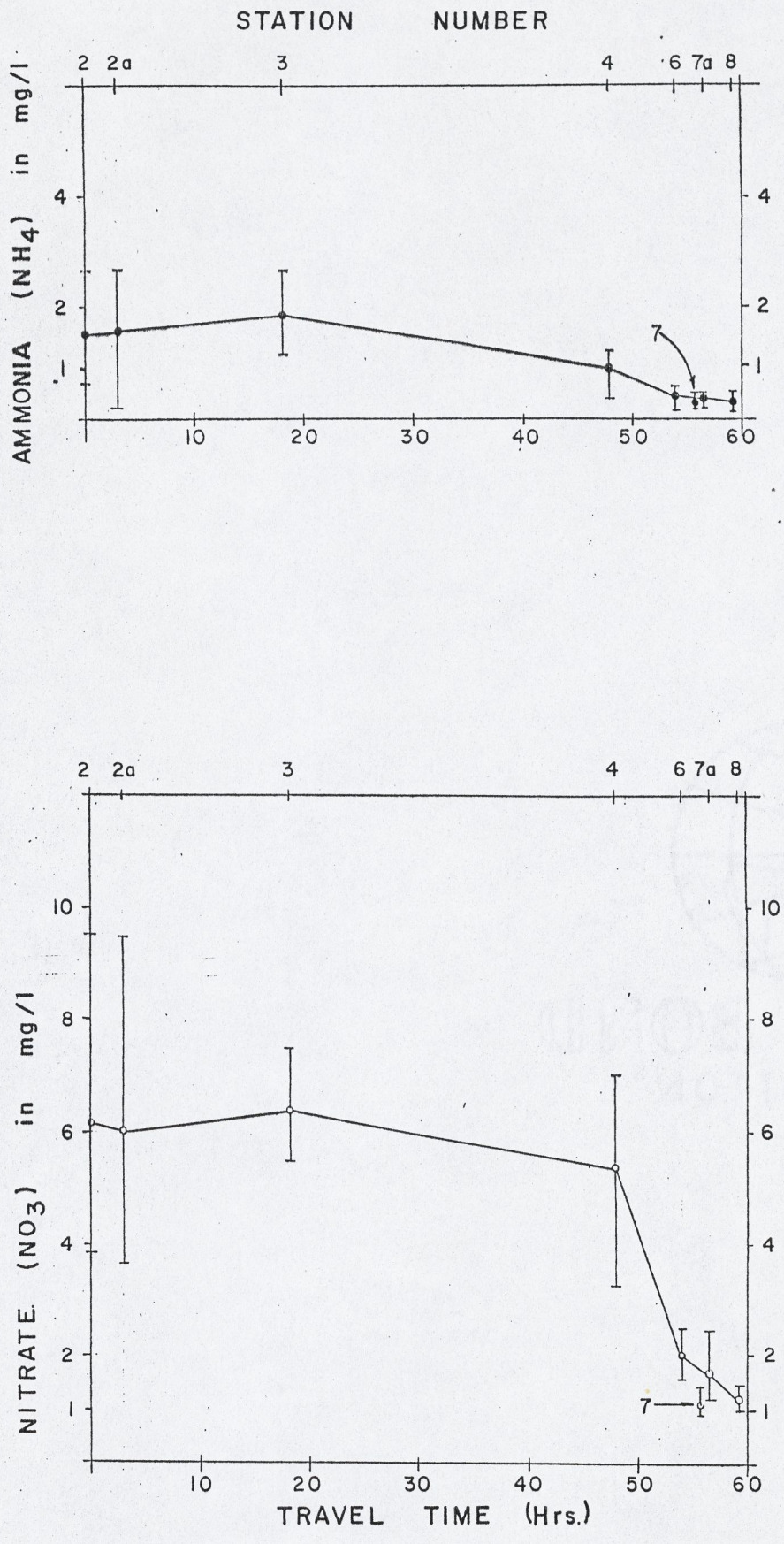
Site	June 4-6, 1984 Survey Mean Flow (cfs)	Feb 15-16 & April-May 84 Mean Flow (cfs)
Grants STP (0+00)	1.7	1.75
2a (25+00)	1.7	1.75e
3 (230+50) mulpais reach above Hwy 66 Bridge	1.4	1.3
4 (428+00) 500' above H. Spr	1.0 ±	1.0e
5 (433+20) H. Spr.	3.2	~~4~~ 3.9
USGS Gauge 6 (451+25)	4.2	4.9
7 (503+00) Anzac channel	2.3	2.4
7a (503+20) irrigation ditch at footbridge	4.2	~~7~~ 4.9
8 (578+60) Beaver Tree	6.5	7.3



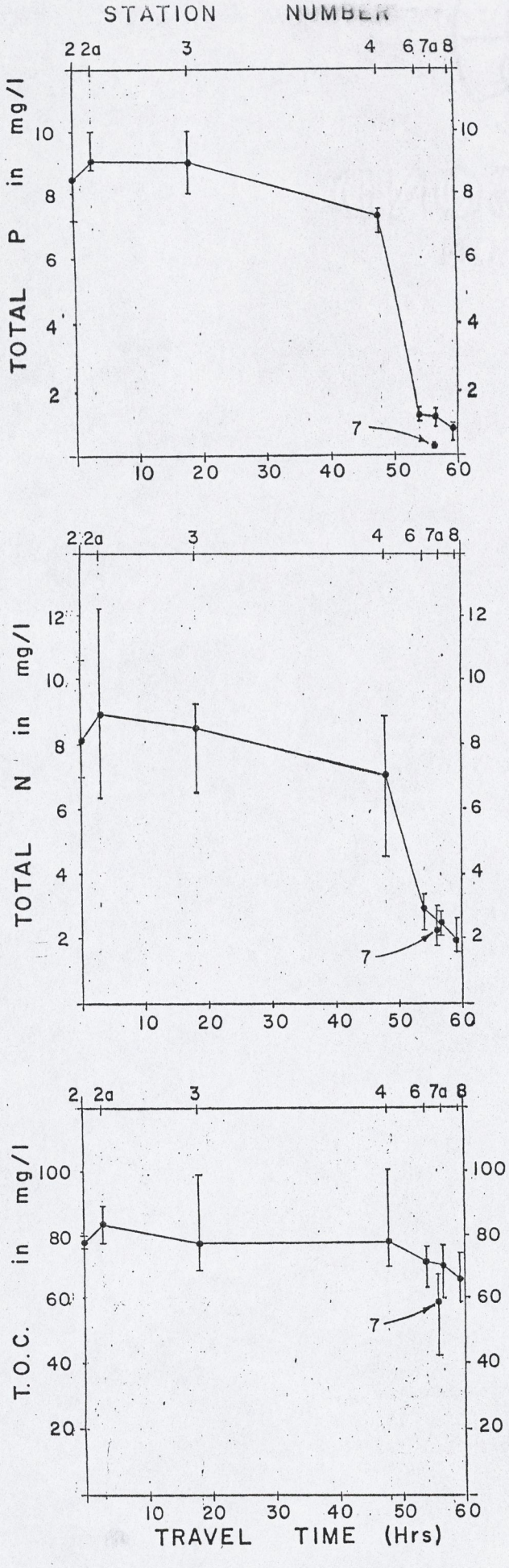
Mean and Range of Sodium Adsorption Ratio and Specific Conductance on the Rio San Jose, June 5-6, 1984



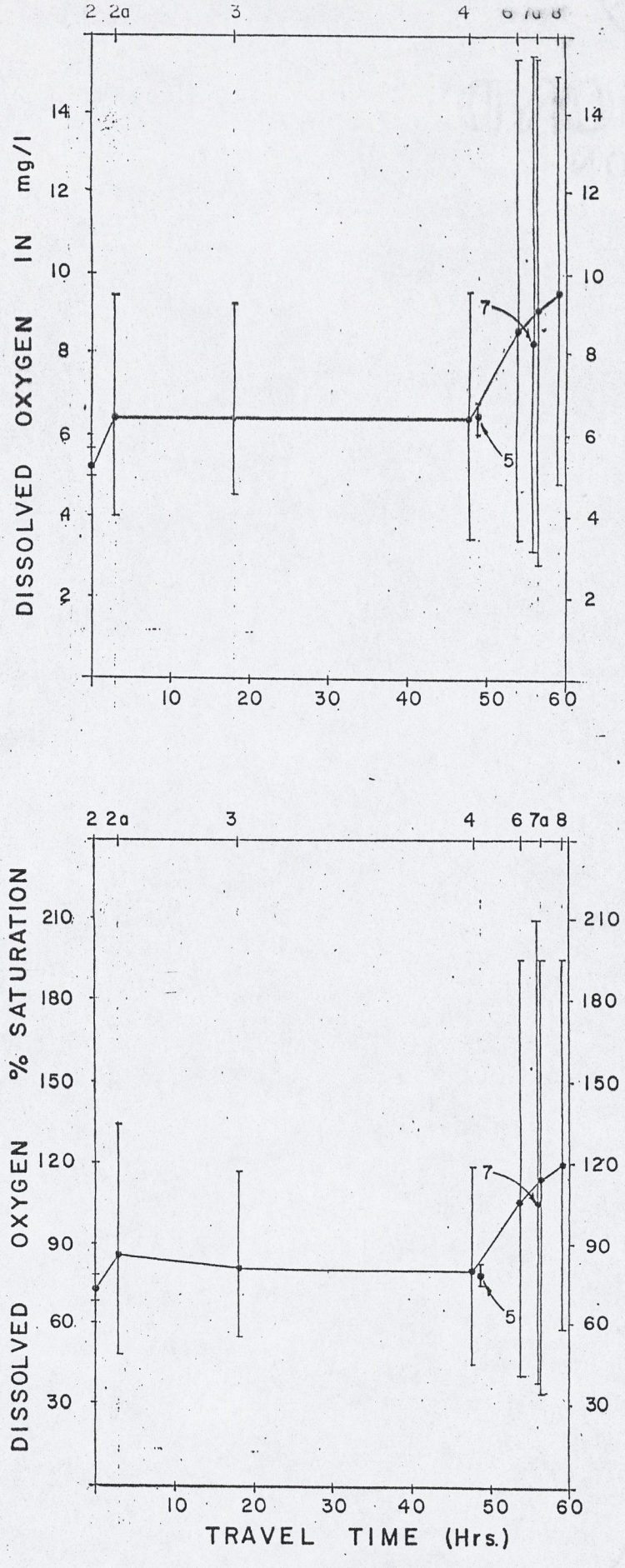
Mean and Range of Total Suspended Solids and Turbidity Concentrations in Rio San Jose, June 5-6, 1984



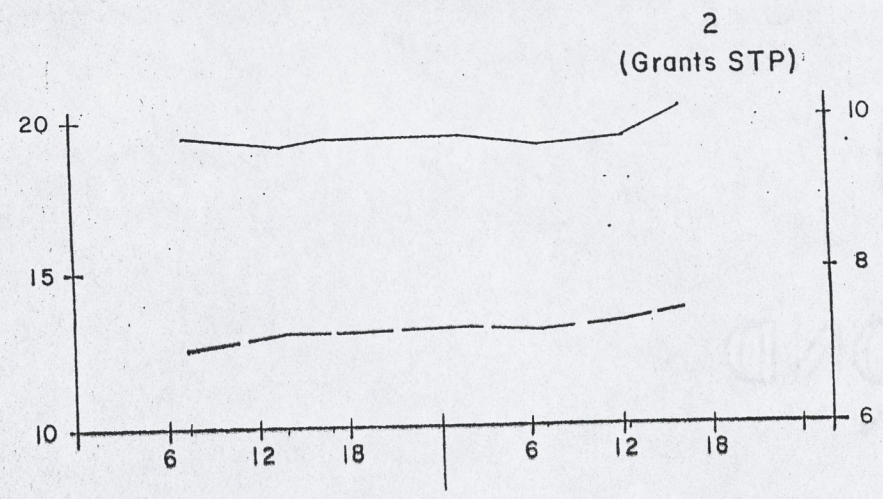
Mean and Range of Ammonia and Nitrate Concentrations in Rio San Jose, June 5-6, 1984

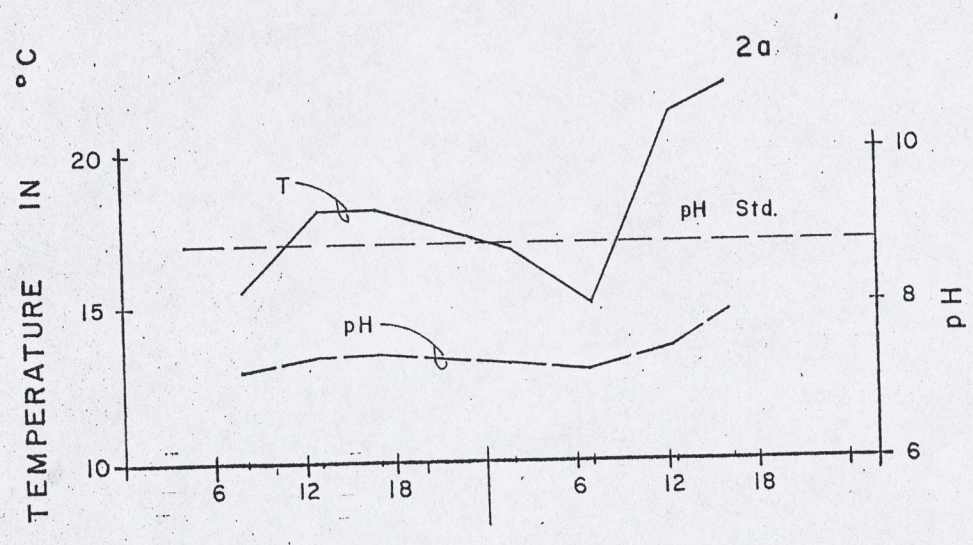


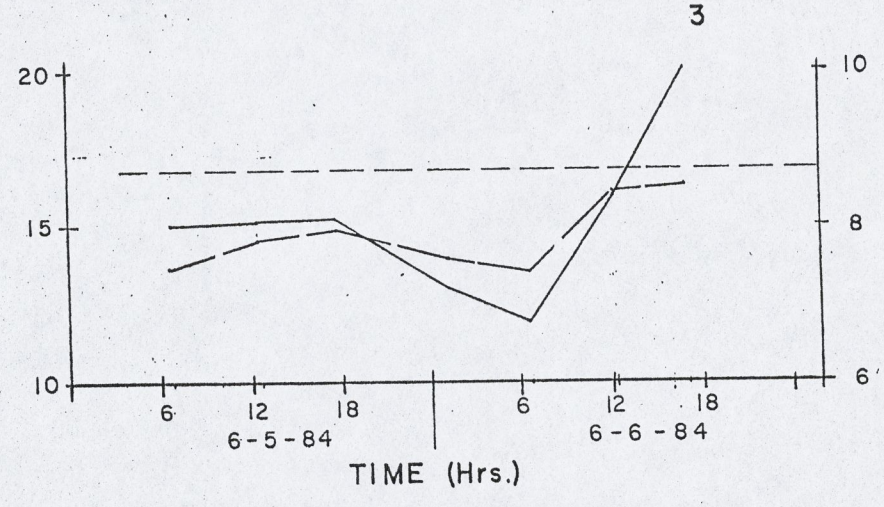
Mean and Range of Total Carbon, Nitrogen, and Phosphorus Concentrations in the Rio San Jose June 5-6



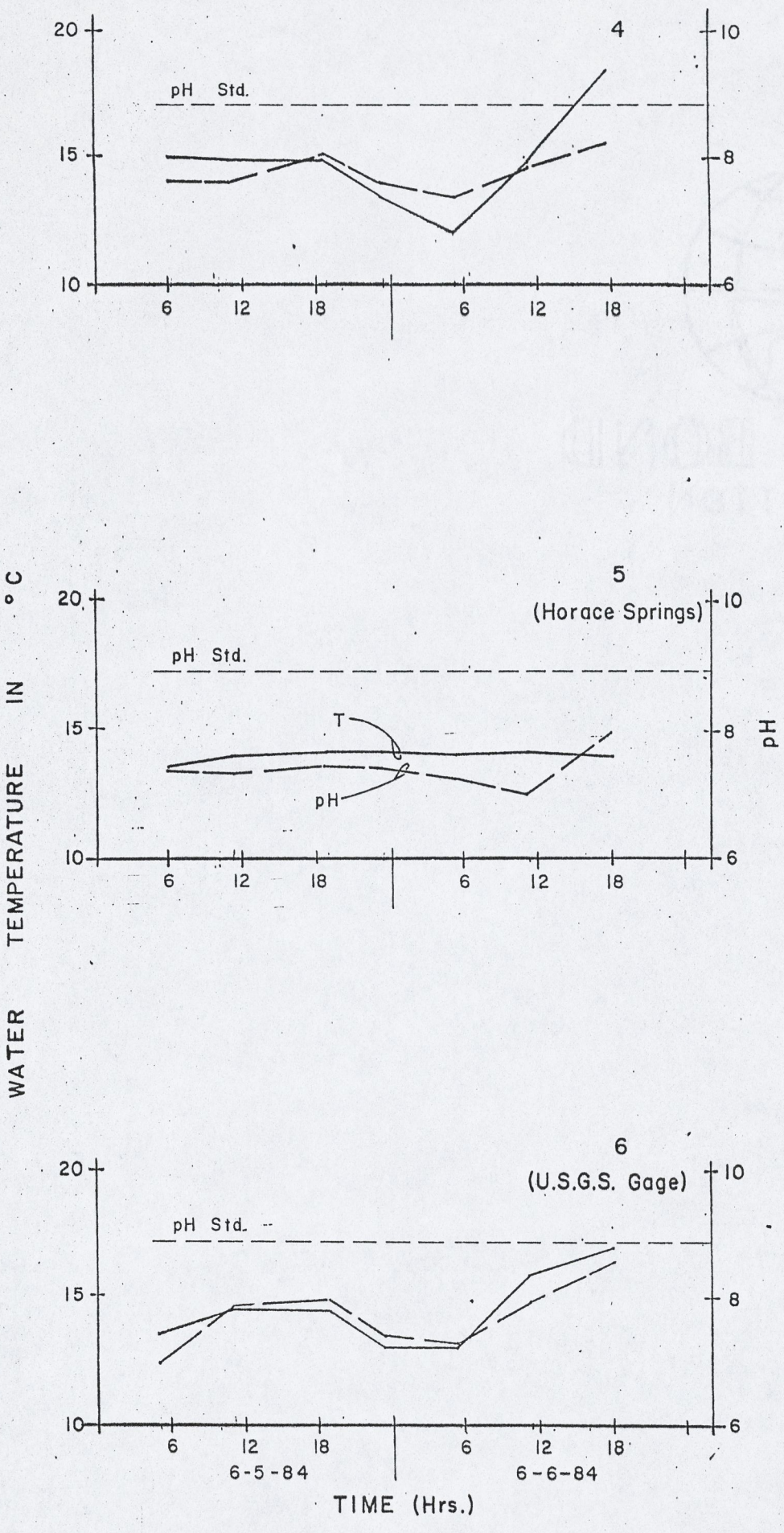
Mean and Range of Dissolved Oxygen Concentrations in the Rio San Jose, June 5-6, 1984



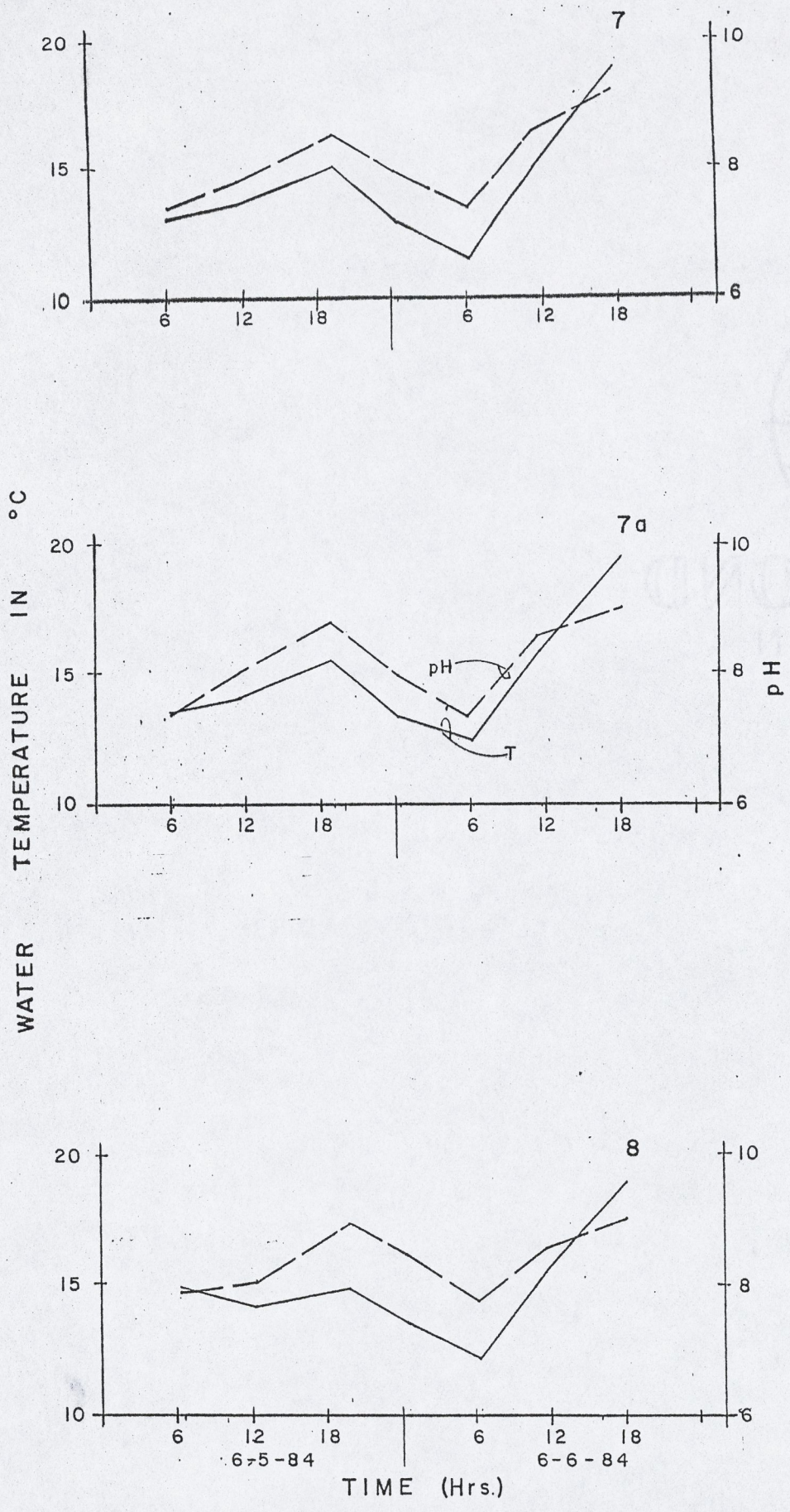




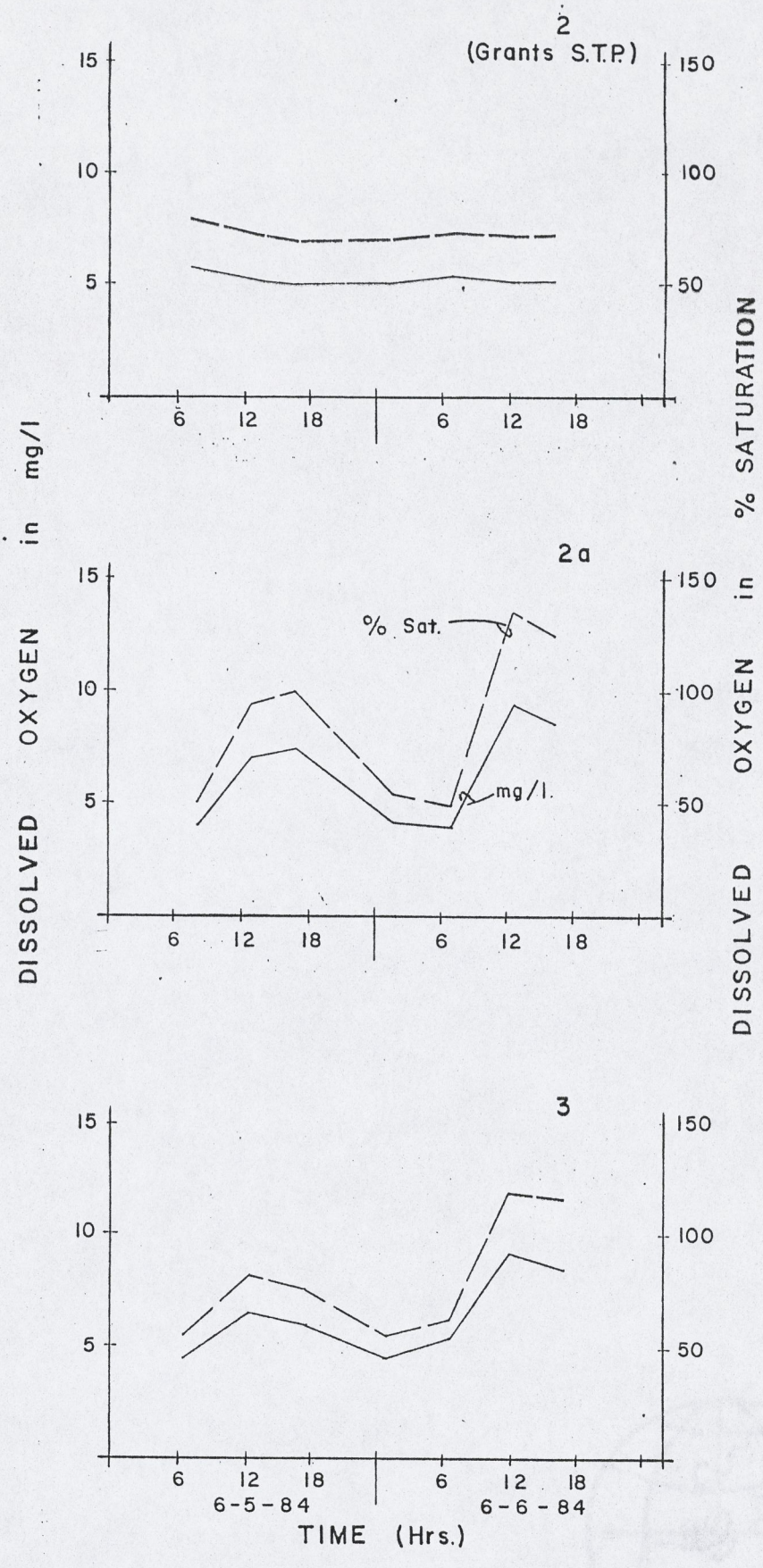
Diel Water Temperature and pH at Stations 2, 2a, and 3 on the Rio San Jose, June 5-6, 1984



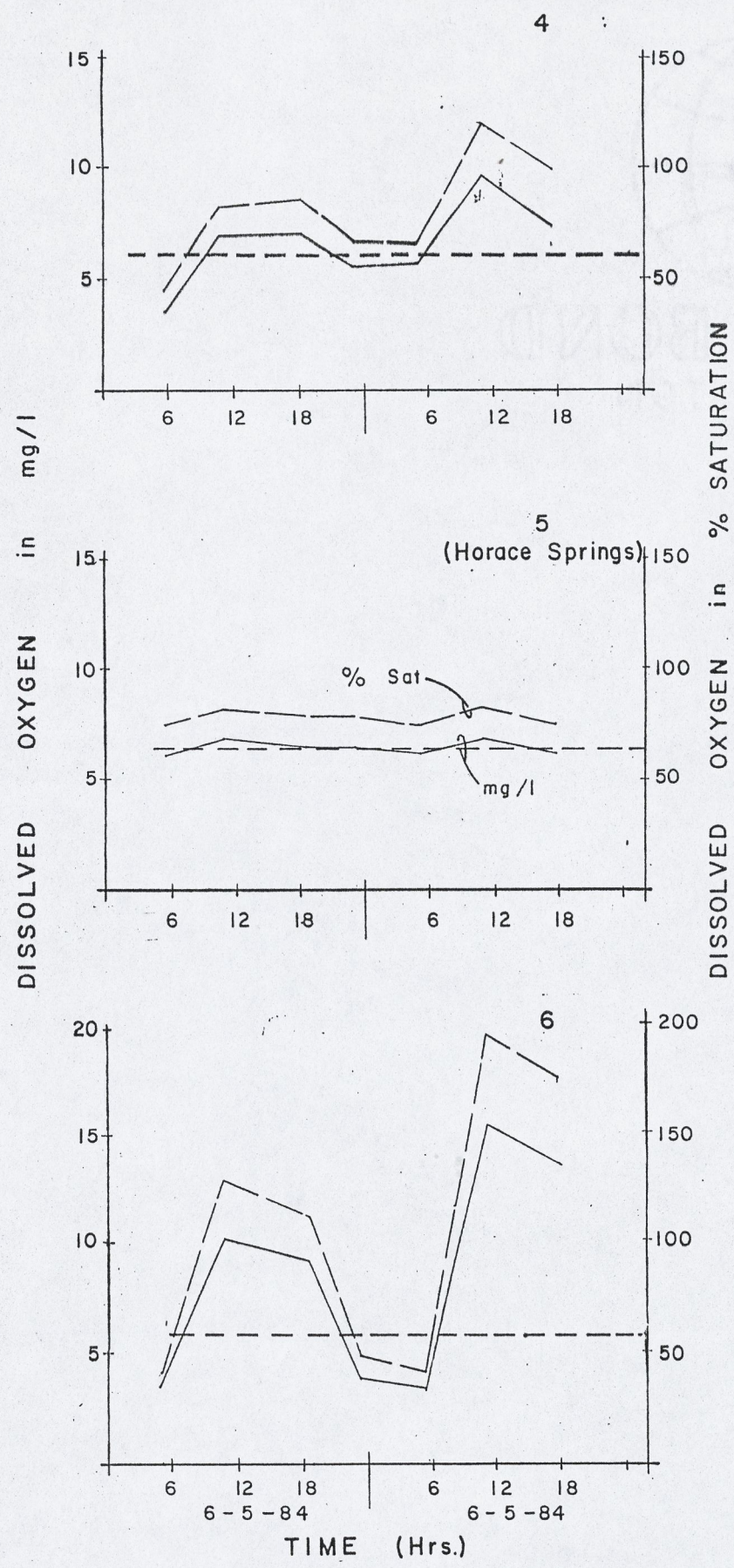
Diel Water Temperature and pH at Stations



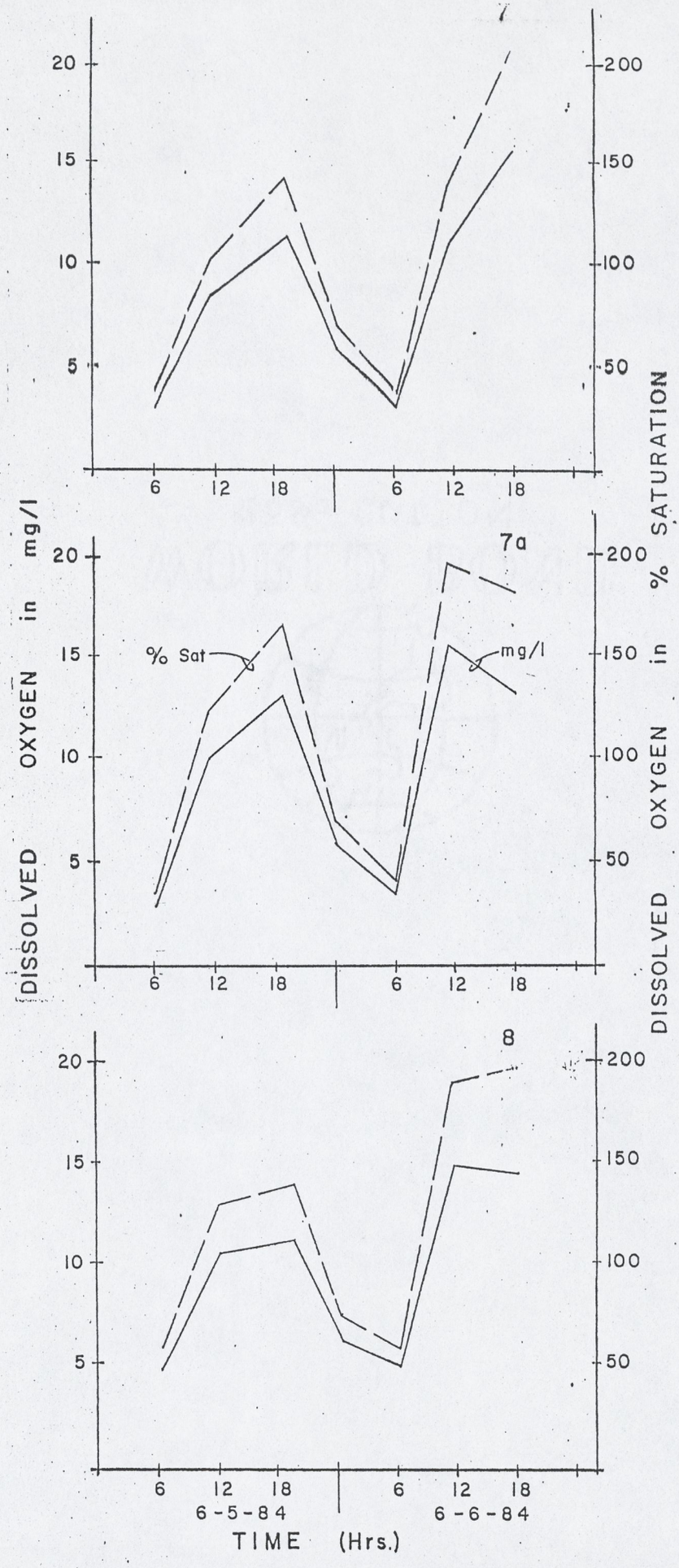
Diel Water Temporature and pH at Stations 7, 7a and 8 on the Rio San Jose, June



Diel Dissolved Oxygen Concentrations at Stations 2, 2a, and 3 of the Rio San Jose, June 5-6, 1984



Diel Dissolved Oxygen Concentrations at Stations 4, 5, and 6 of the Rio San Jose June 5-6, 1984



Diel Dissolved Oxygen Concentrations at Stations 7, 7a, and 8 of the Rio San Jose, June 5-6, 1984

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Dr. Bob Behnke
Dept. of Fishery & Wildlife Biology
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Ft. Collins, Colo. 80523

[illegible]

Pyramid [illegible]

→ Frank [illegible]

- report [illegible]

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vs. low

no spawning

— self-sustaining

- and Chinook -

— BIA : area office

Office of Fish.

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