

Mester

SHASTA RIVER
REMOTE WATER QUALITY AND FLOW MONITORING STATION
#94-HP-08
FINAL REPORT

Great Northern Corporation

August 21, 1996

#14-48-0001-94538

	FILE	INFO	UNIT
01			lb
02			lb
03			lb
JMC			
AS			
AK			
BS			
MS			
TS			
EL			
TE			

OK.
↓

Shasta River Monitor Project, #94-HP-08

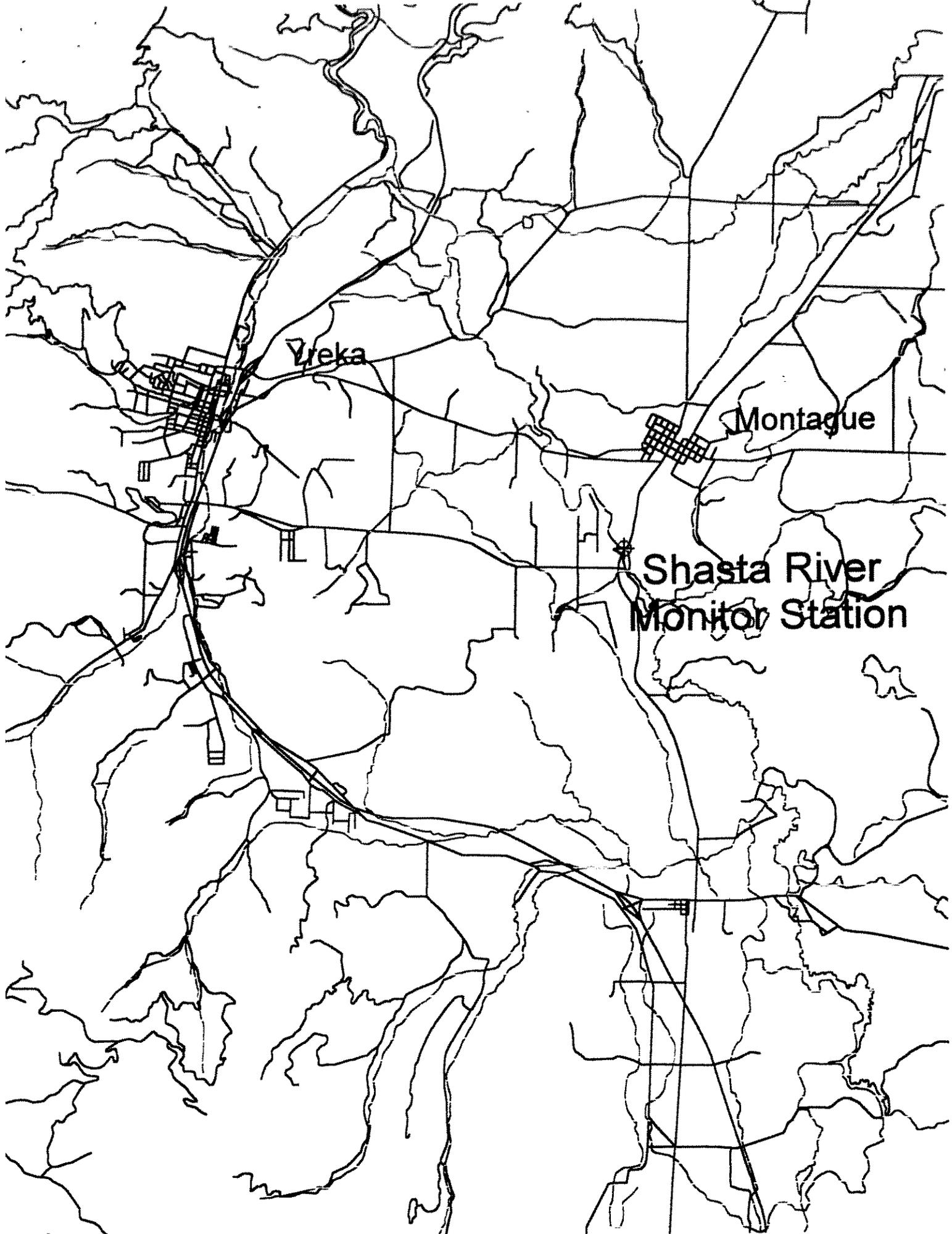
Abstract:

The Shasta River CRMP determined that a real time data monitor with the ability to transmit voice datats via telephone would assist local CRMP members and resource managers in ascertaining the status of the Shasta River.

Great Northern Corporation, on behalf of the CRMP, applied for and received a grant from the Klamath River Task Force to install a monitor on the Shasta River at the Montague/Grenada Road bridge.

The monitor is in place and records Temperature, Conductivity, current stage level, maximum daily stage, and minimum daily stage.

The telephone number is (916) 459-0416



Yreka

Montague

Shasta River
Monitor Station

KELLER-PSI CALIBRATION REPORT

Customer: GREAT NORTHERN CORP
 Model No: 173-110-0005
 Serial No: 95577
 Pressure Range: 0 to 5 PSIG
 Excitation: .5 mA
 Output: 0-20 mV

Test Date: 02-28-95
 Test Excitation: .5 mA
 Test Temperatures: Room = 27 C
 Cold = 0 C

Test Pressure PSIG	BFSL Rm Temp Outputs	-----Run #1-----		-----Run #2-----		-----Run #3-----	
		Rm Temp Outputs	Error %FSO	Rm Temp Outputs	Error %FSO	Rm Temp Outputs	Error %FSO
0.0000	-0.07	-0.067	0.010	-0.056	0.073	-0.158	-0.019
0.9998	3.41	3.398	-0.077	3.410	-0.008	3.344	-0.014
2.0004	6.89	6.875	-0.109	6.886	-0.046	6.860	-0.007
3.0001	10.37	10.361	-0.073	10.367	-0.038	10.379	0.001
3.9999	13.85	13.853	-0.005	13.860	0.036	13.904	0.011
5.0000	17.33	17.342	0.041	17.349	0.082	17.431	0.020
3.9994	13.85	13.856	0.022	13.860	0.045	13.906	0.011
2.9996	10.37	10.364	-0.047	10.372	-0.001	10.381	0.002
1.9997	6.89	6.882	-0.057	6.890	-0.011	6.859	-0.007
1.0002	3.41	3.410	-0.015	3.415	0.014	3.345	-0.014
0.0000	-0.07	-0.056	0.073	-0.053	0.090	-0.161	-0.020

Maximum Static Error: -.109 %FSO

Maximum Thermal Error @ Cold: 0.020 %FSO/C

Maximum Non-Repeatability: 0.069 %FSO

Slope : 0.287 psi/mV

Electrical Termination: Black +Input
 Red +Output
 Green -Output
 White -Input

Monitor Accuracy: Dave Webb

Monitor Accuracy: The monitoring station records several parameters. The accuracy for each is as follows:

Pressure The equipment used (Keller PSI #173 0-5psi pressure transducer) is rated at plus or minus .0.1% of full scale anywhere within its range. $5\text{psi} \times .001 = .005$ $.005 \times 2.3 \text{ ft/psi} = 0.0115 \text{ ft}$. $0.0115 \times 12 = .138 \text{ inches}$, or roughly 1/8 inch. In addition, the accuracy will be much greater at that pressure at which the transducer is field calibrated. See attached calibration report.

Conductivity and Water Temperature The conductivity/temperature probe is a Campbell Scientific model 247. Temperature accuracy is rated at plus or minus 0.4 C. Conductivity accuracy is plus or minus 5% of reading at 0.44 to 7.0 mS/cm, and 10% of reading from 0.005 to 0.44 mS/cm. Discussion: Comparisons of the temperature recorded by the monitor with those obtained by a laboratory grade thermometer indicated accuracy well within the above specs in the temperature range encountered in the river. No opportunity has presented itself for calibration testing of the conductivity sensor. However, absolute conductivity readings have never been observed in the Shasta to be high enough to be of concern. Conductivity trends were sought as an index of irrigation water return. The accuracy available has been more than adequate to track changes through the irrigation season. The pressure transducer initially appeared to be operating outside its specifications. Investigations first focused on installation, physical location, and temperature range. Neither the installation nor the temperature range appeared likely to be a source of error. Investigation of the physical location however, raised several questions. The pressure transducer is located in a stilling well. The same stilling well is used by the Calif DWR Watermaster to gauge river flows. It was re-built about 1980. There is a staff gauge located in the river immediately upstream of the stilling well. At the time of installation of the remote monitoring station, it was calibrated to the reading on that staff gauge. Periodic field checks were then made over time to assure that it was tracking the river consistently and accurately. Those field checks indicated that the readings of the staff gauge did not correspond to the river height as reported by the CR10. Eventually, we fabricated a second staff gauge and installed it in the stilling well, calibrating it to the staff gauge in the river at the time of installation. Observations of the two indicated that the height of the water in the stilling well was not following the height of water in the river very well either. Further investigation showed that the inlet pipe to the stilling well had been disconnected, and hence the well was not a true stilling well. That discovery was made near the end of the irrigation season,

and high water prevented further efforts to improve accuracy. Over the winter of 1995-6 contact was made with the DWR supervising watermaster to discuss the weir and stilling well. We both agreed that greater accuracy was desirable. At the present time, efforts are getting underway locally to make a series of flow measurements at the weir site which will allow DWR to create a new stage height-discharge curve. In addition, we will be investigating ways to improve the function of the stilling well. Finally, once water levels drop with the arrival of hot weather, field observations will be made numerous times over a one day period in order to compare the readings of the staff gauge in the stilling well with the heights as reported by the CR10. That should then allow full discrimination of the various sources of error. Appropriate corrections can then be made.

Volunteer contributions: Labor installing telephone line @ \$500, much of time spent learning how to program CR10 @ \$800, 1,000 ft telephone wire @ about \$25/ft.= \$250, Keller PSI pressure transducer @ \$700, mounting box @\$700, air temp. sensor @ \$50, Telephone junction box and hardware @ \$150



Volunteers assisting with telephone line installation