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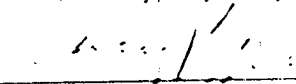
ASSESSMENT OF RIO GRANDE
WATER QUALITY

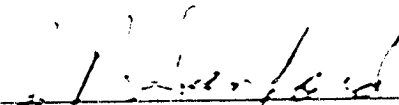
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**DEDICATED
TO
MY PARENTS**

**ASSESSMENT OF RIO GRANDE
WATER QUALITY**

BY

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THESIS

**Presented to the Faculty of the Graduate School of
The University of Texas at El Paso
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ABSTRACT

The Rio Grande originates in Colorado and flows across New Mexico, Texas and terminates in the Gulf of Mexico. The Rio Grande water is the only surface water source for the City of El Paso and Ciudad Juarez. Recommendations for increased usage of Rio Grande water as a potable source have led to a greater interest in understanding the characteristics of water quality of the river.

Water quality of Rio Grande was characterized by compiling the historical data for a period of 10 years (Oct,1980 to Oct,1990) for the stretch of river from Lobatos, Colorado to El Paso, Texas. Variation of hardness, specific conductivity, TDS and Coliform Count with time and flow were analyzed. A linear relationship for hardness, specific conductivity and TDS was found at all selected USGS monitoring stations. A parabolic relationship existed between hardness, specific conductivity and flow.

To obtain a more detailed perspective of water quality below Elephant Butte, five stations were selected along the stretch of the river from Elephant Butte to El Paso Texas. The selected sampling stations were located at Elephant Butte, Caballo, Hatch, Mesquite and El Paso. Samples were analyzed for pH, conductivity, total dissolved solids, dissolved oxygen, hardness, alkalinity, coliform, bromide, UV vis and total organic carbon. TDS and hardness at El Paso were 554.22 mg/L and 215 mg/L respectively when compared to 329.78 mg/L and 166.11 mg/L respectively at Elephant Butte. Due to the increased usage of Rio Grande water as potable source, water samples

were also analyzed for THM formation potential. Chlorine was used as the disinfectant. Laboratory results of THM formation were then compared with the results of the empirical equations developed by the Malcolm Pirnie. The water samples collected at El Paso had higher THM formation ($387.84 \mu\text{g/L}$) when compared to Elephant Butte ($243.15 \mu\text{g/L}$) and the overall quality of water deteriorated downstream of Elephant Butte towards El Paso. The empirical equations developed by Malcolm Pirnie predicted the THM formation in Rio Grande water with reasonable error. During the study, sediments samples were also collected at the same sampling stations and were analyzed for Mercury, Chromium, Lead and Cadmium using DCP and Atomic absorption. The measured values of Lead, Cadmium and Chromium were higher than the PDWS. Mercury in sediments measured lower than the PDWS. These metals tend to bind to the fine textured suspended particles and bottom sediments and does not create a drinking water contamination.

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