

WRC

Newsletter

WATER RESOURCES CENTER
TEXAS TECH UNIVERSITY, LUBBOCK

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"Evaluating the Presence of Human Bacterial Pathogens in Lubbock Area Playa Lakes,"

by **Caryl E. Heintz**, Professor of Biological Sciences & **Tony R. Mollhagen**, Assistant Professor of Civil Engineering.

The Water Resources Center is funding three research projects this year. In the last issue we covered two of the three project. This edition presents the third project.

Relevance of Proposed Research

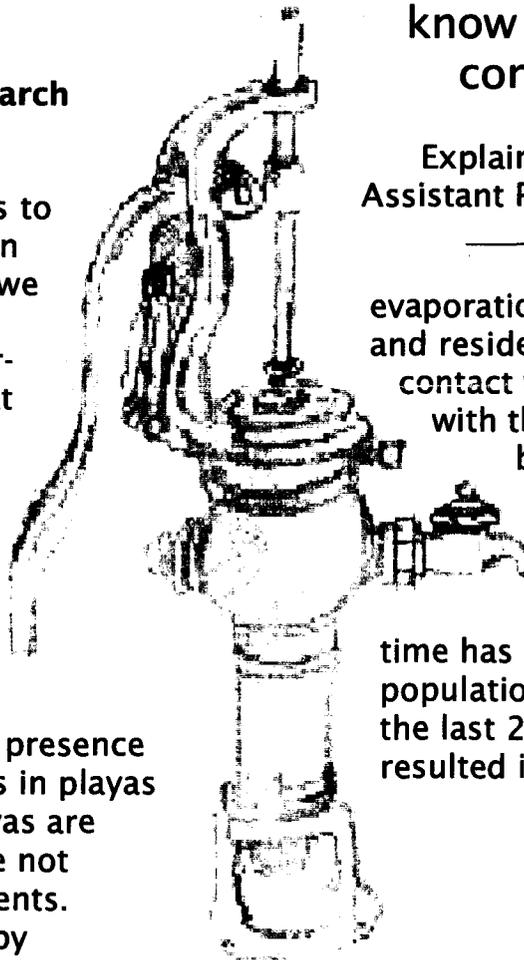
"Pathogens are most likely transported from upland sites to the playas during precipitation and flood events. Moreover, we are on the central flyway and have thousands of geese overwintering on the playas. What risks these factors play in exposing the populace to pathogens cannot be assessed unless we know whether the playas contain pathogens." Explains Dr. Tony R. Mollhagen, Assistant Professor of Civil Engineering. "Assessing the presence of human bacterial pathogens in playas is important because the playas are closed basins. The playas are not flushed after precipitation events. Water leaves the basins only by infiltration into the soil or by

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evaporation, thus allowing transported and resident bacteria to come into contact with people who interface with the water while swimming, boating, fishing, or dealing with floodwaters." Over time, the occurrence and volume of water in urban playas and its retention time has increased. Lubbock's population has grown considerably in the last 20 years and development has resulted in covering large watershed

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Artwork by ARTZ, @2000

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areas with impermeable materials. Vegetation in the upper parts of the watershed that previously facilitated infiltration of water from periodic rain events no longer exists. Moreover, the groundwater table is now closer to the surface. These factors have compromised the natural playa hydroperiods, resulting in increasing threats of flooding to residences near the playas (*Lubbock Avalanche Journal*, June 22, 1999).

The presence of water-borne human bacterial pathogens traditionally has been monitored by demonstrating the presence of indicator bacteria such as *E. coli* and *Streptococcus* sp. Because these organisms were thought to be unique to human feces, detecting them in a water sample was thought to be a reliable indicator of the presence of human fecal pollution. If the indicators were present, there existed the possibility that the water was contaminated with pathogens transmitted in human fecal matter. It is now known that these indicator organisms are present in other types of materials (animal manure, for example) which makes detecting their presence of debatable value in assessing the danger to human health by water-borne bacterial pathogens. Of primary interest in the currently proposed research is completing an evaluation of a methodology for directly detecting a variety of transmissible human bacterial pathogens in water sampled from area playa lakes. Previous studies of bacteria in area playa lakes used different methods for isolating and identifying the organisms, methods that in most cases would not allow the pathogens to be recovered or identified. Unless specialized enrichment and isolation procedures are used for these specific bacterial pathogens, they are unlikely to be found in playa water samples.

Anticipated Results, Applications and Leveraging Plans

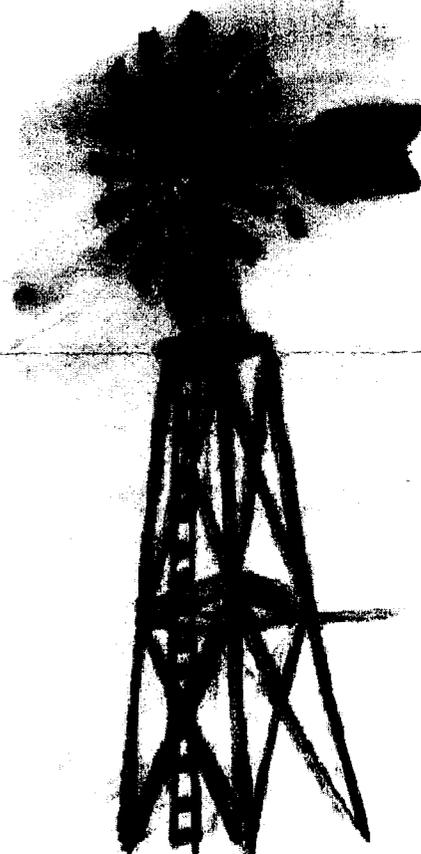
The results showed that the minimum level for each viable organism to be recovered from the playa lake water samples varied

from 1.5×10^2 to 1.5×10^5 organisms/mL, but was constant for each individual pathogen regardless of which playa the sample came from. Therefore we know the viable numbers of each organism that must be present in order to detect them in playa lake samples. In addition, the first six organisms on the pathogen list have been

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Please visit our website.
I have been busy updating it.
It still needs work, however
I hope to keep it not only
updated, but also growing
in content.

--Elizabeth



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"It is the intent of this study to continue this work until we have sampled more playas, and sampled the same playas already studied a greater number of times to determine if more distinct patterns emerge."

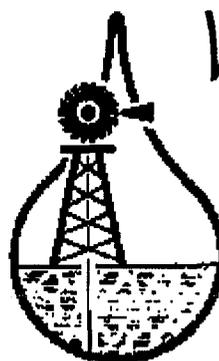
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Assistant Professor of Civil
Engineering

Texas-Mexico border with whom we have been in contact tell us one of their major concerns is whether species of *Vibrio* (*V. cholera* and *V. parahemolyticus*) are present in the Rio Grande. *Vibrio* species keying out to *V. cholera* have been isolated, but it is still unknown whether they belong to the pathogenic O:1 serotype. Methods for serologically examining such isolates will be incorporated into the proposed work. Also, an organism not normally considered to be transmitted by water, *Mycobacterium avium* species complex is on the CDC list of organisms of concern to water treatment facilities because this organism is a frequent opportunistic pathogen in AIDS patients. This organism will be added

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recovered at least once; in some instances, they are isolated routinely. "It is the intent of this study to continue this work until we have sampled more playas, and sampled the same playas already studied a greater number of times to determine if more distinct patterns emerge," explains Dr. Tony R. Mollhagen, Assistant Professor of Civil Engineering. Of special interest will be whether the pathogenic genus *Plesiomonas* that was isolated from the periphery of a flooded playa, will be seen consistently. In addition, a recently released list of water-borne pathogens of concern to facilities treating water for human consumption includes some new organisms, one of which (*Aeromonas hydrophila*) is found routinely in playa water samples. However the organism recovered from the playas is identified as a different species by the Biolog system, and Ms. Hamilton's (a graduate student in Biological Sciences) work will use other identification procedures to determine if they are indeed the same organism. In addition, public health officials along the

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Dan M. Wells Memorial Endowed Scholarship

Applications are now being accepted for the 2000 Dan M. Wells Memorial Endowed Scholarship. Scholarship application is open to seniors or graduate students in all majors who have maintained a GPA of 3.0 during the previous two college semesters. Applicants are required to demonstrate their interests in pursuing a career in water resources by writing a brief (one typewritten page) paper outlining goals, ambitions, and previous work, courses, or other involvement in water resources. Application forms are available from the Water Resources Center. The application are due June 30, 2000.

The Dan M. Wells Memorial Endowed Scholarship was established in memory of Dan M. Wells, Ph.D., P.E. Professor Wells served as director of the WRC from 1966 to 1977. During his tenure, Professor Wells was instrumental in establishing the WRC as a focal point for water resources research and related activities on the Texas Tech Campus.

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to the screening list.

The applications of this work are in developing a reliable means of routinely assessing the presence of a variety of pathogenic organisms that are of concern to the public health in playa lake waters.

Llano Estacado Regional Water
Planning Group News Release:
a new web page

<http://www.llanoplan.org>

"This web site is intended to be a public information tool for anyone interested in water planning efforts within the Llano Estacado Regional Water Planning Area (Region "O")," said A. Wayne Wyatt, planning group chairman.

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