THE STATUS OF PUBLIC HEALTH IN THE TEXAS COASTAL ZONE

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October 1970

for

COASTAL RESOURCES MANAGEMENT PROGRAM

INTERAGENCY NATURAL RESOURCES COUNCIL

DIVISION OF PLANNING COORDINATION

OFFICE OF THE GOVERNOR

TABLE OF CONTENTS

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FOREWORD AND ACKNOWLEDGEMENTS

The present day status of public health on the Texas Gulf Coast is compounded by the rapid economic growth in that area. The great attraction of business and industry to the coastal region of our State *has caused not only a population increase, but a population shift.* With this influx of people have come public health and pollution problems, some of which are unique to this part of the State, and others common to all large population centers.

The purpose of this paper is to report the *existing public health conditions, both environmental and personal,* in the coastal region, with emphasis on the problems and problem areas. Attention is called to undesirable trends. The area being considered in this study includes the 36 counties lying within the five planning regions contiguous to the coast (Southeast Texas, Gulf Coast, Golden Crescent, Coastal Bend, and Lower Rio Grande Valley).

This report was prepared for the Coastal Resources Management Program, a program of the Governor's Office, Division of Planning Coordination, as part of the first phase of that office's Coastal Study. The information and material were obtained during personal interviews and from the files of the Texas State Department of Health and the Texas Water Quality Board. Grateful acknowledgement is made of the cooperation and valuable assistance given by our many friends on the staffs of those two agencies, and by the staff members of the Office of Comprehensive Health Planning.

SUMMARY OF PROBLEMS

Environmental Health

1. *Sanitary facilities* in recreation areas and mobile home parks are overburdened by a heavy influx of tourists and an increasingly transient society.

2. Proliferation of *small water and sewerage systems,* and inadequate local control of the use of septic tanks.

3. Overloaded and inefficiently operated *solid waste disposal sites,* and almost complete lack of procurement of future sites.

4. Incomplete coverage of the area by *mosquito control* districts and local health units.

5. Insufficient sanitary control of estuaries and contiguous land areas for protection of our *marine resources*, and insufficient regulation of the seafood production and processing industry (due to the lack of enabling legislation).

6. Lack of personnel to provide adequate inspection of *food handling and bedding manufacturing* establishments.

Personal Health

1. Lack of health care information and facilities for the *transient segment* - tourist and otherwise - of the population.

2. *High incidences* of tuberculosis and veneral disease, and a *lack of personnel* for an adequate case-finding and treatment program.

3. A lack of immunization and *family planning programs*.

I. INTRODUCTION

Health and pollution problems are "people" problems, and an analysis of recent census data and population trends quickly points out the reason for the health problems in the Texas Gulf Coast area. Almost one-third of the people in Texas live in this part of the State.

From 1960 to 1970 there was a 19% increase in population (Table I) in the 36 counties of the study area, as compared to a 14% increase in the statewide population. An interesting concentration-of-population phenomenon is shown graphically in Plate I. One half of the State's population lies on each side of the diagonal line for the year shown, and it is interesting to note that population concentration toward the coastal area in the last 10 years has made as much progress as it made in the preceding 30-year period. *About 3.4 million people, 31% of Texas' population, live on 33,200 square miles (36 counties), only 12% of the total land area of the state.* Expressed another way, there are *103 persons per square mile* in the 36-county coastal study area, and only *31 persons per square mile* in the rest of the state. So as not to be misleading, however, it should be pointed out that Harris County contains half of the population of the study area.

In the last decade, the Texas Coastal area has been overrun by a *highly transient segment of society - the TOURIST.* Sanitary facilities and health services programs to accomodate

TABLE I

POPULATION CHANGE IN THE

*COUNTIES IN THE COASTAL STUDY AREA**

County	1960	1970	Change	Percent Change
ARANSAS	7,006	8,468	+ 1,462	+20.8
AUSTIN	13,777	13,243	- 534	- 3.9
BEE	23,755	22,161	- 1,594	- 6.7
BRAZORIA	76,204	106,230	+ 30,026	+39.0
BROOKS	8,609	7,732	- 877	-10.2
CALHOUN	16,592	17,052	+ 460	+ 2.8
CAMERON	151,098	137,506	- 13,592	- 9.0
CHAMBERS	10,379	12,030	+ 1,651	+15.9
COLORADO	18,463	17,155	- 1,308	- 7.1
DEWITT	20,683	17,872	- 2,811	-13.6
DUVAL	13,398	11,364	- 2,034	-15.2
FORT BEND	40,527	51,410	+ 10,883	+26.9
GALVESTON	140,364	165,669	+ 25,304	+18.0
GOLIAD	5,429	4,580	- 849	-15.6
HARRIS	1,243,158	1,722,533	+479,375	+38.6
HIDALGO	180,904	173,715	- 7,189	- 4.0
JACKSON	14,040	12,597	- 1,443	-10.3
JEFFERSON	245,654	242,719	- 2,940	- 1.2
JIM WELLS	34,548	32,127	- 2,421	- 7.0
KENEDY	884	665	- 219	-24.8
KLEBERG	30,052	32,181	+ 2,129	+ 7.1
LAVACA	20,174	17,483	- 2,691	-13.3
LIBERTY	31,595	30,565	- 1,030	- 3.3
LIVE OAK	7,846	6,308	- 1,538	-19.6
MCMULLEN	1,116	992	- 124	-11.1
MATAGORDA	25,744	27,630	+ 1,856	+ 7.2
MONTGOMERY	26,839	46,950	+ 20,111	+74.9
NUECES	221,573	233,965	+ 12,392	+ 5.6
ORANGE	60,357	70,380	+ 10,023	+16.6
REFUGIO	10,975	9,089	- 1,886	-17.2
SAN PATRICIO	45,021	44,445	- 576	- 1.3
VICTORIA	46,475	52,776	+ 6,301	+29.3
WALKER	21,475	24,885	+ 3,410	+15.9
WALLER	12,071	13,965	+ 1,894	+15.7
WHARTON	38,152	36,128	- 2,024	- 5.3
WILLACY	20,084	15,432	- 4,652	-23.2
TOTALS	2,885,021	3,440,002	+554,945	+19.2
STATEWIDE	9,728,783	11,112,497	+1,383,714	+14.2

NOTE: It is interesting to note that 21 of the 36 counties lost population. Harris County accounted for 86% of the total gain for this coastal region, and Harris and Montgomery Counties together accounted for 90% of the total increase.

**U. S. Bureau of the Census preliminary releases (August, 1970.)*

this group are overburdened. Litter on the beaches, shallow water supply wells, and often inoperable and undersized sewerage facilities (if any) are characteristic of the inadequacies. The tourist is the least informed person in our midst; does he know where to go for medical help? What facilities do we have to serve him while he is in our area?

In providing for the transient segment of our society, tourist or otherwise, one important consideration is the matter of *mobile housing*, the available space for these homes, and the related sanitary facilities to serve them. The September 15, 1970 issue of the Texas Municipal League newsletter Legislative Policymaking Facts states that as of March, 1970, there were *90,474 mobile homes* registered with the Texas Highway Department, an increase of almost 23,000 since last year. Roughly *34%* of that increase occurred in the coastal study area (this area comprises only 14% of the 254 counties in Texas but 31% of the population). In 1969, *more than 70%* of the new homes sold in Texas for less than $15,000 were of the mobile type; and nationally, 48% of all single family homes sold were of this type. This year, mobile home sales will comprise *more than 95%* of all home sales under $15,000.

The coastal region is also becoming a *very popular retirement area;* another reason for increasing population. An integrated program of geriatric centers and services will be needed. At the present time, there are no organized centers, and such services are handled on a more or less random basis. The greatest need for geriatrics is a motivation and remotivation program.

Although the state regulatory and advisory agencies - primarily the Texas State Department of Health - have carried on active surveillance programs and have appropriately notified local officials of the various problems and hazards, there has generally been *inadequate environmental health planning at the local level and heed taken of these warnings in this part of the state.* The coastal area is an important food source, both land and estuary, as well as an expanding industrial area. It is the drainage basin for the entire state, and it needs constant sanitation surveillance, more than any other part of the state, because of the subtropical climate; it is a prime area for reinfection. *Diseases* like plague, dengue, yellow fever, and malaria - nonexistent at present - could be reintroduced through the shipping industry because the vectors (flies, fleas, mosquitoes, rats) are still there.

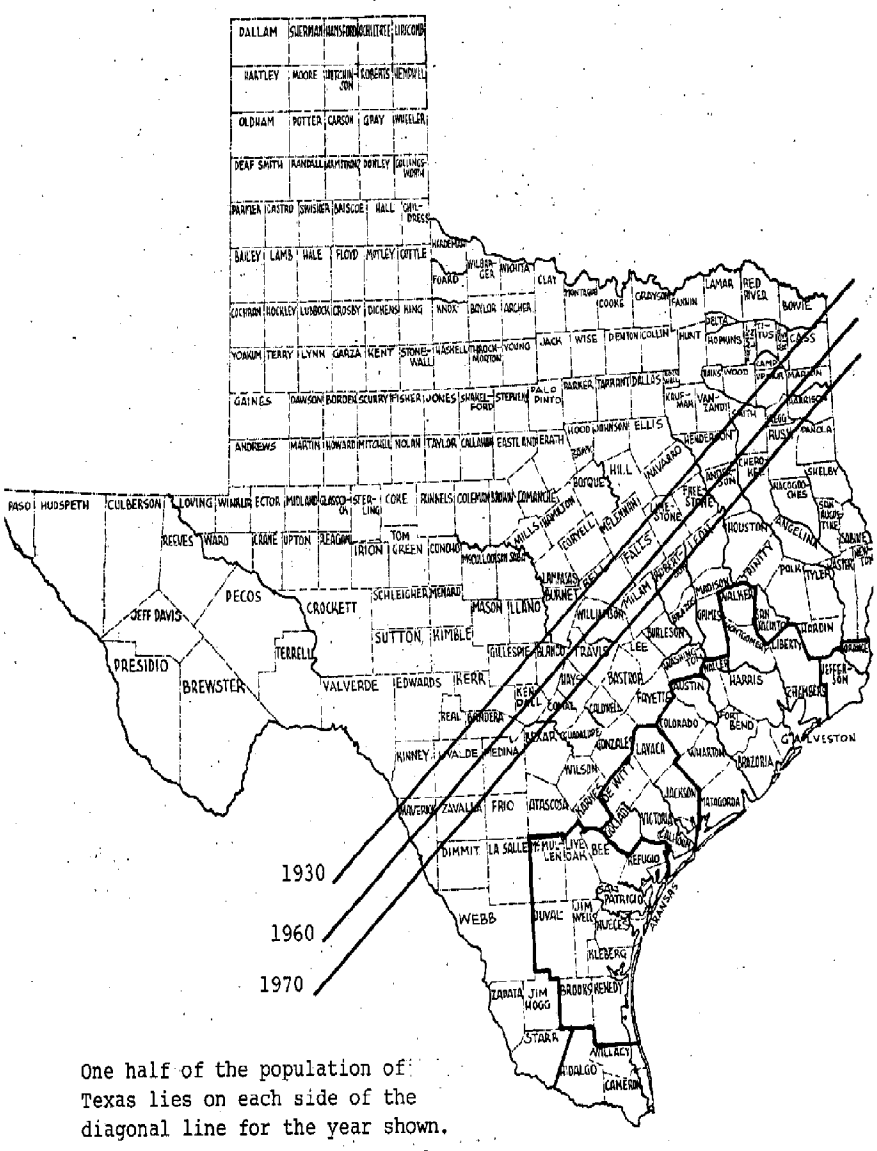
II. ENVIRONMENTAL HEALTH CONSIDERATIONS

Water Supply

There are about 550 water supply systems (Table II) in the study area, over 200 of which are located in the Houston metropolitan and suburban areas. The "spawning" of these systems,

PLATE I

POPULATION DISTRIBUTION



One half of the population of Texas lies on each side of the diagonal line for the year shown.

made possible by the availability of an abundance of good quality ground water, has occurred in Harris and adjacent counties, especially Montgomery County. *Consolidation of these systems - a master system - is needed in this area,* and will increase public health protection. This can be accomplished by the large public water systems extending services to adjacent small communities.

Approximately *25% of the systems in these 36 counties* hold the Texas State Department of Health State Approval status. Absence of "State Approval" does not necessarily mean that the water is unsafe, but it can be interpreted as an indication of the amount of time devoted to operation of the system. State Approval indicates not only good quality water, but operator competence and safisfactory operation and maintenance. The related fact that there are not enough properly trained water utilities personnel to oversee the management of the numerous small water systems (less than 5,000 population) points to the long-time problem of *public apathy* and a frequent unwillingness on the part of many city officials to pay for good operation and maintenance, i.e., better salaries for competent personnel. This is a problem mainly with the systems serving populations of less than 5,000.

Sewerage - Water Pollution

In general, the Texas coastal waters are satisfactory for fishing and recreation. Water oriented recreation, including water contact sports, is a desirable use of the waters of the state everywhere. Water contact activities in natural waters are not opposed by the state health agency where routine sanitary surveys support such activities, and where, in addition, as a flexible guideline to be used in the light of conditions disclosed by the sanitary survey, the geometric mean of the number of fecal coliform bacteria is less than 200 per 100 milliliters (ml.), and not more than 10% of the samples during any 30-day period exceed 400 fecal coliform bacteria per 100 ml. This policy is advisory only and in no way limits the responsibilities and authorities of local health agencies.

One has to marvel at *Nature's self-purifying capability* and assimilative capacity when analyzing the fact that *two-thirds of the 368* wastewater treatment plants in the coastal area (see Table II), most of which discharge eventually to the estuaries, *are producing a poor quality effluent.* Over 150 of these plants are located in and around Harris County (147 in Harris County, about 50 of these within the Houston city limits), and the same problem is being experienced with proliferation of small systems as was mentioned for water supplies above. The *wastewater plant problem,* however, is of a more critical nature.

In addition to this matter, the exposure to effluent from *septic tanks* presents a potential public health hazard in the

coastal region. Soil conditions are generally unsuited for proper septic tank operation; the effluent standing in roadside ditches provides excellent breeding places for mosquitoes; in some locations, the bacteriological quality of ground water is endangered; there is continual exposure of people to the effluent in many areas; in most locations, there is *little or no* regulation and control of these individual disposal systems at the county level. These facts have furnished the basis for Texas Water Quality Board action in passing several septic tank control orders.

The construction of community sewerage systems in the smaller urbanized areas will eliminate or greatly reduce septic tanks and the health hazard they pose. Prior planning for the development of regional sewerage systems and integration of the small urban areas into such systems will be a significant step forward toward solving health and pollution problems.

Solid Waste

The Texas State Department of Health made a statewide survey in 1968 of all the domestic solid waste disposal sites in Texas. Only *4.7% (40 out of 875)* of the sites surveyed were acceptable sanitary landfills. In the coastal study area, the record is not much better (see Table II); 15 out of 171 (8.8%) are acceptable.

The survey pointed out several problems, most of which are not unique to any particular area, but apply statewide:

1. The *people's attitude* toward a "dump" site, i.e., land use incompatibility, is unfortunate.
2. *Flies and rodents,* dust and odors, smoke from open burning.
3. *High watertable* - common in the coastal zone - leaches contaminants and pollutants out of the garbage into ground water supplies.
4. *Manpower;* a strike would pose an immediate public health problem.
5. It is very difficult to attract sufficient numbers of *qualified personnel* to this field of work.
6. Poor waste disposal programs in *recreational* areas.
7. *"Promiscuous" dumping,* i.e., into roadside ditches.
8. Lack of *financial and administrative* structure and resources.
9. Lack of *planning* by counties and local entities.

Suggestions for solutions and improvements of the general situation:

TABLE II

ENVIRONMENTAL CONTROL SYSTEMS

TEXAS COASTAL REGION

	Wastewater Treatment Plants		Water Systems		Solid Waste Disposal Sites	
County	Number	Satisfactory Operation	Number	State Approved	Number	Sanitary Landfill
Aransas	3	1	7	1	2	0
Austin	4	3	4	2	2	0
Bee	4	1	2	1	3	0
Brazoria	16	5	25	8	15	0
Brooks	1	0	1	1	1	0
Calhoun	5	3	5	3	3	0
Cameron	11	5	22	6	8	1
Chambers	5	1	9	3	3	0
Colorado	4	3	6	3	6	0
DeWitt	5	1	5	2	3	0
Duval	3	1	5	1	3	0
Fort Bend	14	5	11	4	6	1
Galveston	20	4	29	11	10	0
Goliad	1	1	1	1	1	0
Harris	147	40	200	23	19	5*
Hidalgo	12	9	23	11	12	1
Jackson	4	2	4	2	3	1
Jefferson	21	7	18	6	5	1
Jim Wells	3	2	3	3	3	0
Kenedy	0	-	1	0	1	0
Kleberg	2	1	4	2	3	0
Lavaca	3	3	3	3	3	0
Liberty	7	2	16	3	5	0
Live Oak	2	1	5	1	2	0
McMullen	0	-	2	0	1	0
Matagorda	6	2	15	2	3	1
Montgomery	4	1	31	1	2	0
Nueces	16	4	10	4	8	3
Orange	10	5	29	4	6	0
Refugio	3	1	5	2	4	0
San Patricio	8	2	11	6	8	0
Victoria	5	2	6	2	4	1
Walker	5	1	5	1	2	0
Waller	5	2	3	3	4	0
Wharton	7	4	6	3	4	0
Willacy	2	1	8	1	3	0
TOTALS	368	126	540	130	171	15
Percent		34.2		24.1		8.8

*one incinerator

1. *Public education programs* to obtain acceptance of solid waste management programs, publicize the urgent need for proper systems, encourage planning at the local level, and encourage competent people to enter the field.

2. Provide *better training* for all personnel in the solid waste profession.

3. *Upgrade the profession* and raise the status and image of the workers by setting higher standards for qualification and performance, better pay, and better working conditions.

Much of industrial solid waste, which is under the regulatory jurisdiction of the Texas Water Quality Board, is in aqueous suspension or in semi-liquid form, and has not presented a significant problem as solid waste.

Vector Control

Of the common vectors - fly, rat, tick, flea, mosquito - *only the mosquito* constitutes a significant public health hazard in the coastal region. The other vectors are usually controlled indirectly through adequate control and management of other environmental problems, i.e., flies as a part of the sewerage and refuse problem, rats - usually - as part of the refuse problem, ticks and fleas as part of the control of rats and other animals. While rats are often controlled as part of the refuse program, most large cities have separate, active rodent control programs in operation.

The mosquito, which is of great concern in the coastal region, is, for the most part, a *nuisance*. But this insect is also responsible for periodic outbreaks of *encephalitis; yellow fever*, another mosquito-transmitted disease, has been nonexistent in Texas, and *malaria* has been rare in recent years. It is not known, however, how many secondary infections are the result of mosquito bites, or how significant a problem the mosquito is in recreational areas - how many people go home just to get away from the nuisance?

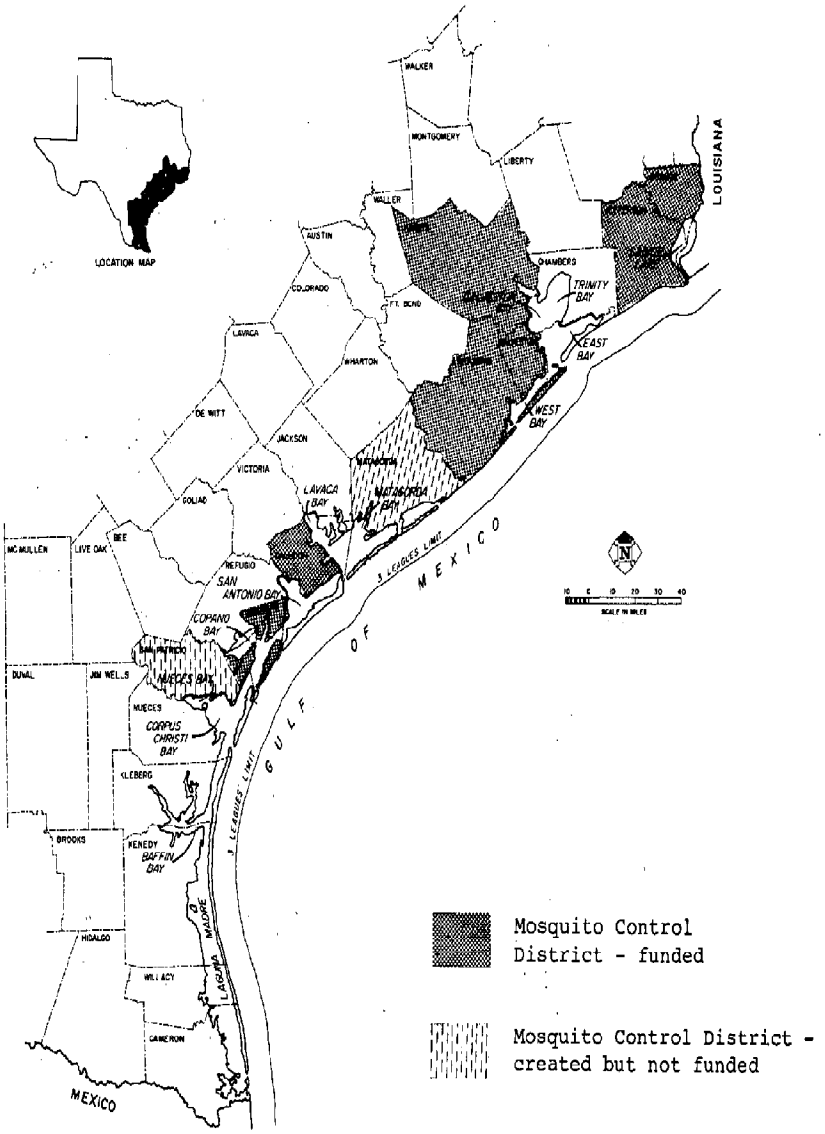
For effective control, *every county should have or be part of a mosquito control district*. There are only seven funded districts in the coastal area at present (see Plate II); such districts are especially needed from Kingsville to Refugio and in the Rio Grande Valley, although during the summer cotton spraying, the density of mosquitoes in the Valley area is not great.

Pesticides

Even with our best control efforts, *insects still destroy about one-fourth of everything we raise*. The organophosphate

PLATE II

MOSQUITO CONTROL DISTRICTS



insecticides are the most common ones used in Texas agriculture today; few farmers use DDT, and few have found it useful since about 1950. So if DDT were banned in Texas, it would not have a significant effect on our agricultural program. It is interesting to note that Sweden, the first country to ban DDT, *is not ready to return* to the use of this material becuase the pine weevil is threatening to wipe out the country's forests. Likewise, the *use of DDT is being reactivated* on the island of Ceylon because of *one million cases of malaria* in the last several years of the ban.

In the lower Rio Grande Valley, since 1964, occupational exposure to organophosphate insecticides has resulted in a significant number of cases of *acute poisoning* (over 300 cases). All cases have been successfully treated with no known residual effects. It appears that as the workers gain knowledge of the hazards and experience in handling the materials, the number of cases declines.

The hazards involved with the use of pesticides can be summarized as follows:

1. Acute poisoning cases

2. Possible contamination of potable water (short term)

3. Possible runoff of contaminants (NOTE: DDT is highly toxic to fish, although *toxaphene* is the chemical most commonly involved in fish kills in Texas; DDT is highly insoluable in water, i.e., soluable only to the extent of about 1 ppm.)

4. Environmental buildup. The long term effects on the ecology are not completely understood, but they are apparently not critical.

Some of the hazards of not using certain pesticides are as follows:

1. The entire coastal area is very receptive to an array of *vector-borne diseases*.

   a. Malaria and dengue, which were once prevalent in that area, could be reintroduced

   b. Plague, related to introduction of infected rats and fleas

   c. Murine typhus (flea-borne)

   d. Encephalitis, the most likely vector-borne disease to occur in the coastal area

2. Heavy *crop damage*

In comtemplating the ban of a particular insecticide, therefore, one must take into consideration the Risk-Benefit Equation and assign priorities. *How much risk are you taking for the amount of benefit derived?*

Marine Resources

A great potential exists in the Texas Gulf Coast's *ability to produce seafood.* In general, the Texas bays and estuaries are in good condition, and the acreage open to oyster harvesting has remained relatively constant in most of the bays for the past 20 years. Lavaca and Galveston Bays are the exceptions. Approximately *54% of Lavaca Bay* (see Plate III) is closed to harvesting because of sanitary (8,500 acres - urban runoff) and industrial (11,400 acres - recent mercury findings) hazards. On the other hand, Galveston Bay, from whence come 75 to 90% of the Texas oysters, has been significantly "enlarged" in approved acreage (55,565 *additional acres* in Galveston Bay proper between 1951 and 1969). This has been due to improved surveillance techniques, as well as more information available regarding the condition and characteristics of the bay.

The bays and estuaries are not free of environmental hazards, however. Some of the more pressing problems/threats are:

1. *Increasing population and industrialization*

2. Large quantities of *domestic wastewater* placing a heavier organic burden on the assimilative capacity of the coastal waters.

3. Rapid changes in technology are creating new waste disposal problems and, in turn, a need for additional emphasis on *monitoring of industrial waste discharges.*

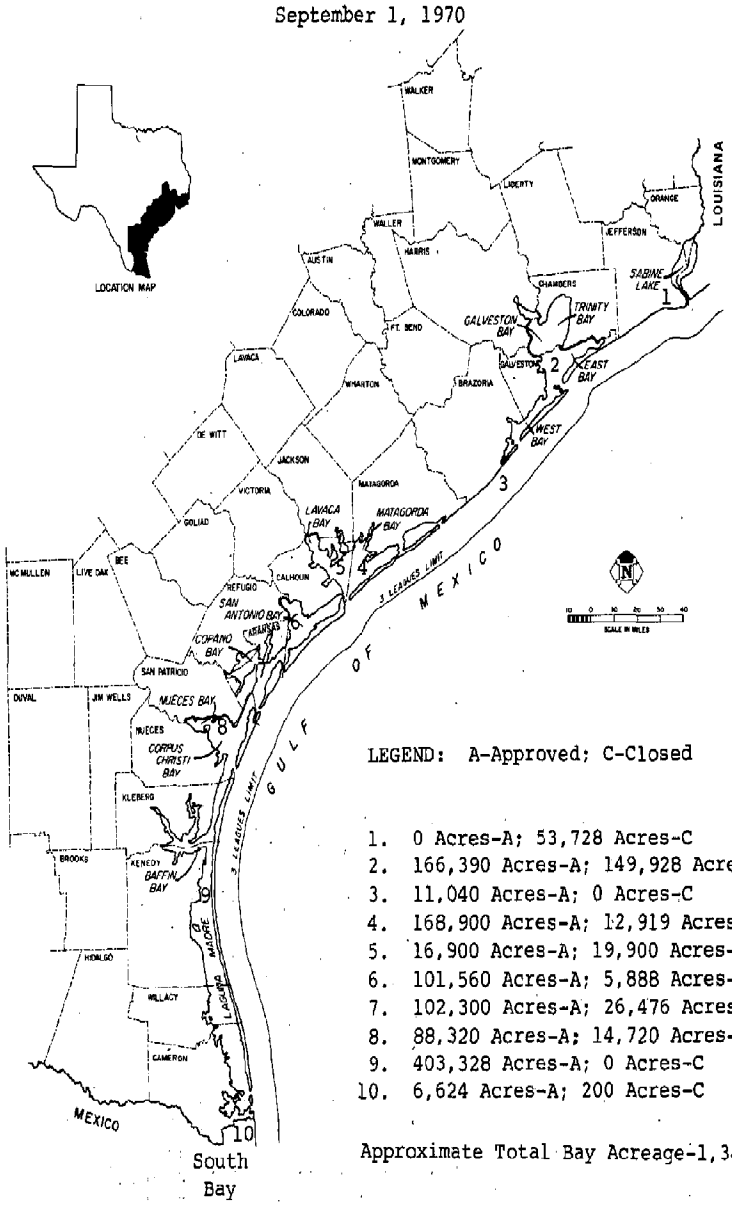
4. *Heavy metals,* such as mercury (brain, kidney, and nervous system damage), cadmium (cardiovascular disorders), and lead (miscarriage, damage to vital organs).

While there is specific legislation covering the oyster and crab processing industry, there is no "Wholesome Food Act" that places the *same emphasis* on regulation of seafood processing as on red meat. *There is little or no specific control,* for example, over the rate of moving marine produce from boat to processing plant, particularly in the case of the "small" operators, with the exception, of course, of that exercised over oysters and crabs. Marine produce is highly perishable and, therefore, requires special handling procedures and techniques between time of harvesting and time of processing.

At the plant, disposal of liquid and solid processing waste is a problem, and in general, there is *no satisfactory means of disposal provided.* The ill-planning of dock facilities has presented

PLATE III

MARINE RESOURCES - OYSTER HARVESTING
Texas State Department of Health
September 1, 1970



LEGEND: A-Approved; C-Closed

1. 0 Acres-A; 53,728 Acres-C
2. 166,390 Acres-A; 149,928 Acres-C
3. 11,040 Acres-A; 0 Acres-C
4. 168,900 Acres-A; 12,919 Acres-C
5. 16,900 Acres-A; 19,900 Acres-C
6. 101,560 Acres-A; 5,888 Acres-C
7. 102,300 Acres-A; 26,476 Acres-C
8. 88,320 Acres-A; 14,720 Acres-C
9. 403,328 Acres-A; 0 Acres-C
10. 6,624 Acres-A; 200 Acres-C

Approximate Total Bay Acreage-1,349,121 Ac.

special sanitation problems, such as inadequate or no toilet facilities, inoperable or lack of backflow preventors, and inadequate facilities for washing boats and equipment.

At the present time, control of these aspects of the marine produce industry, by the Texas State Department of Health, would be greatly strengthened by the passage of legislation that would set forth definitive requirements and authorize the development of specific regulations.

Food and Milk

Food contamination by insects and rodents and subsequent spoilage is an especially critical matter in the coastal zone. This is the Number One food control problem in the state, and is *magnified in the coastal area by the climatic conditions.* Closer control is needed because the food originating in this area (mostly fish) is of a more perishable nature.

Approximately 50% of the shrimp breeding in the world is accomplished in the Texas coastal zone, and activities related to this industry - control of bacterial contamination - constitute a sizeable portion of the Texas State Department of Health's Food and Drug Division surveillance effort. *This particular program needs about twice the staff* to sufficiently do the job.

The coastal region is *not* a good dairying area; there are very few dairies located there, and consequently, no problems of major importance. Pasteurization has, for the most part eliminated milk-borne diseases. Many of the cities have their own milk inspectors, which has resulted in some duplication of effort with the Texas State Department of Health. Updating of laws and regulations would eliminate some of this overlap and permit the more efficient and effective utilization of personnel.

Bedding

This program of the Texas State Department of Health protects the public health by regulating the processing and manufacture of bedding material and products, and the processing and sale of second hand material and products. The big problem is the regulation (and there is considerable *illegal* activity in this field) of the sale of the *second hand bedding.* It must be germicidally treated to be rendered safe for resale. This problem is unique to a Texas coastal location (Houston) only in that there are more bedding manufacturers, processors, and related activity in that area (Dallas is second behind Houston).

The solution is more people for regulation and enforcement activities, but funds are not available for a larger staff. The bedding program is unique in that, by law, it must be *fiscally self-sustaining* through the requirements for registration fees and revenue inspection stamps. It gets no revenue from the General Fund.

Radiation

In general, the production and use of radioactive materials in Texas does not pose a threat to public health. However, there is a significant potential for such a hazard if the program of constant surveillance carried on by the Texas State Department of Health's Division of Occupational Health and Radiation Control is not maintained. About 50% of all the licensees in the State of Texas are issued to users in the coastal region; 80% of this number (40% of the total) is located in Harris, Galveston, and Jefferson Counties.

The *industrial and medical utilization* of radiation equipment and sources seems to be concentrating in the coastal area. It is more economical to serve large numbers of people with the more sophisticated and expensive devices, and this equipment is being "drawn" to the dense coastal population centers from other parts of the state. The area is enhanced by a large potential in the Coastal Bend region for mining low grade uranium ore. A "glamorous" part of the surveillance effort is centered around Tood Shipyards on Pelican Island, Galveston, Texas, where the *nuclear ship Savannah* is serviced and refueled.

One of the main problems encountered in the radiation control program (a problem not especially common to any particular area) is that of obtaining the cooperation and compliance of industrial radiographers. In general, this somewhat transient group of people is careless about instrument calibration and the use of proper safety equipment.

At the present time, the Texas State Department of Health is adjusting its program to deal with a new hazard: *Non-ionizing radiation produced by electronic sources*, laser and microwave devices, and radar. This situation is characterized by improper shielding and defective components, and can be remedied, for the most part, by stricter standards governing the manufacture of the equipment. There has been a legislative proposal to expand the definition of radiation, which would give the State health agency legislative authority over these radiation sources.

Air Pollution

Because of the high concentration of population and industry, and the unique meterology of the area, the Texas Coastal Region has the greatest potential for the occurrence of air pollution problems. The area is characterized by rapid heating and cooling of the land surface, updrafts during the day, and downdrafts at night. The localities of prime concern are the Houston-Galveston area, Beaumont-Port Arthur-Orange area, and Corpus Christi area to some extent.

Air quality may have some effect on respiratory disorders such as emphysema and chronic bronchitis, but it has been deter-

mined to have *no effect* on tuberculosis. *Some investigators are not convinced of the relationship* between air pollution and respiratory diseases.

Occupational Safety

Although accidents certainly are not unique to the coastal area, most of the effort of the State Health Department's Occupational Safety Program (related to the work of the Occupational Health Program) is concentrated in this region because *the majority of the industrial activity in the State is found there.* The "heavy" areas are Houston, Beaumont-Port Arthur-Orange, Corpus Christi, and the Rio Grande Valley. Dallas-Fort Worth and San Antonio run a close second.

Plate IV indicates the high-accident areas of the State, and is based on numbers of "debit employers." A debit employer is one whose accident experience (record) is worse than the average for his type of industry.

Housing

Housing has an undisputed and profound effect on our daily lives. This matter is not reserved for the poor, but is of concern to all of society. When considered in relation to the environment, housing is usually seen in context with "public" housing for the "economically deprived," or is related to "substandard" conditions. Certainly, many of the problems confronting mankind in his environment - disease, maternal and infant mortality, juvenile delinquency, drug abuse, truancy, sanitation - could be ameliorated by providing and maintaining satisfactory housing. This paper considers the more direct environmental and personal health problems, many of which can be related to housing, rather than placing emphasis on housing problems in the Coastal Area.

III. PERSONAL HEALTH CONSIDERATIONS

Local Health Services

One of the biggest public health problems in our State, as well as on the coast, is *the cost and delivery of health services.* There are not enough local health departments and programs, and the Texas State Department of Health is working toward the goal of complete coverage through the activation of a regional public health system.

Plate V indicates the location of the full-time county health departments in the coastal area (50% coverage).

PLATE IV

COUNTIES WITH THE GREATEST
NUMBER OF DEBIT EMPLOYERS

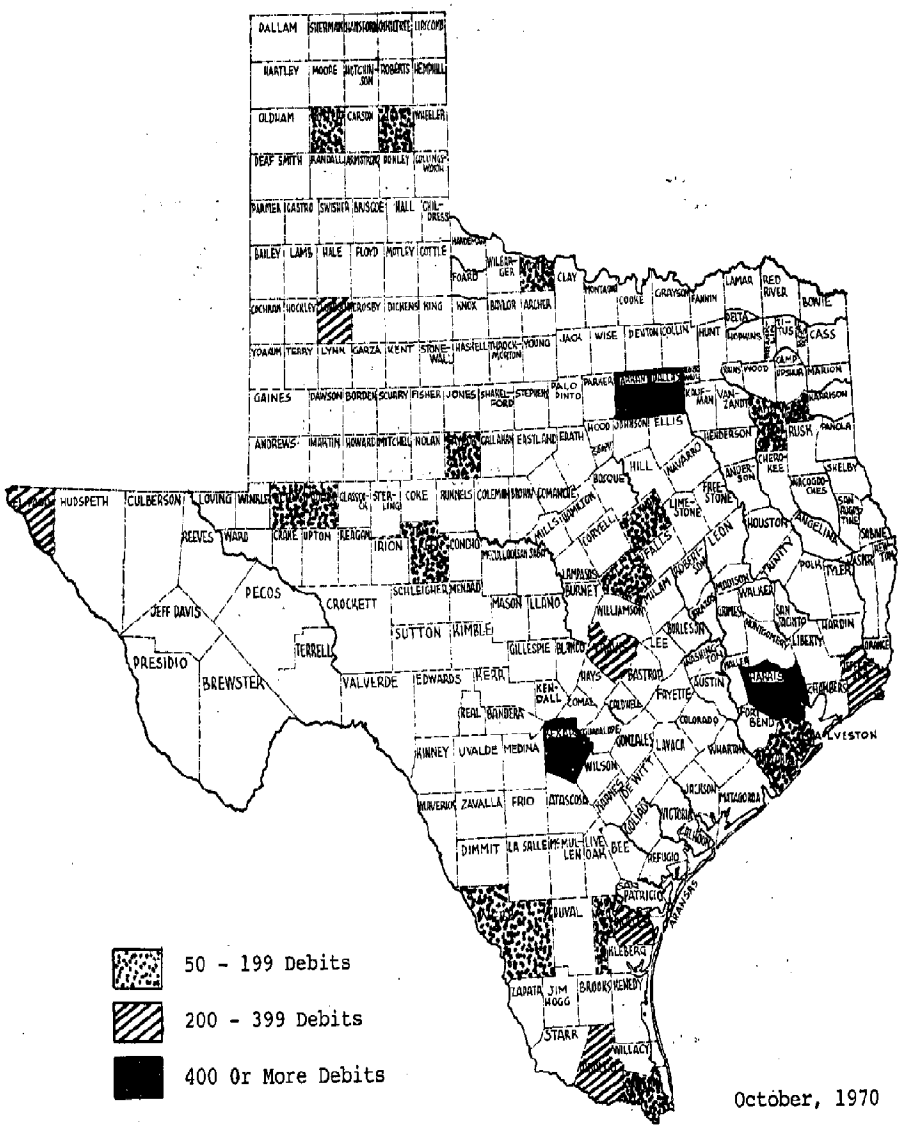
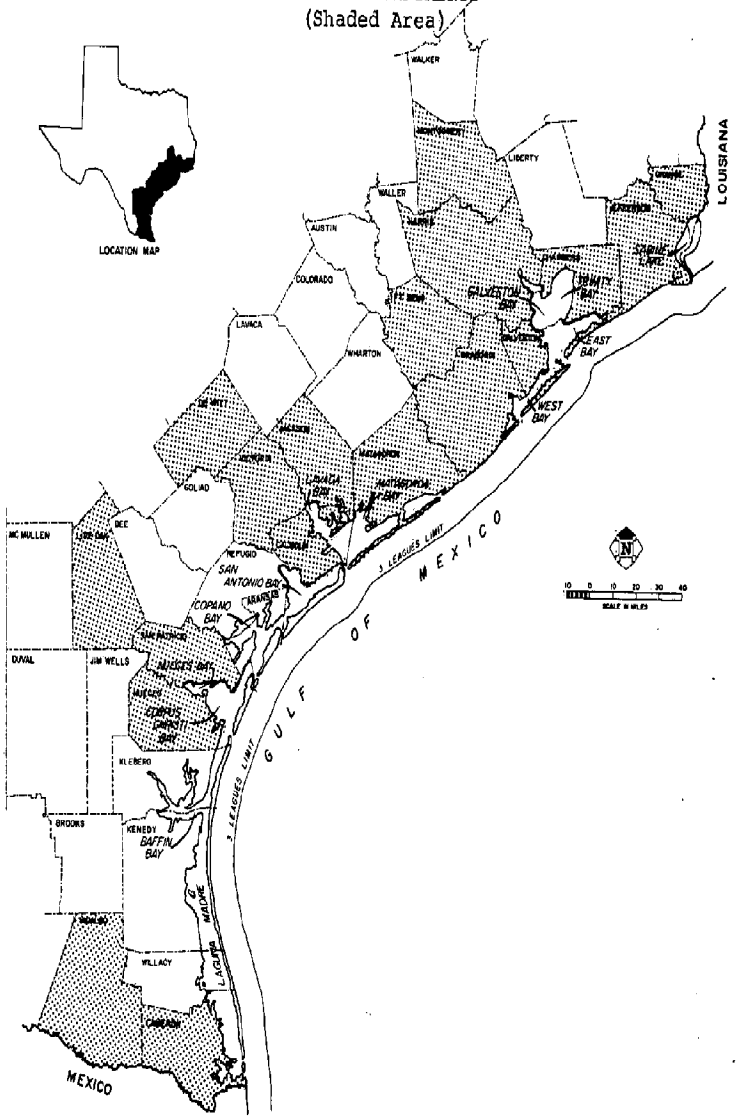


PLATE V

COUNTIES WITH FULL TIME
HEALTH DEPARTMENTS
(Shaded Area)



October, 1970

Communicable Diseases

It's one thing to be in the "Top Ten" in football, but to be a national leader in the disease field is a somewhat dubious honor. From a review and analysis of the statistics, it is evident that *Texas has more than its share of communicable diseases.* In a report prepared in October, 1970, by the Texas Office of Comprehensive Health Planning, the 1968 statistics on 12 selected communicable diseases (see Table III) are analyzed. These diseases were chosen because they are believed to be the most accurately reported and thus are better suited for comparison. *The incidence rates in Texas for nine out of the 12 were higher than the respective U. S. rates.*

The rates were also calculated for the Coastal study area (the five planning regions contiguous to the coast) and are compared with the Texas and U. S. figures (Table III). The results are shown graphically in Plate VI, and it can be seen that the rates in the coastal region for nine out of the 12 are higher than the U. S. average; seven out of 12 are higher than the U. S. and Texas averages.

Tuberculosis is one of the most prevalent diseases in the coastal area, and it is probably *the most common* among migrant farm workers (see section on Migrant Health Program below). The Coastal region has about 30% of the State's population, but approximately 40% of the new active cases in Texas each year are found there (highest incidence areas: Houston and the Texas-Mexico border). The case rates for that part of the state are in the range of 35 to 38, whereas, the rate for the whole state has been in the range of 26 to 30. Climate has no bearing on TB incidence; the significant factor is *concentration of people.* One-fifth of all the cases in Texas come out of the Houston area (Harris, Montgomery, Brazoria, Fort Bend, Galveston, Waller, Austin, and Walker Counties). The eradication program presently includes case finding, treatment, treatment of "high-risk susceptibles," following inactive cases for five years after completion of therapy, and prevention through the child-centered testing program.

Veneral disease is a constant problem; the incidence in Texas is higher this year than ever before. There has been a *498% increase* in infectious/early syphilis in the State since 1958. A portion of this increase is undoubtedly due to improved case finding. The following statistics should serve to further illustrate the problem.

REPORTED CASES

	State	Coastal Area	%
Total syphilis (all stages), 1969	6,170	2,907	47.1
Total syphilis, Jan. - Sept., 1970	4,871	1,930	39.6
Infectious/early syphilis, Jan. - Sept., 1970	3,602	1,307	36.3
Gonorrhea, 1969	38,405	14,817	38.6
Gonorrhea, Jan. - Sept., 1970	32,689	12,180	37.2

TABLE III

REPORTED COMMUNICABLE DISEASES
1968

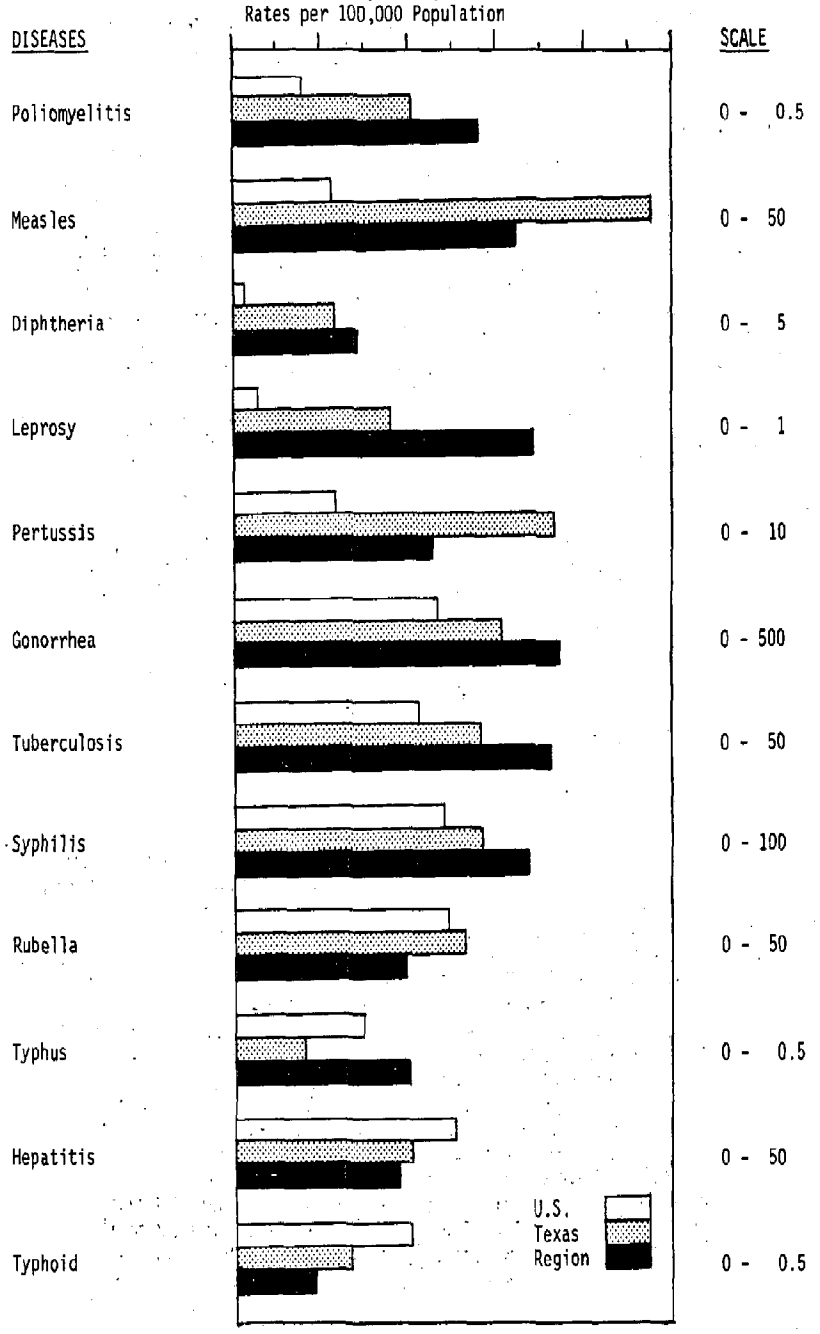
	United States		Texas		Coastal Region		Region's Percentage	
	Number	Rate*	Number	Rate*	Number	Rate*	Of U.S. Rate	Of Texas Rate
Poliomyelitis	53	0.03	22	0.20	10	0.28	933.3	140.0
Measles	22,231	11.12	5,204	47.40	1,139	32.20	289.6	67.9
Diphtheria	260	0.13	131	1.19	50	1.41	1,084.6	118.5
Leprosy	123	0.06	40	0.36	24	0.68	1,133.3	188.9
Pertussia	4,801	2.41	802	7.31	147	4.15	172.2	56.8
Gonorrhea	464,543	232.43	33,667	306.70	13,158	371.60	159.9	121.2
Tuberculosis	42,758	21.39	3,108	28.31	1,289	36.40	170.2	128.6
Syphilis	96,271	48.17	6,208	56.55	2,371	67.00	139.1	118.5
Rubella	49,371	24.70	2,923	26.63	692	19.50	78.9	73.2
Typhus	298	0.15	9	0.08	7	0.20	133.3	250.0
Hepatitis	50,722	25.38	2,300	20.95	670	18.90	74.5	90.2
Typhoid	395	0.20	14	0.13	3	0.09	45.0	69.2

* Rates per 100,000 population

PLATE VI

REPORTED COMMUNICABLE DISEASES - 1968

COMPARING RATES IN U.S., TEXAS, AND COASTAL REGION



It can be seen that the incidences for the first nine months of 1970 are very near the totals for the previous year. Only Dallas is on a competitive level in incidence. *(NOTE: Bear in mind that the reported figures from which these VD statistics are compiled only represent approximately 25% of the actual cases).*

Leprosy in Texas is high, and most of the cases come from the coastal zone. There has been a vigorous case-finding effort since 1961, and at present there are *500+ cases* under surveillance. These cases have always been there, but not until recently have they been found and treated.

The *dysenteries,* including *amoebiasis,* are seen mostly among the lower socio-economic groups (not an ethnic problem), usually as a result of *poor personal hygiene and sanitation.* Although *hepatitis* is commonly listed among water-borne diseases, it is spread more by not washing hands. An adequately financed environmental health program can do much in these cases.

Diphtheria, poliomyelitis, measles, pertussis, and *rubella* are "immunizable" diseases; we shouldn't have them. They crop up whenever immunization levels are allowed to become low.

Mention should be made of the *zoonoses* - diseases transmitted from animals to man - such as *brucelosis, anthrax, botulism,* and *rabies.* Of these, rabies is a constant menace; present especially in wild animals, and prevalent at this time in the Rio Grande Valley, West Texas, and Central Texas (the high reservoir in Central Texas exists because of the large number of *bat caves).*

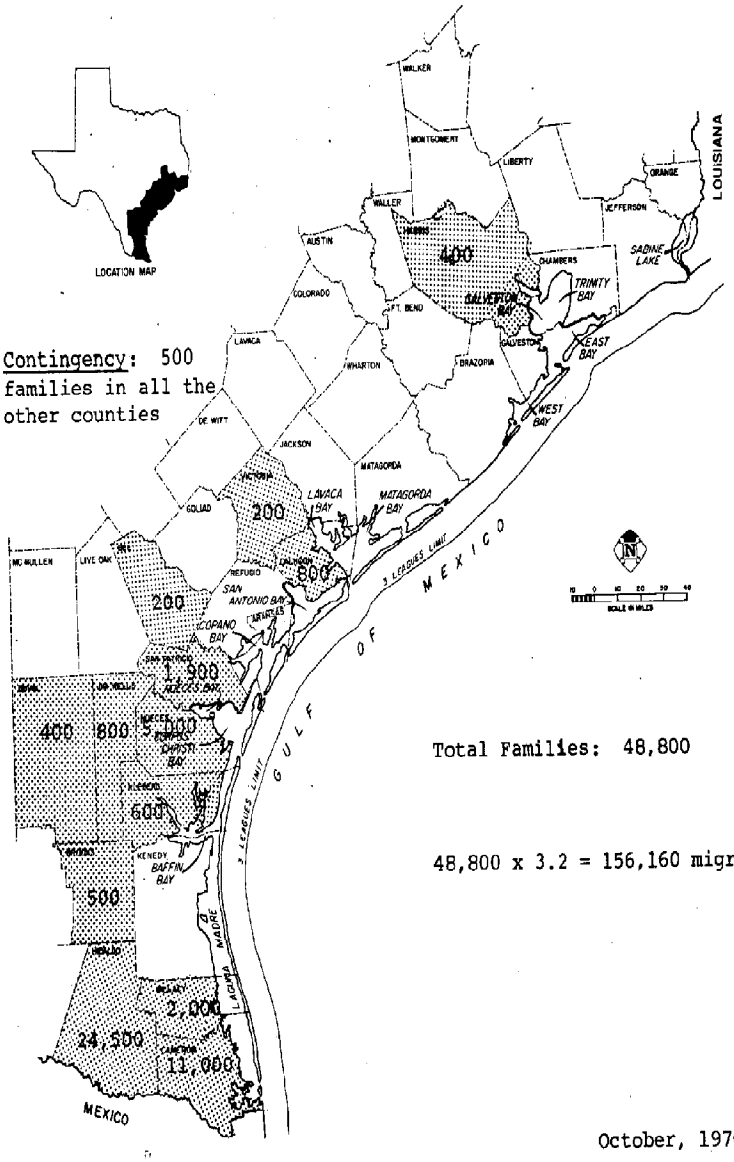
Migrant Health Program

The primary purpose of the Migrant Health Program of the Texas State Department of Health, which was coordinated through the Division of Sanitary Engineering until 1963, is *to improve health care and services for migrant agricultural workers.* The greatest concentration of activity associated with this program is in the Lower Rio Grande Valley and the coastal zone. Plate VII shows the location of the estimated 156,000 migrants in the coastal zone.

The language barrier and the general unavailability of education and educational programs among the migrant workers are significant parts of the cause of the major problems that affect the health of these people. These problems, for the most part, are *environmental in nature:* Crowded and substandard housing, inadequate water and sewerage facilities, no insect and rodent control, little or no garbage collection. The health problem is compounded by the fact that usually the migrant *will not* seek a doctor until he is seriously ill. The Texas Education Agency, as well as the State Health Department, takes an active part in the Migrant Health Program toward overcoming this problem. Mechanization has also compounded the problem by putting many migrants out of work, i.e.,

PLATE VII

LOCATION AND ESTIMATED NUMBER
OF MIGRANT FAMILIES



Total Families: 48,800

48,800 x 3.2 = 156,160 migrants

October, 1970

migrants have less money to spend for health care, and more of a financial burden is placed on the health care system.

The "serious" disease most common among these people, and certainly most prevalent among them in the coastal zone, is *tuberculosis*. The greatest number of patients (with all diseases) is in the age range of 15 to 44.

One interesting aspect of the migrant situation that may have an effect on the Migrant Health Program is the fact that the *minimum wage* law has caused many large land owners in the Rio Grande Valley to dry up their fields and move into farming operations across the border into Mexico. The workers, who actually have an opportunity to make more money working on a unit basis than by the hour, have also migrated south.

Maternal and Child Health, Nutrition, and Family Planning

The problems in these areas can be credited to the extreme poverty of the high minority group population and the rapid growth and industrialization of the coastal region. *Improper and insufficient pre- and post-natal care* are given, and there are more cases needing treatment than there are facilities for treatment.

This situation is also characterized by a *poor nutritional state*. Many babies are born potentially retarded because of poor nutrition.

There is a high and increasing number of *teenage pregnancies* in the coastal region. The adolescence of the mothers is also a major contributing factor to babies being born potentially retarded (of abnormally small size). Morbidity increases in both mother and child as a result of the mother having too many children. It is estimated that there is three times more morbidity in having too many children that in taking "the pill."

IV. HURRICANE-CREATED HAZARDS

When an area is devastated by a hurricane, as has been the case many times before in the coastal area, special health and sanitation problems, mostly of an environmental nature, are presented.

Water Supply

Power outages, which usually occur, render water system pumping equipment inoperable. Pressure on the distribution system soon decreases, thus increasing the chances of contaminants entering the system. In addition, water cannot be taken from the source of

supply for treatment and delivery. To overcome this situation, an auxiliary power source (gasoline engine) is needed. The majority of the cities in the coastal area *do not* have auxiliary power facilities.

Water Pollution

Sewerage systems are often flooded, and septic tanks are underwater. When this situation occurs, there is no collection of wastewater and no effective treatment.

Solid Waste

A solid waste management and disposal problem of large magnitude is created; everything that has been destroyed is classified as solid waste. To help alleviate the situation, the Texas Air Control Board grants an *immediate variance* for open burning of the refuse and litter.

Vector Control

Dead cattle and other animals attract and breed *flies; rats* are displaced and come out to look for food. Heavy rain often accompanies a hurricane (Hurricane Celia in August, 1970, was relatively "dry," however.), and the *mosquito* population is increased; their presence is detected about the fifth day after the storm. High winds blow out windows and screens, and windows without screens are opened for ventilation because power outages have "knocked out" air conditioners, and the mosquitoes come in. A health problem results when a "disease reservior" (*encephalitis*, most commonly) develops.

Shellfish

Pollution and contamination of the coastal waters result when high tides and heavy rains flood the adjacent country-side. A large amount of debris and urban runoff are washed into the bays. The oyster harvesting areas must then be closed for two to six weeks until sampling and testing can acertain safe bacterial levels. This does not happen very often, however.

Food

Contamination of food results; directly from wind and water, indirectly from spoilage when power goes off. More surveillance is needed in salvage operations to insure proper procedures and salvage of only the "correct" food products.

Radiation

Radioactive sources are occasionally blown around and sometimes lost. Surveillance teams (Texas State Department of Health) are rushed to the area to determine the severity and extent of the problem and to confine it and prevent spreading.

V. DISCUSSION

A conservative prediction (and this may be a gross understatement) of *growth and development in the coastal region is that it will continue, and probably at an increasing rate.* This is indicated by the influx of industry into the area and corresponding impact on the economy of our State, access to and development of suitable recreation centers, and the concentration of population in that part of the State; especially the Houston area. *More people mean more problems,* and public health is no exception. Since the people are what make things happen and keep things going, there is the obvious need to keep them healthy. It follows, therefore, that the State Legislature and the environmental protection agencies, especially the Texas State Department of Health, must direct a significant part of their attention and effort to the coastal region.

Texas has more undeveloped *(unspoiled?)* coastline than any other state. There is still time for productive, thrifty, and orderly development to take place - in contrast with the East Coast, for example, that is presently trying to "salvage and regroup" in many locations - if planning for a healthy environment is effected in the relatively near future.

The present trend of proliferation of small water and sewerage installations must not go unchecked; *master water systems and regional sewerage systems* must be developed for good public health protection. It may be well to examine the attitude and philosophy regarding water use and needs, water wastage, pollution control, and pricing of this product. *Will each of us really need 200+ gallons of water per day by the year 2000? If so, where is it going to come from? Is the answer to water quality control the construction of more and larger wastewater treatment plants?*

A change in public attitude toward the water utilities profession and the value placed on the services rendered by these people is urgently necessary. The quality of public health protection in this field is *directly proportional* to the price paid for it, and right now, the amount being spent for salaries and facilities is very low. A *greens keeper* at a municipal golf course receives a higher salary than the man responsible for supplying safe water to the public.

There has been *very* little planning done for *solid waste management,* not to mention improper operation of existing dis-

posal facilities. Because of increasing unavailability of land for disposal, alternate solutions must be sought to reduce the amount of refuse being generated and to dispose of the tonnage that is and will be confronting us.

Complete area coverage by *mosquito control districts* operating in conjunction with full-time, active local health departments will be a necessity to combat vector-borne and other communicable diseases that hang as a Sword of Damocles over this subtropical, receptive region.

In addition to water quality control measures and intensified sanitary surveillance of estuary and land areas - necessary to protect our marine resources - in the entire coastal zone, stricter regulation of the *seafood production and processing industry* will be needed.

The general public and public health officials are indeed concerned at the present time - maybe "in an uproar" is a better term to describe the situation - over the *diphtheria epidemic* in our state (San Antonio); *about 200 cases* with *two or three deaths*. Why is there not the same loud outcry over the *syphilis epidemic (over 3,000 cases with about 150 deaths in our state each year* - and bear in mind, again, that these reported figures represent only 25% of the actual cases)? *Is our public health surveillance effort properly directed?* It might be well for we the people to reexamine our attitudes and philosophies toward public health practices and standards.

VI. CONCLUSION

1. An intensified public health *education program* for environmental health and communicable diseases.

2. More emphasis on health care delivery, facilities, and environmental protection for the *transient segment* of our population, especially the tourist.

3. Development of *regional water and sewerage systems* and more rigid control of the use of septic tanks in the densely populated areas.

4. *Improved solid waste* management techniques and planning.

5. Complete coverage of the area by *mosquito control districts* and local health units.

6. More intense sanitary surveillance for protection of our *marine resources*, and *additional regulation* of the seafood production and processing industry.

7. Additional personnel are needed for such *consumer protection programs* as bedding (regulation of the sale of second-hand bedding material) and food and drug surveillance.

8. An environmental facilities/land use plan for the entire coastal area.

9. Intensified effort toward *tuberculosis* case-finding, treatment, and eradication.

10. A reinforced program for veneral disease case-finding and treatment, and increased state funding for facilities and personnel for treating the cases.

11. A continuous and concerted effort toward *immunization* of all persons, especially children, for the "immunizable" diseases.

12. A serious and intense *family planning* and *"zero population growth"* program with special attention and force directed toward young teenagers.

13. *Reexamination of attitudes, philosophies, and standards regarding public health practices, use of natural resources, and environmental control techniques.*

14. It could go without saying that adequate funding, along with an enlightened attitude, is needed to implement the items listed above.