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THE NEED FOR ADMINISTRATIVE CONTROL
OF
GROUND WATER IN TEXAS

THE TEXAS PLANNING BOARD

AUSTIN

JUNE, 1938

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This report was prepared under the
direction of the committee by

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INTRODUCTION

For two years The Texas Planning Board through its Water Resources Committee, has studied the problem of ground water regulation in Texas. The problem itself may be summarized thus:

Certain specific areas in which the ground water supply is already overtaxed, are in urgent need of some means to protect this supply from further withdrawals.

Other sections are making greater demands on their ground water each year, which eventually will exceed the rate of underground flow. These sections will need to protect against lowering water tables, which is the inevitable consequence of overdevelopment.

Still other areas are not now concerned with such problems, for they either depend upon surface water supplies, have no satisfactory ground water sources, or do not anticipate any intensive demand for ground water.

The solution of the problem can not be stated in any such concise terms. Unlike surface water, ground water does not lend itself to precise measurement, and therefore information regarding its occurrence, rate of flow and quality cannot be predicted, except within rather broad limits. Records as to operation of wells are not often kept over periods comparable to the length of stream records, which makes ground water investigation still more difficult. The various geological formations in which water is found, and their chemical effect of the water introduces still another uncertainty into ground water study. In Texas, the wide diversity in water uses, climatic conditions, geology and industry must also be considered throughout any state-wide study of ground-water.

The combination of all these factors and others of minor importances makes the problem of ground water regulation one which requires the benefit of the best minds available. Not only must legislation for ground water control be consistent with existing surface water law, but it must be such as to benefit areas in need of regulation, and at the same time work no hardship on sections where regulation is now unnecessary.

Realizing the many sides to the problem and the many interests involved, The Texas Planning Board's Water Resources Committee appointed a sub-committee to map out a program of action. This committee decided that a state-wide meeting was the first step in crystallizing public opinion on this matter, and accordingly requested Governor James V. Allred to call such a meeting in the interest of the state as a whole.

To implement this request, the sub-committee prepared and submitted this report to Governor Allred. It forms the basis for his decision in calling a state-wide meeting in Austin, on July 29, 1938. It is the hope of the sub-committee that the material presented herein will also serve to promote a full discussion of Texas ground-water at this meeting.

THE NEED FOR ADMINISTRATIVE CONTROL
OF GROUND WATERS IN TEXAS

Ground water, or water from wells and springs, is the most important natural resource in Texas. On the average, rainfall in the amount of over thirty inches falls over the entire State; yet only one-tenth of this amount flows down our rivers. Nine-tenths is absorbed into the ground as ground water, or is consumed by evaporation and by plant life. This means that immense amounts of ground water exist, which have never been tapped.

Perhaps for this reason ground water appears to be inexhaustible, most people looking upon it in much the same way as we regard the air we breathe. Unfortunately, this is not true, for many factors are present which prevent such a condition. Rainfall is quite scarce in parts of the State, although heavy in others. The ground in some areas is impervious to water, while in others it soaks up virtually all the rainfall. On account of these factors and many others, we find that ground water is exhaustible when too many demands are made upon it in a given locality.

The real importance of ground water may be gauged more accurately when it is realized that more than three out of every four persons in Texas depend upon wells and springs for their water supply. All these people are by no means inhabitants of small towns in rural areas. Two-thirds of our urban population (over 2,500) goes to make up this group including that of Houston, San Antonio, and about one-third of Dallas. Eight out of every ten urban cities in Texas depend upon wells for their water. In the rural areas, 95 percent use wells and springs. Water for the remainder of the State's population is supplied from lakes and streams, and is known as surface water.

Industrial users of ground water are in about the same proportion as the urban population. Most industries in Texas depend upon their city water system to furnish their water, but where independent water supplies are provided, these are usually wells. This is particularly true in the case of large office buildings which often have private wells to supply water for the operation of air-conditioning systems. Considerable waste of ground water in some of these systems results from using the water only once for cooling the air and then discharging it into the sewers. By the use of proper equipment, and by proper regulation of such uses, this waste can be virtually eliminated. Air-conditioning is increasing with astonishing rapidity, and the prodigal use of water for this purpose is a source of alarm in cities all over the Nation.

While domestic and industrial water requirements probably account for the largest volume of ground water used in Texas, the wells for these purposes are scattered over the State, and with a few notable exceptions, have apparently not yet affected the available amount of ground water.

In areas where irrigation from wells is feasible, the rate of taking water from wells during the irrigation season is much higher than in any but the most highly industrialized areas of Texas. It is in such areas, as well as in industrial districts, that the capacity of water-bearing strata is most likely to be exceeded.

Contrary to popular belief, irrigation is not confined to the more arid portions of the United States. It is true that in the more arid parts of the country the artificial application of water from wells and streams to crops is indispensable, and this probably accounts for the idea that irrigation is not practiced in the humid regions. The cultivation of rice in Texas is carried on

along the Gulf coast where rainfall is apparently ample, but rice growing requires that the crop be partly submerged for a portion of the growing season. Large acreages of rice are irrigated from wells near Beaumont and Houston. Supplemental irrigation of "dry-land" crops during periods of deficient rainfall has proven very profitable in parts of Texas, and by means of ample ground water might be extended even to the extreme eastern border of Texas. In fact, truck farming in Florida is made possible by well irrigation during the winter months when rainfall at that season is inadequate. In New Jersey, supplemental irrigation of truck farms by means of wells is practiced extensively.

Texas has other large and highly valuable areas which are irrigated by wells, such as the "Winter Garden" area in South Texas, and the shallow water area of the Panhandle. The last named area includes all or portions of Deaf Smith, Castro, Hale, Swisher, Floyd, Lubbock, Bailey, and Lamb Counties. A number of large Texas cities depend upon wells for water. In some of these such as Houston, San Antonio, El Paso, and Galveston, the demands of industry on ground water are superimposed upon municipal requirements. In both the urban areas and in the irrigating regions there are instances where the rate of pumping of ground water has created a serious lowering of the water levels in the wells, indicating that the safe yield of the water-bearing strata has been exceeded.

Cities, industries, and irrigation projects rely on dependable water supplies for their continued existence. When the water supply becomes uncertain, there can be no stability for industry, for irrigation, or for the public supply. Investors cannot be induced to put money into industrial enterprises which cannot offer a reasonable degree of permanence, and this degree of permanence is dependent, among other things, on water, either directly or indirectly. The same

applies to irrigation. Landowners cannot afford to invest money in facilities to bring water to their land unless assurance can be given that water will be available for at least the life of the facilities. Investors will not buy irrigation bonds if the project cannot show some guarantee of water dependability. For a number of years the Federal Land Bank has refused to grant loans to farms irrigated from wells, where no regulation of ground water withdrawal exists. The Resettlement Administration at one time was very anxious to establish a project in the Panhandle area of Texas but was prohibited from doing so, because there was no guarantee that ground water rights would be protected from over-exploitation by adjacent owners.

Assurance against water shortages in wells can be given only when it is certain that the rate of replenishment of the water-bearing strata involved will not be exceeded by the withdrawals. In turn, prevention of over-development can only be insured when some form of administrative control of the areas in question can be applied, and only when sufficient factual information has been collected concerning ground water in that area, to enable the administering agency to act with assurance.

It would be quite unreasonable to assume because one farmer, or even one town takes water from wells that the supply in surrounding areas is in danger of exhaustion. On the other hand, it seems equally unreasonable where intensive use of ground water does exist that means of controlling that use within safe limits should not be provided.

The question of administrative control of ground water is a problem which does not rest on the laws of physics alone but on these laws as interpreted by legal minds, and also on the fundamental law of property as applied to water.

The law of ground water, as now developed, is less than a century old, whereas the law of surface water in the United States had its antecedents and development in the Roman Empire.

Few states exercise administrative control of ground water by actual statute, although many do so by virtue of court decisions. Only in comparatively recent times has ground water become important. The first case used as a precedent by the Courts of the United States was decided in England in 1843, and the controlling case was decided in 1857. In both these decisions ground water was considered as a mineral which could be extracted at will by the landowner without recourse on the part of others who might be damaged by such extraction. All American courts followed this rule for a time, but in 1862 the New Hampshire Court departed from it and promulgated the rule that the use of ground water must not be greater than reasonably necessary for the tract of land in which the water is produced. Under the former rule, exportation of water from one owner's land could be made even if it damaged others dependent either directly or indirectly on the ground water, but in the newer rule, exportation was not allowed if damage resulted. This is termed the "doctrine of reasonable use," or the "American rule." It is applied in a number of the states located in the humid sections of the United States; whereas in others, the former doctrine of what may be termed "unreasonable use," or the "English rule," still prevails.

The status of the law as to underground waters in the various western states is given by Conkling*, as follows:

"Arizona -- There are no statutes on underground water in Arizona. The court has ruled that such water is not subject to appropriation (*Maricopa County Municipal Water District v. Southwest Cotton Co.*, 1931, 4p. 2d 369), and at first, reserved decision as to whether the English rule or the correlative doctrine which originated in California should prevail:

* Harold Conkling: "Administrative Control of Underground Water: Physical and Legal Aspects," *Transactions of the American Society of Civil Engineers*, Vol. 102, 1937.

but in 1934 (Fouryan v. Curtis, 29p.2d 722), it decided in favor of the American doctrine of reasonable use, that is, that the water belongs to the land under which it is found and could be taken to distant lands if injury did not result to another on the stream system. In the case of Pima Farms v. Proctor (245 P. 369, 1926), the underground water in a stream valley several miles wide was in question. No surface flow exists except in flood times. The Court rules that this was a definite underground channel (the litigants stipulated at the outset that the water involved was the immediate underflow of the river), that the prior user of underground water had a vested right to the maintenance of the water level, and that subsequent users must deliver water to him at no greater cost than had been incurred prior to the new use. This is similar to declaring that a prior appropriator of surface waters had a vested right in the means of diversion; in fact, the Court states that this is the law, but cites no decisions to that effect.

"California -- There are no statutes on underground water in this state, but it may be appropriated by taking on sufferance of the overlying landowners. These appropriations ripen into a right after five years of open taking and are so recognized by the Court.

"No exclusive rights are permitted in underground waters except the appropriations previously noted. Cities and other municipal organizations are regarded as appropriators even if they are located directly above the underground basin. All overlying lands, and lands riparian to a stream where the percolating waters feed a surface stream, have a correlative and equal rights to the stream system whether water is on the surface or underground (that is, percolating). A diversion from a surface stream made prior to 1914 may be an appropriation even if on riparian land, and as such, prescription obtains against an underground water user below who may be supplied wholly or in part by percolation from the surface stream.

"The law of waters in California, both surface and underground, is highly developed and rests on reasonable use and the correlative doctrine of equal rights.

"Colorado -- Underground water is not mentioned in Colorado statutes as subject to appropriation. The Courts have held that it is subject to appropriation, however, and subject to the same regulation as surface water. Rights under appropriation are in order of priority of filing on the stream in question. The Courts seem to be tending to the rule that in Colorado all water, whether surface or underground, are presumably tributary to a surface channel, and that their taking is thus subject to prior appropriation of the surface stream.

"In Colorado the taking by an underground user is stopped if it decreases the surface flow available to the down-stream user even if the down-stream user could sink pumps to the underflow and get a full supply. This amounts to a guaranty of the method of diversion previously discussed.

"The theory of underground water law in Colorado is consistent with that of surface streams, but the application varies in the afore-mentioned particular. The waters of an entire stream system are treated as one.

"Idaho -- Underground water is not specifically mentioned in statutes in Idaho. The Court concurs in the doctrine of appropriation of underground waters and states that it may be by the procedure of the water code, or by taking (*Silkey v. Trego*, 5 P. 2d, 1049, 1931). The subsequent appropriator of the underground water must not lower the water table from which the prior appropriator pumped (*Noli v. Stonen*, 26P. 1112, 1933). In other words a prior appropriator is protected in his means of diversion when underground water is in question.

"Kansas -- All underground waters in the northwest quarter of the state are, by statute, subject to appropriation. Disputes on underground water have not been before the Court to any great extent, but so far decisions appear to be based on the English rule.

"Montana -- There are no statutory provisions for the appropriation of underground water in Montana. Conflicts involving underground water have not been frequent. A case decided in 1912 followed the English Rule (*Ryan v. Quinlan*, 124 P. 512).

"Nebraska -- There is no legislation concerning underground water in this state, but in 1933 the Court declared in favor of the doctrine of reasonable use (*Olson v. City of Wahoo*, 124 Neb. 302).

"Nevada -- The statutes provide that all water within the state whether above or below the ground surface, belongs to the public and may be appropriated for beneficial use as provided in the act and in no other way; but it specifically eliminated percolating water, the course and boundaries of which are incapable of determination. Use of underground water is not great and details of administration have not been established by state authorities. There have been no recent court decisions on the matter.

"New Mexico -- In 1927, a statute as to appropriation of underground waters was passed in New Mexico but was declared unconstitutional in 1929 because of faulty title. In 1931, a new act, designed to satisfy the Court's objections to the first, was passed by the Legislature.

"The statute applies to waters of underground streams, channels, artesian basins, reservoirs, or lakes having reasonably ascertainable boundaries and declares them to be public waters and subject to appropriation. as a result of the definition, waters diffused and percolating toward a stream in the manner customary in humid countries, may not be included.

"As a result of investigation the State Engineer has declared three basins as coming within the scope of the law. Two of these are basins in which the water is not under pressure, but in a condition such as that defined previously under the heading, 'percolation through basins.' The other is the famous Roswell artesian basin previously mentioned.

"The degree of coordination between procedure in the case of underground water and surface water in the same stream system is not apparent in the statute or the procedure outlined by rulings of the State Engineer. Apparently the State Engineer proposes to accept filings only in those basins which have been examined and which have been declared to come within the purview of the statute. The Court has declared that adjudications should embrace both ground and surface water in one proceeding (El Paso and P. I. Ry. v. District Ct. 8P. 2d 1064, 1932).

"North Dakota -- The statutes of North Dakota declare underground waters to be in the same ownership as the land on which they are found. No Court decisions have been made.

"Oklahoma -- The statutes of this state make no mention of underground water and Court decisions on the question have not been found.

"Oregon -- All waters, according to the Oregon statute of 1909, may be appropriated for beneficial use. In 1927, underground water east of the Cascades was declared subject to appropriation when it occurred in basins the boundaries of which could be defined with reasonable certainty. As finally amended in 1932 the statute as to underground waters still limits appropriation to the areas east of the Cascades and conforms to the law of New Mexico. Applicants for appropriations follow the general procedure outlined for surface waters. Development is proceeding east of the Cascades. There are no recent Court decisions as to the status of the underground water in Oregon.

"South Dakota -- The statutes in force in South Dakota are 'silent' on underground water. All court decisions upheld the common law doctrine of absolute ownership and unreasonable use.

"Texas -- There are no statutory enactments as to underground water in Texas. All court decisions uphold the doctrine of absolute ownership of underground water.

"Utah -- By a number of decisions the Utah Court has held that owners of overlying land have co-equal and correlative rights in underground water (Katz v. Walkinshaw, Supra) and also that such owner may export his pro rata share to distant points. The controlling case is Glover v. Utah Oil Refining Co. (218 Pac. 955, 1923). In the case of Wrathall v. Johnson (1935), the Court -- in a peculiarly divided opinion -- held that the use of underground water is by appropriation even if on overlying land and is subject to the same restrictions as prevail for appropriations of surface water. This was a decision on demurrer and cannot be regarded as conclusive.

"The Legislature of 1935 enacted a statute placing underground water in the same status as surface water; that is, as a right secured only by application for appropriation to the office of the State Engineer. This act follows a model recommended by the Association of Western State Engineers and is similar to the New Mexico statutes.

"Washington -- All water in the State of Washington is declared to be subject to appropriation which would include underground water, but state officials consider that no authority is conferred on a state over such waters. One court decision on underground water adopts the doctrine of reasonable use on overlying lands; another, that underground water may not be taken to the injury of surface water diverters from the stream. The doctrine of the courts is not well defined.

"Wyoming -- No mention is made of underground water in the statutes of the state: nor are there recent court decisions to clarify the law.

"All Other States -- The only attempt at statutory control coming to the notice of the writer is in New York State where wells on Long Island drawing more than a hundred thousand gallons per day are placed under the jurisdiction of the State Conservation Commission.

"Summary -- Summing up the results of the foregoing examination, there are found to be four doctrines of law in the United States on which use of underground water is based: (1) Absolute ownership of water because of the ownership of the land beneath which the water is found, with no obligation to respect the rights of others, is herein termed the 'doctrine of unreasonable use,' or the English rule: (2) absolute ownership of water to the extent of reasonable use on the land beneath which the water is found, but with no right to export to distant land if by so doing damage is caused to another, is herein termed the 'doctrine of reasonable use,' or the American rule: (3) ownership, co-equal and correlative with that of every other landowner, of water lying over the basin, or riparian to a stream fed by water rising from the basin, is herein termed the California doctrine; and (4) entire lack of ownership on the part of the proprietor of the land, but ownership by the State instead -- which allows use by appropriation under a procedure set by the State, or otherwise, and which is subject to prior rights of other users whether from a surface stream or from underground sources tributary to the stream -- that is, the doctrine of prior appropriation. These differences are successive and cumulative impositions of control, or broadly speaking, the police power as found desirable because of the growing use of underground water, and as found possible because of increased knowledge of ground water hydrology.

"Unless analysed, these diverse doctrines would seem to entail endless confusion, but when it is remembered that there is also great diversity of climate in the United States and that also great variation in the present stage of development and possibilities of future development, the probable confusion appears not to be very great as a whole although potentially bad enough in limited areas. The worst legal confusion could result from lack of consistency between surface-water law and underground water law in the same general region; but even where these laws are inconsistent the climate may be such that costly development is impossible, and if so, the conflict may be more apparent than real."

In New Jersey there has been a partial control of ground water by the state since 1907. This has been accomplished by laws which provide that new or additional developments of water, either surface or underground, for public supply, by municipalities or privately owned water supply companies, cannot be made until the supervising commission (the State Water Policy Commission) has approved the plans for such development.

Favorable action by the supervising commission apparently does not constitute a grant of any right to use the water, but merely an approval of plans etc. However, the Attorney General of the State has ruled that the State has control over draft of ground water. The law has had the effect of controlling to some extent the development of ground water supplies in certain areas where there is danger of the safe yield being exceeded either by actual refusal of approval, or by modifying provisions as to location of wells or quantity to be withdrawn.

In New Jersey the law does not apply to diversions of ground water by industries or others using the water for purposes other than public supply systems. This distinction has caused a peculiar situation, in that upon showing that a proposed development for municipal supply may injure an existing private supply, the controlling commission may refuse, and has refused on occasions, to approve the public development. On the other hand, a private development may be made which may greatly reduce the capacity of the wells of the public system or perhaps even destroy its usefulness. In such cases, the Commission is powerless.

There are certain definite areas in Texas where ground water development has reached the point where some restraint on ground water pumping is necessary to prevent serious water shortages. The proper development of a ground water

area would be beneficial to existing municipal and industrial supplies. The City of Houston is an example of this condition. Here, a city has grown very rapidly by virtue of its favorable location with respect to those factors which attract industries. Among the greatest of these factors is availability of a convenient supply of food water from wells. But successive increases in the demand on water-bearing strata which supply the Houston, Pasadena, Baytown, Texas City, Galveston region have resulted in lowering the water level in wells to such a degree that a continued increase in the demand, without regulation, might endanger security of the ground water supply of the entire region, causing considerable concern among industrial and municipal users. This is partly because pumping from the increased depth adds materially to the cost of water and partly because of the danger of encroachment by salt water due to excessive pumping in a small localized area. In recognition of this condition, the City of Houston employed a firm of engineers to study and recommend methods of obtaining an adequate city water supply. Yet the Houston public water supply is less than one-third of the total ground water used in the Houston area. Industries having independent well supplies make up more than two-thirds of the total demand on the ground water in this area. Without some kind of regulation of ground water, and at the present rate of Houston's industrial growth, further improper development of the ground water supply is to be expected. New industries desiring to use ground water will certainly be hesitant to locate in the Houston area as long as this condition exists, unless they are afforded adequate protection for their investment in ground water facilities.

Other cities in the Houston area are affected at least indirectly by this serious water situation. Galveston, which obtains water from wells several miles inland is in danger of damage by reason of salt water intrusion into its

wells due to the lowering of the fresh water level. Moreover, once this salt water intrusion occurs, the affected area is permanently ruined as a water supply. Cities and industries in the Houston region might reach out away from the area of excessive pumping and tap other reserves of ground water, but with the present demand for ground water, both actual and potential, they would have no security of supply, since any other agency seeking water could do likewise.

Other examples of water shortages are offered by the East Texas oil fields, in which the water-bearing strata have been greatly overtaxed, and in the Lufkin region, where the proposal to locate a newsprint mill has created the problem of supplying huge quantities of ground water without injuring city water supplies.

In the field of irrigation, the "Winter Garden" area of South Texas offers a parallel case. Irrigation by wells has increased rapidly in recent years to the point that ground water levels are steadily dropping, and salt water is being drawn into the wells from beds that overlie the fresh-water-bearing sands. In wells which originally flowed under their own pressure, water levels now stand as much as two hundred feet below the surface. There is a very definite limit to the cost which an irrigator can afford for water. In well irrigation this cost is made up largely of pumping expense, and pumping expense varies roughly with the depth from which water must be lifted.

Thus, excessive lowering of the water table in well irrigation in the "Winter Garden" presents a triple hazard: shortage of water, increased operating costs, and encroachment of salt water. This is the situation in the "Winter Garden" today. Yet there is no protection available to the land-owners who have developed that area -- no protection from those who would further deplete the ground water resources of that area. Surely, here is need for administrative

control of ground water. The irrigators in the "Winter Garden" recognize this need and are anxious for legislation to remedy the situation.

There are other areas in Texas which are being developed for well irrigation at an increasingly rapid pace each year. There were about 1,300 wells in the Panhandle "shallow water" district, which supplied irrigation water for 180,000 acres in 1937. Nearly three-fourths of this development took place during the preceding two years, and now wells are being drilled every day. The fact that the water table in this district has not yet been seriously lowered does not mean that such a thing will not happen, provided development continues. The history of other over-developed areas proves this. There is reason to believe that development in these areas will be greatly stimulated in the future as a better knowledge of proper irrigating methods is secured in these particular areas. Still other areas in which present conditions show urgent need for regulation are Kleberg, Kenedy, and Brooks Counties in South Texas; Brazoria County in southeast Texas, and El Paso County in extreme West Texas.

The Texas Planning Board, having in mind long-time planning in water conservation, has given considerable study to this problem of ground water regulation. Their findings bear out the results of investigations by the State Board of Water Engineers and the U. S. Geological Survey in regard to the need for control. It is convinced that the future of well irrigation and domestic and industrial use of ground water will be best insured by well planned regulation.

The problem of making regulations and securing hydrologic information, in Texas is very complex, requiring the full cooperation of all large users of ground water in the State. Formulation of legislation of this nature should be approached from the standpoint of its possible effect on all classes of users.

The views of all types of users should be given full consideration and informal public discussion before any bill is submitted for passage. In this way the problems and needs of various interests can be reconciled into a workable plan for regulation. Thus the legislature and its committees will be saved considerable time. In acting on a matter which is unfamiliar to most of its members the legislature will be afforded the benefit of experience and sound planning.

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