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DESCRIPTION AND EVALUATION OF INSTITUTIONS  
INVOLVED IN WATER ALLOCATION AND  
DISTRIBUTION IN UTAH

by

Kimber C. Webb

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

in

Economics

Approved:

UTAH STATE UNIVERSITY  
Logan, Utah

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## CHAPTER I

### INTRODUCTION

#### Justification of the Study

Water development and allocation have been among the most important problems Utah has had to face throughout the past 117 years of development. When Utah's first white settlers, the Mormon pioneers, entered Salt Lake Valley in July of 1847, little met their eyes to entice their stay. The earth was so parched and dry that they were unable to scratch the surface with their plows. Less than two hours after their arrival members of the party began digging ditches and building dams to irrigate and soften the earth so they could begin plowing.<sup>1</sup>

With the coming of additional settlers it was necessary to move to insure an adequate supply for domestic uses as well as water for irrigation. Since the clear, mountain stream water was ideal for domestic use, steps were soon taken to divert water of lower quality for irrigation use. The Jordan and Salt Lake Canal was such a project to bring water from nearby Utah Lake.<sup>2</sup>

Additional settlers and the exhaustion of local water supplies made it necessary to establish colonies away from the center of the new settle-

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<sup>1</sup>H. H. Bancroft, History of Utah (San Francisco: The History Company, 1889), p. 261.

<sup>2</sup>Fisher Sanford Harris, 100 Years of Water Development, A report submitted to the Board of Directors of the Metropolitan Water District of Salt Lake City, Salt Lake City, Utah, April, 1942, p. 5.

ment. Exploring parties were sent in every direction to look for suitable locations. Water was always an important factor in selection of a site for the new locations.<sup>3</sup>

Cooperation was a key word in the development of Utah. The Mormon people worked together to build homes, schools, and churches as well as ditches, reservoirs, and other needs of the community. The conditions prevalent in the early history of Utah made the Church organization all powerful. The secular as well as ecclesiastical affairs of the people were administered by the Church, including problems arising over water use. Gradually even before many non-Mormons joined the settlements, organizations formally separable from the Church were established to administer water problems. The development was accentuated, moreover, with the increased arrival of non-Mormons.<sup>4</sup>

The irrigation company was one of the first of these organizations. Gradually the towns and villages took steps to insure their right to an adequate quantity and quality of water. As demand for water increased, steps were taken to expand or conserve existing supplies, and develop additional sources of supply. In most cases some type of organization was established to administer the allocation and distribution of these waters.

This trend has continued throughout the history of Utah; as water supplies have increased, so have the institutions responsible for the administration of this resource. Today there are a multiplicity of these

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<sup>3</sup>Wells A. Hutchins, Mutual Irrigation Companies in Utah, Utah Agricultural Experiment Station Bulletin 199, May 1927, pp. 9-11.

<sup>4</sup>Ibid., p. 16.

institutions which are involved either directly or indirectly in the distribution and allocation of water. Those institutions which appear to play an important role in Utah today are:

1. The structure of the water law
2. The Office of the State Engineer
3. The Utah Water and Power Board
4. The Water Pollution Control Board
5. Metropolitan water districts
6. Water conservancy districts
7. Water conservation (irrigation) districts
8. Mutual irrigation companies
9. Municipal water departments

This study will be concerned primarily with an evaluation of these institutions, the part they have played in the development of Utah's water policy, and the role they may be called upon to play in the future.

#### Objectives of the Study

The specific objectives of this study are:

1. To identify the institutions involved in the allocation, and distribution of water within Utah,<sup>5</sup> and to describe the functions and responsibilities of each.
2. To appraise and evaluate these institutions with respect to various aspects of flexibility and security: (1) the legal right to the

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<sup>5</sup>This study will be concerned only with state and local organizations. The federal agencies, while prominent in development and conservation, have little authority in actual water transfers, the main interest of this paper.

use of water, both quantity and quality, (2) the ease or difficulty with which transfers of these rights between uses and users can be made, (3) the protection against loss of this water right due to lawful acts of others, and (4) incentive to invest in and develop the water resource.

An attempt will be made to answer one overlying and highly significant question. Are the laws and institutions in operation today effectively fulfilling, from an economic point of view,<sup>6</sup> the needs of Utah's water program? If not, what additions or deletions from the present system would be advantageous?

#### Method of Procedure

Since this study will attempt to evaluate the institutions involved in water allocation, some norm for comparison and evaluation must be established. Anything less would merely be a description of their functions. Chapter II will deal with the development of criteria with which to make this evaluation. A review of the literature treating theoretical considerations for water distribution and allocation will form the basis of these criteria.

Chapter III will contain a description and evaluation of the institutions to be considered. The information for this chapter was obtained by a study of relevant publications such as the Report of the State Engineer, the Utah Code Annotated, interviews with heads of these institutions, and other studies that have dealt more specifically with one or more of the institutions under consideration.

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<sup>6</sup> An economic point of view is based primarily on efficiency and will be discussed in the next section.

Chapter IV will attempt to draw some conclusions about the overall efficiency of Utah's water institutions and will, if necessary, make suggestions that would improve the efficiency of the various institutions.

## CHAPTER II

## ECONOMIC CRITERIA

Efficiency and Distribution Effects

Why should a study of the laws and institutions dealing with water be undertaken by an economist? Surely this area receives considerable attention by legislators, lawyers, engineers, and various public servants. Each of these disciplines make contributions, but this does not diminish the significance of laws and institutions to the economist; they form a base for economic decision and, in fact, constitute part of the decision making machinery itself.<sup>1</sup>

Almost all sciences can be categorized as either positive, a body of systematized knowledge concerning "what is," or normative, a body of systematized knowledge concerned with "what ought to be."<sup>2</sup> Some, by the nature of their content, are both positive and normative and economics is such a science.

Positive economics is independent of any ethical or moral value judgments. It is based primarily on generalizations that are deduced from theoretical propositions and then are tested by observation of economic phenomena in the real world. These generalizations are then

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<sup>1</sup>Stephen C. Smith, "Legal and Institutional Controls in Water Allocation," Journal of Farm Economics, XLII, No. 5 (December 1960), 1346.

<sup>2</sup>Milton Friedman, Essays in Positive Economics (Chicago: The University of Chicago Press, 1953), pp. 3-4.

used to make predictions about the consequences of some change in the real world circumstances. The worth of a principle is judged on the reliability and consistency of its predictions.<sup>3</sup>

Economics becomes normative whenever economists stray into the area of "what ought to be;" i.e., are concerned with criteria and standards that are judged "good" or "bad." However undesirable it may be, most economic studies do contain some elements of normative science.

Most of the principles associated with positive and normative economics can be handled as either efficiency or distribution effects. The efficiency effects deal with the size of the aggregate production while the distribution effects are concerned with who gets what share.<sup>4</sup>

When any policy innovation or change will result in an increase in the national income or community income, we say this is an increase in efficiency. Or when the net welfare of the society under consideration is increased, efficiency has increased. One of the values of our society seems to be that efficiency, per se, is desirable.

It is easy to see that a policy which would raise the income or welfare of all people within the area of consideration would be highly desirable. But many, and probably most, proposed policy changes are directed toward particular areas or sectors. Even those policies which might result in a net increase of community income or welfare, are likely to be detrimental to some. This situation raises the problem of distri-

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<sup>3</sup>Ibid., p. 5.

<sup>4</sup>Jack Hirshleifer, et al., Water Supply: Economics, Technology, and Policy (Chicago: The University of Chicago Press, 1960), p. 36.

bution, i.e., is it desirable that the interests of one group of people be favored over another?

Economics alone cannot give us answers to policy problems; it can show us how to attain efficiency and what the distributional consequences are of attaining efficiency in alternative possible ways, but it does not tell us how to distribute the gain from increased efficiency.<sup>5</sup>

This study will attempt to remain in the realm of positive economics, i.e., efficiency effects. Hopefully, as distributional questions arise, as they surely will, the only consideration given them will be to say something about the possible consequences of alternative policies.

This is not to say that increased efficiency alone is sufficient justification for implementing particular policies at all times. If the distributional effects of a policy that would increase efficiency are extremely adverse to the well being of certain parts of society, particularly already disadvantaged groups, society itself must decide to reject that proposed policy. Society will be better prepared to make this decision, however, when it has some understanding of the possible alternatives and consequences.

#### Market Vs. Administrative Allocation

Perhaps this is the best point to discuss a longstanding, economic debate about resource allocation. Broadly speaking, there are two methods of resource allocation used in our society, i.e., the market and administrative or judicial decree. Both systems can be applied without violating the criteria that will be developed for economic efficiency. How-

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<sup>5</sup> Ibid., p. 5.



each have their own advantages and disadvantages and, depending upon the situation, both can be used to achieve an efficient allocation of resources.  $P_2$

Under a market system buyers and sellers of resources come together in the market place and make exchanges at agreed upon rates of exchange (prices). Arguments that seem to favor a market allocation of resources are:

1. The market is quite effective in allocating most of our resources, except where third party effects are significant.
2. It is nondiscretionary and automatic and provides its own information.
3. The market price reflects resource values in various uses.
4. Exchanges are always voluntary and compensation is always paid any loss of resources that might accompany the exchange.

At the other pole is a system of centralized planning whereby allocation of the resource is effected by some authority--administrative or judicial. This system may be more efficient, and perhaps, the only alternative in situations where the market will not function satisfactorily, such as:

1. In cases where the resource is fugitive or commonly owned and where property rights or firm assets are impossible to define.
2. Where third party effects are important and cannot get incorporated into market calculations.
3. Where problems are so complex that some human judgement performs better than an impersonal market.
4. Where income distribution problems are important and the market does not allocate income satisfactorily to alleviate poverty and widely

distribute benefits.

By the very nature of this system, it is obvious that administrative decree allows a much greater chance for personal prejudice or moral conviction to enter into the final decision. Therefore, the market allocation system will be accepted, for this study, as the most efficient means of allocating resources, and the criteria developed hereafter will reflect this attitude. However, when attempting to evaluate those institutions utilizing the administrative decree system, reference will be made to this section and how well they seem to follow the criteria developed in the next section.

#### Review of the Literature

Recently there has been considerable economic literature written about the allocation and development of water resources. Several of these articles, particularly those treating theoretical criteria, will be reviewed in an attempt to establish criteria whereby the relevant institutions in Utah can be evaluated.

#### Equimarginal value in use

Hirshleifer, DeHaven, and Milliman, in a book dealing with the water supply, are content to allow the free market almost complete responsibility for allocating water. To begin the argument, they postulate a given quantity of water becomes available without cost, and the only problem is to allocate it between competing uses and users. An economic concept which characterizes an efficient allocation under such circum-

stances is "equimarginal value in use."<sup>6</sup> Value in use is essentially measured by the maximum amount of resources (dollars) which the consumer would be willing to pay for that unit, while marginal value in use is the value in use of the last unit consumed.<sup>7</sup>

The principle, then, is that the resource should be so allocated that all consumers or users derive equal value in use from the marginal unit consumed or used.<sup>8</sup>

Achievement of such an equality would necessitate some system of shares, rights or other means of defining proprietorship which would allow the owners to sell, trade, or otherwise exchange water.

The market, then, is one way of organizing to produce economic efficiency. Incentive to trade will continue until maximum efficiency is achieved. Why? As long as the marginal value of water is greater to one user than another, the former will be willing to pay more for the last unit of water considered than it is worth to the latter, making it profitable for both to initiate a sale or exchange. Such bargaining and trading will continue until exchanges, profitable to all parties, cannot be achieved.<sup>9</sup>

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<sup>6</sup> Ibid., p. 36.

<sup>7</sup> Ibid., p. 37

<sup>8</sup> Ibid.

<sup>9</sup> Ibid., p. 38.

The Heady-Timmons position

Heady and Timmons have attempted to develop an economic framework for planning and legislating efficient use of water resources.<sup>10</sup> Their main concern is to maximize economic welfare. Two major criteria necessary to achieve this goal are: (1) the efficient allocation of water between competing uses to maximize social product, and (2) the equitable distribution of the product or income of this resource among the individuals within the sector.<sup>11</sup> As well as devising laws and physical means to attain these conditions, the authors are concerned with two important side conditions: (a) the legal and physical means to allow reasonable certainty in the use of water and the distribution of its benefits, and (b) the possibility of gradual change to allow diversities between uses and users to meet the changing preferences of society.<sup>12</sup>

To attain the first major condition, which is the main emphasis of the paper, Heady and Timmons outline three necessary steps: (1) determine the supply of water, (2) determine alternative uses and production possibilities, and (3) apply a choice criterion or yardstick to determine which uses are most important and in line with the relative wants or desires of the consumer.<sup>13</sup>

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<sup>10</sup>E. O. Heady and John F. Timmons, "Economic Framework for Planning and Legislating Efficient Use of Water Resources," Iowa's Water Resources, ed. John F. Timmons, et al. (Ames, Iowa: Iowa State College Press, 1956), pp. 47-61.

<sup>11</sup>Ibid., p. 51.

<sup>12</sup>Ibid.

<sup>13</sup>Ibid., p. 52.

Following economic theory, the pricing mechanism is the choice criterion or yardstick whereby the consumer can demonstrate the relative importance he places on various products in the market. Heady and Timmons point out the difficulty involved in placing a value on such intangible uses of water as recreation and flood prevention. To overcome this problem a system of priority use is suggested. Priority use implies ranking the various uses to which water can be applied in order of importance. Water for domestic consumption would undoubtedly have highest priority but beyond that point, much more study needs to be undertaken.<sup>14</sup>

#### Wantrup's economic criteria concepts

Criteria for evaluating water resource allocation developed by Wantrup are concerned more with increasing national income than maximizing social satisfaction.<sup>15</sup> The concepts of security and flexibility of water rights are discussed as the most significant conditions which facilitate or impede such an increase.

To the economist security has two connotations: (1) protection against physical uncertainty, (e.g., supply of the quantity of water usable under the right and quality), and (2) protection against variability over time due to the lawful acts of others.<sup>16</sup> Physical uncertainty can be reduced significantly by physical means such as water storage and pollution control. Of much more interest, at least in the

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<sup>14</sup>Ibid., p. 56.

<sup>15</sup>S. V. Ciriacy-Wantrup, "Concepts Used as Economic Criteria for a System of Water Rights," Land Economics, XXXII, No. 4 (November, 1956), 295-312.

<sup>16</sup>Ibid., p. 297.

context of appraising institutions, is the security of water rights against tenure uncertainty. There are three factors present to some degree in all systems of water rights which affect security of tenure: (1) prescription, (2) differentiation of preference classes based on purpose of water use, and (3) a restriction on water rights to yield to future demands of others.<sup>17</sup>

A sub-topic of security of tenure, protection of investment, is favored by Wantrup in cases where the water right is insecure, such as water held in reservation by a municipality for future use and being appropriated only temporarily by another user.<sup>18</sup> This private user will not invest in the water resource beyond the point warranted by the expected income stream unless he receives some guarantee of "adequate compensation" for nonrecovery of investment plus a sufficient profit margin. When these conditions are not met, considerable under utilization of the resource will persist.

X The criterion "flexibility of water rights," focuses on those aspects of water rights which facilitate or obstruct changes over time in the allocation of water resources between uses and users.<sup>19</sup> Whether or not water can move from a use of low productivity to one of higher productivity is important. The transfer of water can be accomplished in several ways. Voluntary transfer through buying and selling in the market place is not uncommon. Involuntary transfers, such as prescrip-

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<sup>17</sup> Ibid., p. 300.

<sup>18</sup> Ibid., pp. 301-303.

<sup>19</sup> Ibid., p. 304.

tion, abandonment and forfeiture, and condemnation are important parts of a system of water rights.

Thus Wantrup concludes that in the area of natural resources, and particularly water allocation, direction rather than exact destination is the important consideration.

The emphasis of this approach is on minimum standards in resource use rather than on the optimum use; on establishing base levels rather than on locating peaks; on avoiding dead-end streets and on keeping direction rather than on computing the shortest distance; on mobility and adaptability of productive factors rather than on their optimum combination; on reducing institutional obstacles to water development rather than on maximum level development; and on provisions in water law that facilitate changes over time in water allocation rather than on an optimum water allocation at particular times and places.<sup>20</sup>

#### Economic Criterion

The criteria whereby the institutions involved in the distribution and allocation of water in Utah will be evaluated are:

- ✕ (1) Equimarginal value in use. Water should be so allocated that all users derive equal value in use from the marginal unit consumed or used. This concept implies a high degree of flexibility since it relies on a movement of water from uses of low productivity to those of higher productivity.
- ✕ (2) A system of vested rights or proprietorship which guarantees the owner final disposition of the prescribed water. It must also insure adequate compensation if the right is transferred involuntarily,

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<sup>20</sup>Ibid., p. 311.

such as condemnation proceedings. Such a system would provide security against tenure uncertainty and insure investment to the point warranted by the potential income stream created by the water in use.

The following questions as sub-topics might be examined to evaluate the institutions.

1. What degree of proprietorship is granted with an appropriation? Can water rights be bought, sold, or rented freely? Can changes in use be made without filing additional applications? Can changes be made without losing priority?

2. Is there a system of priority uses? Does it facilitate or hinder changes in use and between users? Is the priority system flexible over time to meet changing conditions?

3. What legal mechanisms exist within the institutions to insure transferability?

4. Are water rights independent of property ownership?

5. Does the law provide for security of tenure?

6. Is compensation guaranteed in cases of condemnation? Is there a fixed method for determining compensation? Is this adequate to insure investment?

7. Is expensive litigation needed to maintain tenure?

8. What protective measures are there to insure the quality of water?

9. Do the pricing policies of distributing institutions attempt to recover the full cost of supplying the water? Is this done on a marginal or even an average cost basis?



10. Is there incentive for developing new sources of supply?

What has been the development process?

These questions will be considered, as they apply, in the following discussions of the various Utah institutions.

## CHAPTER III

## DESCRIPTION AND EVALUATION OF INSTITUTIONS

Water LawRiparian doctrine

Water law is represented throughout the United States by two major legal doctrines, riparian and appropriation. The riparian rights doctrine, inherited from English common law, holds that the owner of land which adjoins a stream or body of water has rights to the use of that water. The water is a segment of his property endowment. The amount of water he may use and the purpose for which he may use it are not subject to exact determination. However, the courts, which have general supervision of this doctrine, have favored the "reasonable use" rule. Under this rule each riparian owner may use water to the extent of his domestic needs, and then, subject to the domestic uses of other riparians, may use water for such other purposes and in such amounts as is reasonable in the light of all surrounding circumstances.<sup>1</sup>

The riparian doctrine was developed and has remained in use in areas of abundant or at least ample water supply. But in the arid West water sources are not so abundant. There is often many miles between water sources. Also, the annual rainfall is considerably less. It was

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<sup>1</sup>Clyde O. Fisher, Jr., "Western Experience and Eastern Appropriation Proposals," The Law of Water Allocation in the Eastern United States, ed. David Harber and Stephen Bergen (New York: The Ronal Press Co., October, 1956), pp. 66-67.

readily apparent to the earlier settlers in Utah that the riparian doctrine was not adequate. They favored and adopted the appropriation doctrine.

#### Appropriation doctrine

Under the appropriation doctrine all water is property of the state. Right to the use of that water is granted by the state upon the request to apply previously unappropriated water to a beneficial use, irrespective of the location of use in relation to the source of water. Administered either by the courts or some other institution assigned that specific responsibility, this doctrine lends itself more to flexibility since water can be used away from lands adjacent to the source. It places a premium on actual beneficial use of water because unused rights are not allowed to persist. Security of tenure seems greater under the riparian doctrine although some have alleged the priority given an appropriated right assures greater security than the reasonable use rule.<sup>2</sup>

The appropriation doctrine, as it is applied in Utah, will be discussed in the following section in much more detail.

Proprietorship of the water right. An appropriated water right grants the right to use a specific quantity of water, for a specific use, to be taken at a specific point of diversion. The early settlers in Utah appropriated water for some intended use by merely placing a written claim in a can nailed to a tree close to the diversion point.<sup>3</sup> Gradually many

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<sup>2</sup>Ibid., pp. 86-87.

<sup>3</sup>Wayne D. Criddle, Utah's Future Water Problems (Logan, Utah: The Utah State University Press, 1958), p. 6.

claims were filed in county offices. This procedure resulted in over appropriation of most streams, emphasizing the need for a more reliable means of defining individual water rights.<sup>4</sup>

On March 12, 1903, the first comprehensive water law for the state of Utah was passed. This law required all future appropriations of water to be filed and cleared through the Office of the State Engineer. All persons having rights to the use of water at that time were awarded "diligence rights" to their water supply upon proof that the right was in existence prior to 1903.<sup>5</sup>

The 1903 law specified all water within the boundaries of the state to be the property of the public.<sup>6</sup> The desire to apply water to a beneficial use gives anyone a potential claim upon the state's water resources since beneficial use is declared to be a public use.<sup>7</sup>

Any qualified person or organization wishing to apply water to some beneficial and useful purpose must make an application for such an appropriation to the State Engineer.<sup>8</sup> If it is determined, after initial investigations,<sup>9</sup> that there is unappropriated water at the source speci-

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<sup>4</sup>Ibid.

<sup>5</sup>Twenty-ninth Biennial Report of the State Engineer to the Governor of Utah: Biennium July 1, 1952 to June 30, 1954 (Salt Lake City, Utah, 1954), p. 19.

<sup>6</sup>Utah Code Annotated, 1953, 73-1-1.

<sup>7</sup>Ibid., 73-1-5.

<sup>8</sup>Ibid., 73-3-1.

<sup>9</sup>The procedure followed by the State Engineer in perfecting a water right will be discussed in more detail in the next section of this chapter.

fied in the application, and the intended use is beneficial, the application is approved. This approval is only a preliminary step. It merely empowers the applicant with the authority to proceed and perfect the right.<sup>10</sup>

A valid appropriation is constituted by: (1) an intent to apply the water to some beneficial use, (2) diversion of that water from its natural channel, and (3) the actual application of the resource to some useful industry.<sup>11</sup> To perfect a right the applicant must construct any works necessary to divert and convey water to the point of proposed use. The construction of these works and the application of water to a beneficial use must be completed within a time period specified by the State Engineer.<sup>12</sup>

After the applicant has completed construction and all other details necessary to perfect his right, he must furnish proof of such to the State Engineer, who, upon verification of the claims, will issue a certificate of appropriation defining the quantity of water appropriated, the purpose for which the water is used, the time during which the water is to be used each year, the source from which the water is diverted, and the date of the appropriation.<sup>13</sup>

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<sup>10</sup>Little Cottonwood Water Co. v. Kimball, 76 U. 243, 289 P. 116.

<sup>11</sup>Sowards v. Meagher, 37 U. 212, 108 P. 1112.

<sup>12</sup>Utah Code, 73-3-12.

<sup>13</sup>Ibid., 73-3-17. Priority of rights will be discussed later in this section.

Once a water right has been vested, that water ceases to be public water and is not subject to further appropriation,<sup>14</sup> with two exceptions:

1. Abandonment. To constitute abandonment there must exist at the same time both an intention to abandon and an actual failure to use the appropriated water. If the right is unused for a period of five years and the appropriator fails to apply for an extension of time within which he may resume use of the water, the water reverts to the public and is again subject to appropriation.<sup>15</sup>

2. Eminent domain. This power is held in reserve by most governmental institutions in the state. These institutions may instigate condemnation proceedings against any part or all of any water supply or property connected therewith whenever the acquisition of additional water is necessary for the public good.<sup>16</sup>

In all cases where rights are taken by condemnation, compensation is guaranteed. A court, jury or referee must ascertain and assess the condemned property with respect to: (1) the value of the property sought and all improvements thereon; (2) if the property sought is only part of a larger parcel, the damages which will accrue to that remaining due to the severance of the part condemned; and (3) the damages resulting from the construction of proposed improvements, even though no part is taken.<sup>17</sup>

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<sup>14</sup>Tanner v. Bacon, 103 U. 494, 136 P. 2d 957. Wrathall v. Johnson, 86 U. 40 P. 2d 755.

<sup>15</sup>Utah Code, 73-1-4.

<sup>16</sup>Ibid., 10-7-4.

<sup>17</sup>Ibid., 78-34-10.

The amount paid the condemnee is based on the market value of the property condemned. In cases where only part of the right is condemned, the difference in market value before and after condemnation rather than the cost of restoration should be paid.<sup>18</sup> When there is no readily ascertainable market value, the "inherent value" of the right is the norm for compensation.<sup>19</sup>

In several western states water rights can be obtained (lost) by prescription. A prescriptive right results when an individual, group, or corporation can prove in a court of law that they have used all or any part of the water appropriated by another user, against his will and/or without his knowledge, over a specified period of time. Under these conditions the right to the use of that amount of water passes directly to the adverse user.<sup>20</sup>

Prescriptive rights are not part of Utah water law. In this state when conditions exist that would generally constitute a prescriptive right, that quantity of water is considered abandoned and reverts to the public for further appropriation.

The usufructuary right to the use of water given an applicant does not give him the right to use that water for any other purpose. Once an appropriation has been made, a change in use or point of diversion may be made only by an application to enact such a change approved by the

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<sup>18</sup>State v. Ward, 112 U. 452, 189 P. 2d 113.

<sup>19</sup>Sigurd City v. State, 105 U. 278, 142 P. 2d 154, 199.

<sup>20</sup>Samuel C. Wiel, Water Rights in the Western States, Vol. 1 (3d ed., San Francisco: Bancroft-Whitney Company, 1911), pp. 622-640.

State Engineer.<sup>21</sup> Whether or not the vested rights of others are impaired is crucial to a proposed change in use or diversion point. However, applications will not be rejected solely upon this criterion; if otherwise proper, it may be approved as to part of the water involved, or upon conditions that the conflicting rights be acquired.<sup>22</sup>

Priority of water rights. A common phrase under the appropriation doctrine is "first in time, first in right." This is no less important in Utah.

Priority dates are assigned all vested rights. These dates correspond to the date the initial application was filed with the State Engineer.<sup>23</sup> Appropriators have priority among themselves according to the dates of their respective appropriations. Under the system employed in Utah, the senior appropriator is entitled to receive his whole supply before any subsequent appropriator has the right to any water from that source. This same procedure follows until all appropriators have received their full supply or all the water has been diverted and used.<sup>24</sup>

In times of scarcity, however, priority dates apply only to those rights within the same use; i.e., domestic, agricultural, industry, recreation, power and others. Priorities are then assigned to uses in order of importance to guarantee most beneficial uses an adequate supply. Domestic uses have been assigned highest priority with agriculture re-

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<sup>21</sup>Utah Code, 73-3-3.

<sup>22</sup>Ibid.

<sup>23</sup>Utah Code, 73-3-18.

<sup>24</sup>Ibid., 73-3-21.



ceiving priority over all uses except domestic.<sup>25</sup>

Water appurtenant to the land. The right to the use of water is independent of the right to the land.<sup>26</sup> The Utah Code specifies that water rights may be transferred in substantially the same manner as real estate.<sup>27</sup> Since Utah law also requires that an application to change the use or point of diversion must be accepted by the State Engineer prior to such a change, parties are not completely free to separate the water from the land. The general procedure followed is that a conveyance of land passes an appurtenant water right unless specifically deeded separately in which case, approval of the State Engineer is most generally required.<sup>28</sup>

In cases where water rights are represented by shares of stock in a corporation, they will in no way be considered appurtenant to the land.<sup>29</sup>

#### Evaluation of Utah water law

It appears that current Utah water laws have progressed a long way toward establishing water rights as a property right permitting exchange transactions in the market. The requirement that all changes in use or point of diversion must first be approved by the State Engineer possess

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<sup>25</sup>Ibid.

<sup>26</sup>Sowards v. Meagher, 218.

<sup>27</sup>Utah Code, 73-3-21.

<sup>28</sup>Wiel, Water Rights in the Western States, p. 586-594.

<sup>29</sup>Utah Code, 73-1-10.

one possible restriction upon the property right. Whether or not this is, in fact, a serious restriction to efficiency will depend on the attitude of the Office of the State Engineer as well as the state and district courts in case litigation ensues from a conflict.

The powers granted the State Engineer in this area are largely discretionary and, as such, are continually subject to judicial review. The primary criterion used by the State Engineer in making a decision is the vested rights of others; will they be impaired by the granting of such an application? A liberal attitude has prevailed in the Office of the State Engineer over the past 20 years.<sup>30</sup> Applications have generally been granted as long as a serious impairment of existing rights have not accompanied the change. Applications to change use are rarely rejected since this would generally cause little impairment of rights owned by others. Approval of an application to change the point of diversion requires substantial proof that serious impairment of existing rights will not follow.

In a 1951 case, American Fork Irrigation Company v. Linke, the courts established a liberal policy in granting changes that has been followed quite closely, at least between 1951 and 1962. In upholding a court's decision to reverse the decision of the State Engineer in denying an application, the Supreme Court of Utah held that:

We recognize plaintiff's duty to prove that vested rights will not be impaired by approval of their applica-

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<sup>30</sup>Based on a review of change applications and transfers and interviews with office personnel, primarily Dallin W. Jensen, Assistant Attorney General assigned to the State Engineer.

tion, but we must also recognize that such duty must not be made unreasonably onerous, to the point where every remote but presently indeterminable vested right must be pinpointed. And we cannot turn a deaf ear to every request which reasonably appears for a more beneficial use of water not impairing vested rights, by saying as the Engineer in his decision did, that the proposed change could interfere substantially with the vested rights of others.<sup>31</sup>

This has been the policy of administrators and the court until a 1962 case dealing with a change application, Piute Irrigation Company v. West Panguitch Irrigation and Reservoir Company.<sup>32</sup> The state Supreme Court reversed an early decision to allow West Panguitch Irrigation and Reservoir Company to store water in reservoirs for summer use which was previously used only to flood pasture land during the winter on grounds that such storage would not deprive any of the lower water users of water that would have reached the Piute Reservoir. In his decision to grant the application the State Engineer pointed out that there could be a "de minimus" loss of water to the lower users. During the rehearing the court asserted that the degree of impairment should play no role in the decision; an application should be rejected if there is any impairment of existing rights.

A dissenting opinion in this same case asserted the necessity of allowing wide latitude in granting changes in order that water may move to its most productive use.

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<sup>31</sup>American Fork Irrigation Company v. Linke, 121 Utah 190, 239 P. 2d 188.

<sup>32</sup>Piute Irrigation Company v. West Panguitch Irrigation and Reservoir Company, 13 Utah 2d 6, 367 P. 2d 855.

It seems reasonable that some institution be responsible for protection of other water users in event of change in use or point of diversion. Security of tenure would be severely hampered if this were not the case. Efficiency, however, dictates a liberal transfer policy must be maintained. The limitations to efficiency that may result from the Piute Irrigation Company v. West Panguitch Irrigation and Reservoir Company decision will depend largely on the future direction of the courts. For the time being it seems that this latest decision has not essentially affected the attitude of those administering the law.

No loss of priority accompanies permission to effect a change in use or diversion, once granted, thus eliminating a possible barrier to applications for such changes.

A statement sometimes made is that "Utah's water law and regulations prohibit free movement of water resources to the use where they have the highest marginal utility."<sup>33</sup> Support for this philosophy is taken from section 73-3-21 of the Code specifying priorities that will exist in times of extreme scarcity. Probably because of the difficulty involved in defining extreme scarcity and also because the law is silent as to whether compensation would have to be paid if water was taken from the lower priority use, this section has never been implemented.<sup>34</sup>

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<sup>33</sup>Seth H. Schick, "Demand for Household Water in the Northern Utah Area, 1962" (Master's Thesis, Agricultural Economics, Utah State University, 1964), p. 3. Golden Earl Poor, "Water Policy and the Industrial Development of Utah" Master's Thesis, Business, University of Utah, 1954), p. 34.

<sup>34</sup>Interview with Dallin W. Jensen, Assistant Attorney General assigned to the State Engineer, May 15, 1964.

It seems quite heroic to argue that Utah water law is inefficient on the basis of just one emergency requirement that has never been implemented in practice. One writer suggested revamping this section to give industrial use priority over agriculture.<sup>35</sup> This suggestion would be subject to the same criticism as the rule that agriculture has priority over industry. Both are essentially arbitrary and it is impossible to generalize that one use is more valuable than another.

What is needed is a flexible law that does not establish priorities at all. Deletion of the requirement under consideration would help. The market should be permitted to allocate water, even (in fact, especially) in times of extreme scarcity. If worse came to worse, public institutions would still retain the power of eminent domain and could acquire whatever water they need to meet domestic needs.

Security of tenure does not seem to be a problem with water law. Once a right has been vested it cannot be lost against the owner's wishes by any means, with the single exception of eminent domain. Even then a right will not be taken for any use which the court does not rule to be of greater benefit to the public. This generally protects the right from all uses other than domestic.

When eminent domain is employed, adequate compensation based on assessed market value, is guaranteed. By law, this compensation should cover all investment in the right as well.

There has been considerable development of water resources in the past few years. Water law in no way restricts such development and it is

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<sup>35</sup>Poor, Water Policy and the Industrial Development of Utah, p. 36.

generally carried on within the context of a state institution or in conjunction with the Federal Government. The state is empowered to enter into contract for joint studies and development of all water resources within the state.

In summary, it appears that Utah water law is reasonably conducive to economic allocation of the water resource. A system of property rights have been established and some are being bought and traded in quasi-markets. This is not to say that all water transactions are effected within a market situation the same as other resources, i.e., food, clothing, and real estate. We are not too far removed from the times when lives were lost over water right disputes. Water rights still are esteemed by many in the same manner as family heirlooms,<sup>36</sup> a situation which sometimes prevents an efficient, economic allocation of the resource. But this is a problem of attitude and not of water law.

#### The Office of the State Engineer

Adoption of the appropriative doctrine dictates that some person or agency must accept the responsibility of administering and allocating the state's water resources. There are two methods commonly employed, both of which will be considered in this section.

#### Judicial allocation of water

The judicial system, as employed in Colorado, requires a prospective water user to bring a private suit in the appropriate district court

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<sup>36</sup>Frank J. Trelease, "Water Law and Economic Transfer of Water," Journal of Farm Economics, XLIII (December, 1961), 1152.

requesting the privilege of using water. The petitioner is required to furnish evidence that there is unappropriated water and that it will be put to beneficial use. Any party protesting the appropriation may also testify.<sup>37</sup>

The task of the district court is to determine: (1) whether unappropriated water exists, (2) whether it will be put to beneficial use, and (3) if there will be any detrimental third party effects. The court will decide the case entirely on the evidence presented by the petitioner and the protestant.<sup>38</sup>

Several inherent difficulties in this judicial process are:

1. The court must decide the case on the evidence presented by the petitioner or protestant rather than on the testimony of some qualified person representing the public interest.

2. Legal criteria are given primary consideration; economic criteria are almost completely ignored.

3. The possibility of collusion; all the farmers in one area might protest a transfer in defense of a friend, even though the transfer has no direct effect on them.

4. A district court may tend to favor the popular use of water within the area over which they preside.<sup>39</sup>

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<sup>37</sup>D. A. Seastone and L. M. Hartman, "Alternative Institutions for Water Transfer: The Experience in Colorado and New Mexico," Land Economics XXXIX (February, 1963), 34.

<sup>38</sup>Ibid.

<sup>39</sup>Ibid., pp. 35-37.

This process had led to costly investment in a future supply rather than attempting an appropriation of water through the court.<sup>40</sup>

#### Administrative allocation of water

The other primary method places the responsibility of administering the state's water resources under the executive branch of the state government. Generally this power resides with the State Engineer. The duties and procedures followed by the State Engineer in Utah will be discussed in detail.

The instigation of the first comprehensive water law in 1903 gave specific responsibilities to the Office of the State Engineer. To be appointed by the governor with consent of the senate, the state engineer would have exclusive responsibility for supervising the measurement, apportionment, appropriation, and distribution of all waters within the state.<sup>41</sup> Specifically, the state engineer has the power to:

1. Make and abolish rules and regulations necessary to carry out the duties of his office.
  2. Bring suit in courts to enjoin the unlawful use of both surface and underground water and to prevent waste, loss, or pollution of the water resources.
  3. Establish water districts and define the boundaries of each.
- No person can be appointed unless he has been a bona fide resident of Utah for at least three years and no less than five years experience

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<sup>40</sup>Ibid., p. 37.

<sup>41</sup>Utah Code, 73-2-1.



as an engineer.<sup>42</sup>

In accordance with the authority to employ sufficient personnel to perform the duties of the office, the Office of the State Engineer employs engineers, accountants, technicians, office personnel, legal counsel, and whatever other personnel are necessary.<sup>43</sup>

The operations of the office are financed by biennial appropriations from the State Legislature, collection and disbursement of fees in connection with application, photostating of records, and other miscellaneous services, as well as funds received from individuals or other organizations to finance special investigation and water distribution.<sup>44</sup>

#### Determining a valid appropriation

Upon receipt of an application to appropriate water the state engineer must approve or reject the application on the bases of: (1) whether or not there is unappropriated water in the proposed source, (2) whether or not the proposed use will impair existing rights or interfere with a more beneficial use, (3) the technical feasibility of the proposed plan, and (4) the financial ability of the applicant to complete the proposal as outlined on the application and not for the purpose of speculation or monopoly.<sup>45</sup>

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<sup>42</sup> Ibid.

<sup>43</sup> Ibid., 73-2-4.

<sup>44</sup> Thirty-Fourth Biennial Report of the State Engineer to the Governor of Utah; Biennium July 1, 1962 to June 30, 1964 (Salt Lake City, Utah: 1964), p. 10.

<sup>45</sup> Utah Code, 73-3-8.

The initial investigation helps determine almost simultaneously, the first two objectives. The State Engineer must determine by investigating flow records and prior appropriations of the source if there is sufficient water to satisfy the application without impairing existing rights. He must also advise all persons who may have an interest in the granting of such an application of the details specified in the application. This is generally done by publication in a newspaper having general circulation in the area to be affected. Any person opposing the application may file a written protest with the State Engineer.<sup>46</sup>

In deciding whether or not to grant an application to appropriate, it has been ruled that in a doubtful case the application should be granted, since the policy of the law is to prevent waste and promote beneficial use. This means that the State Engineer need not find affirmatively that there is unappropriated water in the source; only when the source is obviously fully appropriated should the application be rejected.<sup>47</sup>

In making his final decision the State Engineer may require whatever additional information he feels pertinent. For example, he may require a "statement of financial ability" showing that the applicant(s) is able, as well as willing, to carry out the proposed work.<sup>48</sup>

Once a decision has been made by the State Engineer, that decision is final unless any person aggrieved by the decision wishes to bring

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<sup>46</sup>Ibid., 73-3-6.

<sup>47</sup>Little Cottonwood Water Co. v. Kimball, V. 76, p. 116.

<sup>48</sup>Utah Code, 73-3-11.

within 60 days a civil action in the district court for a plenary review.<sup>49</sup>

The same general procedure is followed by the State Engineer in dealing with applications to change use or diversion point, extend time in which to perfect a right, and extension of time for nonuse.<sup>50</sup>

Other responsibilities of the state engineer include determination of existing rights to water upon any stream or source. Suit is to be brought into district court by the engineer if upon initial investigation he finds evidence to justify a determination.<sup>51</sup> He is empowered to cooperate with administrators of other states in determining rights to interstate waters as well as appropriating interstate waters.<sup>52</sup> In cases where two disputing parties attempt to negotiate an agreement as to compensation for impairment of rights, the state engineer acts as an arbitrator and often writes their agreement into his decision.<sup>53</sup>

The state engineer appoints water commissioners, enters into investigations and studies of all water resources in the state, and, as pointed out earlier, has general responsibility for all the water within the state.

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<sup>49</sup> Ibid., 73-3-14; 73-3-15.

<sup>50</sup> Ibid., 73-3-3; 73-3-12.

<sup>51</sup> Ibid., 74-4-1.

<sup>52</sup> Ibid., 73-2-8; 74-4-2.

<sup>53</sup> Utah Code, 73-2-3.

Evaluation of the Office of  
the State Engineer

An evaluation of the laws under which the state engineer operates as well as the position of the courts was discussed in the previous section on water law. This evaluation concluded that water law, for the most part, does not present a significant barrier to market allocation of water. The possible defects in the law, with respect to efficient water allocation, are in the area of certain discretionary powers granted the state engineer. To the extent that economic criteria are ignored in the application of these powers, efficiency is impaired. These powers and the state engineer's application of them will form the bulk of this discussion.

The first of these powers, and by far the most important, is in the area of third party or neighborhood effects. Third party effects arise because all of the water appropriated and applied to a beneficial use is not consumptively used, and therefore much of the excess amount finds its way into other uses and supply sources, and benefits and/or costs accrue to others. While the courts have ruled that a person may not acquire a right to have return flow kept up, when that water finds its way back to a natural stream<sup>54</sup> it may again be subject to appropriation.<sup>55</sup> This seepage and return flow may well be the basis of another man's water right.

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<sup>54</sup>The term "natural stream" would be subject to court determination. Brian v. Fremont Irrigation Company speaks of surplus water reentering the "stream from which it was taken."

<sup>55</sup>Clark v. North Cottonwood Irrigation and Water Company, 79 U.R. 433.

Since any change in use or point of diversion is likely to affect these rights, the law requires the state engineer's approval to effect any change. This is an attempt to protect property rights which is certainly an important responsibility of the law. But this security guaranteed by the law, need not result in a decrease of flexibility. The means of overcoming this disparity is provided for in the law itself.

The law provides that an application to effect a change in use or point of diversion need not be rejected solely because of adverse third party effects. If the conflict of rights can be settled by the disputing parties, the state engineer is instructed to approve the application. This would necessitate negotiations, not only between the two primary parties, but also the third parties as to the amount of compensation necessary to cover the loss of productivity that will ensue by allowing the transfer. Nevertheless, those parties affected, not an agency in the state government, are making the final decision. The role of the state engineer should be to aid in the determination of the third party effects and leave the decision as to the compensation and whether or not to effect the transfer to the parties concerned. The courts would stand in reserve, as they now do, to rule on any claim of inequity brought before it by the negotiating parties. However, this solution to the problem of third party affects has not been frequently used.

The question of equitable compensation must be considered in a discussion of third party effects. While a water transfer may adversely affect rights in the area of original use, beneficial effects may also accrue in the area where the water is transferred, the net effect on the entire community concerned being approximately zero. The question arises as to why the party wishing to transfer a right should be entirely res-

possible for compensating adverse third party effects, without receiving at the same time reimbursement for third party gains in the new area. If all effects are adverse, then efficiency would require that the transfer be able to carry these losses, or the transfer should not be made. But since this is seldom the case, perhaps society should bear the cost of compensating third party losses and attempt to capture the beneficial effects that will accrue to new users. It is reasonable to assume that increased productivity will result from additional water, increasing property valuation and eventually state tax receipts. Even if compensation is impractical, the determination of gains and losses is necessary to decide if the transfer is really economical for the entire community.

Another discretionary power vested in the state engineer allows him to deny an application to appropriate water if, after initial investigations, he believes that granting the application will result in restricting a more beneficial use or prove detrimental to the public welfare.<sup>56</sup> Again, no use should be given priority over any other use as long as society is protected from such adverse effects as pollution. Insofar as the state engineer follows welfare criteria and can acquire the requisite information to make a judgement about social welfare, then this discretionary power may not be inefficient. But use priority often involves other considerations and may be economically inefficient.

A surface examination of the activities of the Office of the State Engineer over the past few years indicated considerable reliance on economic criteria in reaching decisions. This further supports the

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<sup>56</sup> Utah Code, 73-3-8.

conclusion stated earlier in this paper that Utah water law is reasonably conducive to economic allocation of the water resource.

Regardless of the economic efficiency of the state engineer in the past, the state has no guarantee that this will be the case in the future. If the future state engineers tends to be too legalistic, they may not give much consideration to efficiency criteria in allowing changes in use and point of diversion. To avoid this, the discretionary powers of the state need to be restricted in the above mentioned ways to insure economic efficiency in allocating the state's water resources.

#### Utah Water and Power Board

##### Responsibilities of the Water and Power Board

"To the end that every mountain stream and every water resource within the state can be made to render the highest beneficial service,"<sup>57</sup> the State Legislature in 1947 created the Utah Water and Power Board. An initial appropriation of \$1,000,000 was made with the intent of adding \$1,000,000 each biennium until a revolving fund of \$10,000,000 was achieved. The Board consists of a chairman and 13 other members appointed from various water districts throughout the state.<sup>58</sup> In addition the Board is authorized to employ engineers, legal counsel and all other services it deems necessary.

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<sup>57</sup>Utah Code, 73-10-1.

<sup>58</sup>Ibid., 73-10-2.

The primary goal of the Water and Power Board is to achieve greater utilization of existing supplies and development of new sources. Historically, the Federal Government has been most active in this phase of water supply. However, most projects undertaken by the Federal Government have been quite large and costly, such as the Weber Basin Project, Provo River Project, and the Central Utah Project. The small communities or ditch companies having need of a small reclamation project to achieve greater utilization of water were without financial backing. The Water and Power Board attempts to remedy this situation by supporting development projects too small to get support by the Bureau of Reclamation, Corp of Engineers, or other Bureaus of the Federal Government.

To achieve its objectives, the Board is empowered to make detailed studies and investigations of the water and power resources of the state. The Board then makes recommendations upon projects which are in the best interest of the state and the order in which these projects should be undertaken.<sup>59</sup> When the sponsors of a project, aided by the Water and Power Board, are unable to obtain financial assistance from any other source, the Board may advance state funds from its revolving fund. These projects are financed on a 100 percent reimbursable basis without interest. The repayment period of all funds provided by the Board shall conform to the needs and circumstances of the water users.<sup>60</sup> When any project is financed by these state funds, the project remains the property of the state until such time as the loan is completely repaid.

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<sup>59</sup>Ibid., 73-10-4.

<sup>60</sup>Statement of Policy of the Utah Water and Power Board, April 1963, Article VIII, Section E., p. 5.



The right to the use of the water to be derived from the project must be appropriated by application to the state engineer. The Board is empowered to make this application and take all steps necessary to perfect the right.<sup>61</sup>

Once the project has been completed and the water right granted, the Board administers the allocation of the water. Those persons who, in the opinion of the Board, can "best utilize" the water from the project, are given right to its use. They are in turn assessed a fee which is "necessary and reasonable" for the maintenance of the project and will return to the state the actual costs of the project.<sup>62</sup>

The policy of the Board is to support water development regardless of the type of sponsoring party. However, if projects of equal merit are submitted from individuals or groups, preference is given to the group enterprise.<sup>63</sup> A qualification of this statement concerns conservancy districts or similar organizations with taxing powers. Such organizations will not receive loans until the Legislature so directs and provides sufficient funds to make the loans.<sup>64</sup>

This development program is unique among the western states and many of the smaller projects originating from it have shown a greater return per unit of investment than the larger, well known ones.<sup>65</sup>

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<sup>61</sup>Utah Code, 73-10-4.

<sup>62</sup>Ibid., 73-10-6.

<sup>63</sup>Statement of Policy of the Utah Water and Power Board, p. 6.

<sup>64</sup>Ibid., Section D.

<sup>65</sup>Developing a State Water Plan, A joint study by Utah State University and Utah Water and Power Board, March 1963, p. 51.

The Water and Power Board has been specifically designated to make studies, investigations, and the general responsibility for planning all water development in the state as well as coordinating these plans with other state operations.<sup>66</sup> For example, highway construction to the extent that it affects any water course must be cleared through the Water and Power Board.

Other obligations of the Board are varied but closely associated with water development. Supervision and administration of compacts affecting interstate rivers, lakes, and other sources of supply are responsibilities of the Board. Whenever any agency of the state has need for water, such as the Department of Fish and Game to build a state bird refuge, application to the state engineer for that water is to be handled by the Water and Power Board.<sup>67</sup>

The duties and powers of the Board, even though they are to be literally interpreted, do not in any way interfere with the authority of the state engineer.

#### Evaluation of Water and Power Board

The Water and Power Board has no direct responsibility in allocation of the water resource except within areas where a project is being financed by the state funds, and even then, only until the project loan has been repaid. The Board has its greatest impact on the efficiency of state water policy by granting loans for development purposes.

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<sup>66</sup>Utah Code, 73-10-14.

<sup>67</sup>Ibid., 73-10-4.

The requirement that loans be repaid 100 percent coincides with a basic economic criterion that benefits exceed (at least equal) costs. Knowing that funds must be completely repaid, the sponsors of a project would be unwilling to commit themselves to repayment of a project unless they were fairly confident that the increased income resulting from the project would exceed its cost.

Possible misallocation of resources might result from the policy of granting interest free loans if the only alternative to state financing is private capital. In such a case the difference in the marginal costs of the development project would be substantial because of the high interest rates associated with private loans. A requirement by the Board that interest should be charged on their loans, however, would not necessarily solve this potential allocation problem. Federal Government loans do not require interest and in many cases include sizeable subsidies. Therefore, if the Water and Power Board were to charge interest, misallocation as between federal and state funds would result.

Closely allied to this question is one which asks if the Legislature is justified in appropriating \$1,000,000 each biennium for small reclamation projects. Any government appropriation is subject to considerable controversy because of the difficulty of evaluating the marginal returns of social services provided by the government. Perhaps the dollar invested in the water development would yield a greater marginal return if invested in libraries, educational facilities, highways, tourist promotion, or any one of many possible areas of state responsibility. This is a problem that must be decided by the State Legislature. Greater efficiency might be achieved, however, if those in the

planning area as well as the State Legislature would take an increased interest in evaluating marginal returns, wherever possible, associated with alternative investment possibilities.

The planning and coordination of all water development could have a significant effect on efficiency of state water policy. Past water development has been conducted on somewhat of a "hit or miss" basis. Development of irrigational institutions, to be discussed later in this paper, attests to that fact. The duplication of facilities within Salt Lake County alone must be extremely costly to the consumers. By cooperating with water institutions of all types and coordinating their development plans, considerable savings could be effected.

#### Water Pollution Control Board

##### Powers and duties of the Board

The Water Pollution Control Board is the most recent of the trio of state agencies which have principal concern with water. It was established by the State Legislature in 1953 to develop programs for the prevention, control, and abatement of new or existing pollution of waters in the state.<sup>68</sup>

The Water Pollution Control Board consists of nine members appointed by the governor for terms of eight years.<sup>69</sup> Specific segments of the state's economy must be represented on the Board, each of which might in some way affect the pollution of state waters; the mineral industry, food

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<sup>68</sup>Developing a State Water Plan, p. 51.

<sup>69</sup>Utah Code, 73-14-3.

processing industries, other manufacturing industries, municipalities, agriculture and livestock industries, and fish, wildlife and recreation interests.<sup>70</sup>

By law, the executive secretary of the Board must be the chief sanitary engineering officer of the State Health Department. The Board may employ whatever persons it deems necessary. However, technical, legal, or other services should be performed, insofar as is practicable, by personnel of the Department of Health and by other state departments, agencies and officers.<sup>71</sup>

The powers and duties of the Board include any and all actions which may prevent or reduce pollution of state waters. The Board sets the standards of water quality and then works with existing agencies and various interests which may in some way affect that standard. They have the power to restrict to any degree any action which they believe will increase pollution.<sup>72</sup> The decision of the Board is binding upon all parties unless appealed to a district court.<sup>73</sup>

One of the primary tasks of the Board is to work with municipalities, industries, or others to construct or improve existing treatment works and other remedial measures to prevent pollution.<sup>74</sup>

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<sup>70</sup>Ibid.

<sup>71</sup>Ibid.

<sup>72</sup>Ibid., 73-14-4.

<sup>73</sup>Ibid., 73-14-11.

<sup>74</sup>Ibid., 73-14-4.

The policy of the Board thus far has been to urge a cooperative, voluntary program of pollution control rather than one of rigorous enforcement.<sup>75</sup> Recently the Board has given serious consideration to a policy to employ some of their police powers and force municipalities, industrial firms, and others to take conclusive steps to end pollution of state waters.

### Evaluation of Water Pollution

#### Control Board

This Board has at present only related interest in allocation and distribution of state waters. It is therefore impossible to evaluate its operation under the criteria developed for this study. Nevertheless, water pollution is of growing concern throughout the United States. Pollution studies are in progress on most of the major rivers in the eastern United States and some in the West. This concern has developed because of population growth as well as increased industrial production have resulted in serious pollution of our waters. To make matters worse, there has been widespread refusal or neglect by polluting parties to voluntarily take steps to ease the problem.

In essence, water pollution is a problem of "neighborhood effects." Just as a person cannot utilize his own property in a manner that will inflict discomfort or loss on those around him, there is justification for restraining the upstream user from polluting the water supply of those below him.

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<sup>75</sup>League of Women Voters, Utah Chapter, "Water Resources: Support of Measures to Promote Comprehensive Regional or River Basin Planning with the State," August, 1960, p. 2.

Although this problem is not yet the most serious one in Utah, concern is growing. The prospects of increased industrialization and population growth are increasing this apprehension. It may well be that future problems of allocation and distribution will be just as concerned with water quality as water quantity. If so, the Water Pollution Control Board will assume a very important role in allocating the state's water resources.

#### Metropolitan Water District

The institutions discussed thus far exist at the state level, and as such, are concerned with the overall management of the state's water resources. In addition to these there are several different types of institutions functioning at the local level to develop, allocate, and distribute water to the water users in the state. The metropolitan water district is such an institution.

#### Preparation and passage of the

#### Metropolitan Water District Act

The recurring water shortages in Salt Lake County during the early 1900's and the inability of existing political structures to take any significant steps to alleviate future problems, set the stage for creation of an institution capable of guaranteeing adequate development of water supplies and future needs. In 1931 E. O. Larsen, District Engineer of the United States Bureau of Reclamation, in his feasibility report recommending construction of the Deer Creek Project, also suggested the formation of a metropolitan water district modeled after the Metro-

politan Water District of Southern California.<sup>76</sup> This suggestion coincided with considerable public sentiment to the effect that any effective water program could only be accomplished within the context of an independent water board, which would not be subject to change with city administration.<sup>77</sup>

The Metropolitan Water District Act was presented to and passed by the State Legislature in 1935.<sup>78</sup> Later in the same year, the State Supreme Court returned a decision that the new Act was constitutional.<sup>79</sup>

The Metropolitan Water District Act provides for the creation of a district within the corporate boundaries of any one or more municipalities. The primary purpose of a district is to provide for the water needs, both present and future, of all water users within the boundaries of the district. Creation of a district in the last analysis rests with the people within the prescribed area of jurisdiction. Initially, the legislative body of any municipality may pass an ordinance declaring: (1) the intention to organize a metropolitan water district, (2) the names of the cities to be included in the proposed district, (3) the name of the proposed district, and (4) the cost to each city of organizing a district.<sup>80</sup> Once passed this ordinance must be passed upon by the

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<sup>76</sup>Harris, 100 Years of Water Development, p. 42.

<sup>77</sup>Ibid., p. 42-43.

<sup>78</sup>Laws of Utah, 1935.

<sup>79</sup>Harris, 100 Years of Water Development, p. 44.

<sup>80</sup>Utah Code, 73-8-4.



legislative bodies of those municipalities to be included in the district.<sup>81</sup>

The question must then be submitted to the electorate of those municipalities whose legislative body favored creation of a district.<sup>82</sup> If a majority of the electors of any one or more of the municipalities in question vote affirmatively, a district will be formed. The Secretary of State will issue a certificate of incorporation creating the district which will state the name of the district and the municipalities which will be included.<sup>83</sup>

Administration of a metropolitan water district is vested in a board of directors, with a representative for each municipality, appointed by the legislative body of each respective city. Each representative is entitled to one vote for each ten million dollars of assessed valuation of property, provided that each representative has at least one vote. The affirmative vote of members representing more than 50 percent of the votes is necessary to carry any resolution coming before the Board.<sup>84</sup>

When a district encompasses only one municipality, the Board is to consist of either five or seven members, to be decided upon by the legislative body of the city, a majority being necessary to carry a resolution.

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<sup>81</sup>Ibid., 73-8-6.

<sup>82</sup>Ibid., 73-8-8.

<sup>83</sup>Ibid., 73-8-16.

<sup>84</sup>Ibid., 73-8-20.

The terms of office of a director is six years.<sup>85</sup>

The primary purpose of a metropolitan water district is to acquire, appropriate, develop, store, sell, lease, and otherwise distribute water for municipal and domestic purposes, irrigation, power, industrial and all other beneficial uses.<sup>86</sup> To accomplish this goal, the district must take steps to obtain a supply of the water resource and facilities to put that water to be specified beneficial uses. A district is empowered to take by grant, purchase, bequest, or lease, and to hold, lease, sell or otherwise dispose of water, water works, water rights, and sources of water supply and any real or personal property of any kind within or without the district necessary or convenient to the full exercise of its powers.<sup>87</sup>

Especially in the beginning it is often necessary for a district to assume bonded indebtedness or a contractual obligation to acquire a water supply and/or build the works necessary to service and distribute that supply. When necessary, a district may incur indebtedness not to exceed 10 percent of the value of taxable property within the district. They may also enter into contracts with some agency of the Federal Government or any private corporation for construction of necessary works.<sup>88</sup>

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<sup>85</sup> Ibid.

<sup>86</sup> Ibid.

<sup>87</sup> Ibid., 73-8-3.

<sup>88</sup> Ibid.

Revenue for financing operation of the district, provide for repairs and depreciation of works, pay the interest on any debt, and provide a sinking fund for payment of the principle, are to come from sales of water, insofar as it is practical and possible. The directors are required to fix rates to accomplish this purpose.<sup>89</sup> When revenue from water sales are insufficient, a district has the power to tax without limitation so far as necessary to insure the payment of an obligation due the United States but otherwise not to exceed 2.5 mills.<sup>90</sup>

The principal customers of a district are municipal water departments and other agencies already established whose primary purpose is to provide water services for their respective cities. Water is also sold to industry and some for agricultural uses. An important provision of the law is that giving priority to domestic and municipal uses. Agriculture has priority over industry.<sup>91</sup>

Priority is also given any water uses or users within the district over those outside. At any time the board of directors can suspend the contract, lease, or other type of agreement with a user outside the district by written notice one year in advance.<sup>92</sup>

A district, just as any other political subdivision of the state, has the power of eminent domain and must adhere to the state requirements for compensation.<sup>93</sup>

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<sup>89</sup>Ibid., 73-8-31.

<sup>90</sup>Ibid., 73-8-36.

<sup>91</sup>Ibid., 73-8-18.

<sup>92</sup>Ibid.

<sup>93</sup>Ibid.

Evaluation of metropolitan  
water districts

The passage of the Metropolitan Water District Act was an attempt to remove water development from the realm of politics and end the apparent diseconomies that prevail when several small, neighboring communities attempt to develop their water supplies independent of each other. While it does not seem to have been a specific goal of the originators of the Act, a metropolitan water district can (or could) effect great gains in efficiency by breaking down intercommunity transfer restrictions. To achieve the maximum efficiency possible, a district would have to require that water be allocated in such a way that the value of the marginal product of water in all uses is equal.

The act provides, with certain limitations, that a district could act as a retailer, owning or at least controlling a supply of water, and sell it to whomever it wishes. This would greatly facilitate free transfers of water among uses and users within the community. Any use or user could obtain a water supply by applying for such to the district and, if necessary, bid that amount of water away from a use of lower productivity. If several municipalities can be encompassed within a district, the additional efficiency gains of optimum distribution of water among municipalities, as well as among users within a municipality, can be achieved.

The limitations, previously mentioned, are in the form of a system of priorities and reduce the potential efficiency of a metropolitan water district. Giving priority to uses within the district and providing that any outside user could have his supply cut off in one year's time, results in inefficient discrimination, and possibly underinvestment in

outside uses. The users outside the district would be unwilling to invest in water works necessary to fully utilize water available from the district with such a risky supply. By guaranteeing compensation to cover the investment costs which are lost due to cancellation of a water contract (the Act is silent on this point) security could be increased, but this would not be likely to completely mobilize water delivery to outside users. Maximum efficiency dictates that all users, within and without the district, be treated the same.

The Act also specifies priorities as between municipal, agricultural, and industrial uses. Again this was probably done to protect the municipal supply. As was pointed out earlier in the section on water law, in a rapidly changing world, any system of priorities can be damaging to efficiency. In a market allocation if domestic use deserves first priority, domestic users will bid water away from other users, in which case the priority would be redundant. As demand for a given water supply increases, the market can most efficiently dictate which use has the greatest value. It seems apparent that industry will not wish to purchase water if the value of the marginal product is less than the cost of acquiring it.

Since a metropolitan water district is primarily a distribution institution, its method of pricing the water has considerable consequence on the efficiency of a district. The actual method of pricing to be used is a decision of the district management. A later section on the municipal water departments discusses pricing methods that might be employed in more detail.

By providing that revenue, for the most part, should come from the sale of water, the Act is adhering to the concept that those who receive

the service should pay the bill. In addition, there is some justification for a small tax levy to cover some of the district's costs. Everyone within a district, no matter how much or little water they use, receives some benefits from the program. Increase in property valuation because of an adequate supply of water is one possible way. However, this should not be a major source of revenue and one would wonder if a 2.5 mill levy under normal conditions and the possibility of an unlimited tax levy to repay an obligation due the United States were not somewhat greater than a small tax levy.

As is often the case, what could be accomplished and what actually takes place in reality, are considerably divergent. The metropolitan water districts have increased efficiency, but their full potential has not been reached. The best example of this discrepancy is the largest, best established metropolitan water district in the state, the Metropolitan Water District of Salt Lake City.

Established in 1935, soon after the creation of the Metropolitan Water District Act, the Salt Lake District was intended to join cities of South Salt Lake, Sandy, Holladay, Murray, and others with Salt Lake City for the purpose of water development. This goal was never realized because of a provision in the original law regarding voting procedure.<sup>94</sup> This provision stated that when two or more municipalities joined together to form a district, no one of the municipalities could have more votes than all others on the board combined. This would have enabled the small suburb cities to out-vote the control city. It is understandable

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<sup>94</sup>The original provision was amended to its present status in 1957.

why Salt Lake City was unwilling to accept this voting requirement. What is difficult to see is why some attempt was not made to change the law rather than organize a district completely out of harmony with the purpose of the Act.

The area of jurisdiction of the Salt Lake City District is the corporate boundaries of Salt Lake City. The district's water supply comes from rights owned in the Deer Creek Division of the Provo River Project, the water being transported to Salt Lake City by means of a huge aqueduct. While some service is given outside the district, Salt Lake City is the district's principal customer. In fact, Salt Lake City has potential claim on all water held by the district.

Salt Lake City and the Metropolitan Water District duplicate each other in many ways. Both have supply lines, water processing facilities, maintenance men to maintain existing facilities, office staff to manage operations and water sales, and the physical plant of the office itself. For all practical purposes the Metropolitan Water District duplicates through another organizational layer what Salt Lake City could have done and still does by itself by amending city statutes to allow the city to accept the amount of indebtedness necessary to subscribe for 50,000 acre feet of Deer Creek Reservoir water.<sup>95</sup> It is intuitively apparent that such duplication can lead only to inefficiency. If only the function of the two offices could be combined, efficiency would be increased.

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<sup>95</sup>Rene Ballard, "The Salt Lake Metropolitan Water District," Utah University Institute of Government, Vol. 1-10, bulletin no. 5 (Salt Lake City: University of Utah, December, 1958), pp. 14-15.

It seems, however, that some inefficiencies will always exist in a metropolitan water district. Water for municipal-domestic use, by the very nature of the organization, will always receive first priority no matter what changes in the law are enacted or what preventive measures are taken. The institutions to be discussed next could overcome this obstacle and still insure municipalities of an adequate water supply.

#### Water Conservancy District

In 1950, the first conservancy district, the Weber Basin Water Conservancy District, was organized to administer part of the water to be developed by the Weber Basin Project. In 1951 the Salt Lake County Water Conservation District was organized to help meet the expanding water needs of that county. Since that time there have been several more districts formed, mostly in connection with large reclamation projects. Some of these projects, such as the Central Utah and Dixie projects are still in the planning and construction stages and the conservancy districts established in connection with them have only been able to function to a limited degree thus far. Even the Weber Basin Conservancy District has not functioned to its full capacity since the project is not yet complete and the Bureau of Reclamation maintains considerable control over its operations. Even so, the Weber Basin District and the Salt Lake County District represent the two types of institutions established under the Conservancy Act thus far. Each has faced many of the problems associated with the allocation of water on a multiple-use basis, and therefore, will serve as illustrations, wherever applicable, of the potential of a conservancy district.



Organization and responsibilities  
of a conservancy district

In many ways the Water Conservancy Act and the Metropolitan Water District Act are very similar. Indeed, a reading of the two documents reveals whole sections that are identical while many are altered only slightly. The primary difference seems to be an expanding of a single-use institution to one of multiple-use characteristics.

Under the Water Conservancy Act the district courts are vested with the power to establish a conservancy district upon fulfillment of specific conditions, to be discussed below. This Act does not, however, confer upon the court any responsibility for administration or adjudication of water rights beyond those duties already specified by Utah law.<sup>96</sup>

Establishment of a district requires a petition be filed by land owners within the area proposed for the new district. The petition must set forth a general description of the purpose, contemplated improvements, the territory to be included, and a proposed name for the new district.<sup>97</sup> Anyone opposing the establishment of the district may file a protest petition which will be duly considered and either accepted or rejected at a hearing to consider the original petition. If the protest petition fails and the original petition is in complete conformity with the Act, the court shall declare the district organized and it will be recognized as a political subdivision of the state of Utah with all the powers of

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<sup>96</sup>Utah Code, 73-9-3.

<sup>97</sup>Ibid., 73-9-4.

a public or municipal corporation.<sup>98</sup>

The conservancy district is governed by a board of directors, appointed by the district court, each serving terms of three years. Employees of the district include a secretary, who may or may not be a member of the board, and whatever engineers, attorneys, and other personnel are deemed necessary by the board.<sup>99</sup>

A water conservancy district, once created, has much broader interests and responsibilities than most water institutions in the state of Utah. The general purpose and goal of the Water Conservancy Act are to develop and control all unappropriated water of the state and to obtain from that water the highest duty possible.<sup>100</sup> These goals indicate responsibility not only to many users, but also to several uses. To achieve this broad goal the conservancy district both wholesales and retails water for domestic, agricultural, industrial, and all other beneficial purposes.

A district may incur indebtedness for the construction of whatever facilities the board deems necessary to completely accomplish the goals of the district. However, a majority vote of all property owners within the district is necessary before incurring any debt.<sup>101</sup>

A conservancy district has the power to tax up to a maximum of one mill on the dollar of assessed property valuation within the district

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<sup>98</sup>Ibid., 73-9-6; 73-9-7.

<sup>99</sup>Ibid., 73-9-10; 73-9-7.

<sup>100</sup>Ibid., 73-9-1.

<sup>101</sup>Ibid., 73-9-35.

under normal conditions to help finance the operation and maintenance of the system.<sup>102</sup> An additional one-half mill may be levied whenever the system is unable to punctually pay the annual installments on its contract or bonds or interest thereon.<sup>103</sup>

Of initial importance in the development of a conservancy district is the water right to a supply which can be distributed and allocated to prospective users. In general a district can obtain its water supply in any of the several ways provided by Utah law.

The method most commonly used thus far has been to contract with some agency of the Federal Government for the construction of necessary water works. Actually, the above statement is not altogether true since the general procedure is to establish a conservancy district in connection with a large reclamation project. However, the end result is the same, the district administers the waters to be developed by the project and is responsible for repayment of the obligation due the United States.<sup>104</sup>

The Salt Lake County Water Conservancy District employed other means to gain its water supply. Those sources are: (1) wells obtained by application to the state engineer, (2) spring water obtained by purchase of shares in an irrigation company having water rights to that source, and (3) wholesale purchase of finished water from the Metropolitan

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<sup>102</sup>Ibid., 73-9-16.

<sup>103</sup>Ibid., 73-9-20.

<sup>104</sup>Seven Year Summary of the Weber Basin Conservancy District; June 1950 to December 1957, p. 3.

Water District of Salt Lake City.<sup>105</sup>

Since the possible tax levy is relatively low, the primary source of revenue open to the district is the sale of water. In keeping with this, water is sold to municipal, industrial, agricultural, and any other beneficial use.

#### Allocation of the water supply

The ability to use water within a district is obtained by application which must present all pertinent information, including name of applicant, quantity and quality of water desired, description of use, and an agreement to pay the price per unit of water decided upon by the board as well as other rules and regulations of the board.<sup>106</sup>

The board, at its discretion, may accept or reject any application, its criterion being the best interest of the district.<sup>107</sup> Once accepted, the district will enter into a specific contract with the applicant, depending on the nature of the intended use and quality of water needed.<sup>108</sup>

Thus far the largest customers of the conservancy district, like the metropolitan water district, have been the municipalities themselves and the institutions already established within the municipalities to serve the needs of citizens. The district negotiates a contract to meet the needs of both parties. Contracts can be negotiated for any number of years, although the general policy has been to establish the length of the contract to cover the period of indebtedness incurred during the

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<sup>105</sup>Water: Our Ever Growing Need (Report of Salt Lake County Water Conservancy District, Salt Lake City, Utah, 1962), p. 12.

<sup>106</sup>Utah Code, 73-9-19.

<sup>107</sup>Ibid.

<sup>108</sup>Ibid.

initial development.<sup>109</sup> The price to be paid for the water, to be determined by the board, is part of the contract. That price can be changed at any time, but if increased, the contracting party has the option to cancel or continue the contract.<sup>110</sup>

A district can retail water to domestic as well as industrial users within its boundaries provided that, in the case of domestic use, the user is not serviced by any municipality which was incorporated at the time of the district's creation.<sup>111</sup> Applications and contracts for these uses of water are substantially the same as those for municipalities.

A statement made many times in the Water Conservancy Act is that rates and charges shall be "equitable although not necessarily equal or uniform for like classes of service throughout the district."<sup>112</sup> This statement, while included in the specification of all types of water sales, has its most general application in sales to irrigation users.

Under the Conservancy Act, irrigation users must apply for water and enter into contract with a district the same as other users, agreeing to pay the price determined by the board.<sup>113</sup> The Salt Lake County District has only one class of water, the price of which is too great to

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<sup>109</sup> Interviews with Wayne M. Winegar, Manager of Weber Basin Conservancy District, July 15, 1965, and Robert B. Hilbert, Manager of Salt Lake County Conservation District, July 28, 1965.

<sup>110</sup> Ibid., Hilbert.

<sup>111</sup> Utah Code, 73-9-19; 73-9-13.

<sup>112</sup> Ibid., 73-9-17; 73-9-19.

<sup>113</sup> Ibid., 73-9-18.

induce purchase by agricultural users. The Weber Basin District furnishes considerable water for irrigation. That water is priced in relation to the additional production than can be generated by the increased water supply, as computed by the Bureau of Reclamation. This has resulted in extremely low prices for irrigational water, much lower than the price for the same water when sold to industry.<sup>114</sup>

There is also a limit set by the Bureau as to the amount of water that will be supplied for irrigated land. This figure is supposed to represent the maximum amount of water necessary for agricultural production within the district. The district may only supply each irrigator with enough water so that his total supply, other water sources included, will not exceed that figure. At present, in the Weber Basin District 3 acre-feet per acre is the maximum.<sup>115</sup>

Evaluation of the water  
conservancy district

The water conservancy districts that can be created under the Water Conservancy Act have great potential in efficiently allocating water. Of course, like all political institutions, the conservancy district may not be completely efficient, from an economic point of view. The following discussion will attempt to point out the features which are conducive to efficiency as well as discuss the obstacles to economic efficiency in operation today.

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<sup>114</sup>Interview with Winegar.

<sup>115</sup>ibid.

Unlike most water institutions in the state, a water conservancy district is not established to serve one particular use; e.g., metropolitan water districts for domestic uses and irrigation companies for agricultural use. Its boundaries are set to include all uses and users within a common area. This enables the district to allocate water between uses without priorities and discriminatory quotas and pricing.

Inefficiency can result when district policy toward negotiating contracts for water use is too inflexible. As previously noted, contracts can be negotiated for any length of time acceptable to both parties, but the general procedure has been to contract for the length of indebtedness. There are indications that the Weber Basin Conservancy District has been reluctant to deviate from this policy.<sup>116</sup> Persons needing water have been willing to obligate themselves for 60 years, the life of the district bond. In years when they haven't needed the entire quantity provided by their contract, they are restrained from trading or selling that water to some other user, even if facilities exist to initiate the transfer. This tends to make water appurtenant to the land once a contract has been negotiated.

It is true, the contracting party realizes his obligation when initiating the contract. But the future is replete with many kinds of uncertainties that produce changed conditions. Flexibility in water use by subcontracting would seem to increase use efficiency. Besides, the district would be no worse off as long as that particular quantity of water is paid for as stipulated in the initial contract.

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<sup>116</sup>Interview with Winegar.

These inflexible present allocations cannot be laid entirely at the feet of the district directors. Since the Weber Basin River Project is still under construction, much of the control of district water is in the hands of the Bureau of Reclamation. In addition, the district is having difficulty selling enough water to meet its obligations, a problem to be discussed directly later in this section. Apparently those responsible believe that by refusing to allow these transfers, and selling or renting additional water to the consumer desiring additional water, that revenue will be increased.

This will probably not be the case. If the buyers know that subcontracting is impossible and that they themselves will have to pay for the water which they contract to receive, no matter what circumstances prevail, they will be unlikely to offer as high a price as they would if greater flexibility were permitted. In fact, it seems that if contracts were negotiable throughout the period of the contract, a large amount of uncertainty could be overcome. This flexibility would give a large boost to more and larger contracts, and therefore, revenue would be increased.

The Salt Lake County Conservancy District, on the other hand, has exhibited much more flexibility in negotiation contracts. While their indebtedness runs for 50 years and most of their contracts are for that period of time, they have been willing to meet the needs of any user. Emergency contracts have been negotiated which offer no guarantee that the district will furnish any water if supplies are short, or that obligate the consumer to purchase any water from the district. Water will be made available upon demand so long as the district feels there is



a sufficient amount of water in its system to meet other contracts.<sup>117</sup>

The flexibility with which water transfers can be made and the security against tenure uncertainty granted in the contract seems to be dependent on those initiating the contracts rather than being contained in the Water Conservancy District Act itself.

Since a conservancy district must receive the bulk of its revenue from water sales, an admirable requirement of the Act, the pricing policies of a district play a most important role in determining its economic efficiency. The districts are relatively free to choose their own methods of pricing and again, as has already been stated, a detailed discussion of the pricing methods most commonly used in Utah is contained in a later section of the thesis. There seems to be, however, a significant problem within the conservancy districts that will require at least some discussion of pricing policies here.

Optimum efficiency in pricing requires that the same price be charged for each unit of water consumed and that the price be the same for all users. The statement made throughout the Act that rates and charges shall be "equitable although not necessarily equal or uniform for like classes of service throughout the district," is in direct violation of this requirement. If prices are not the same to all users, the value of marginal utility of water to all users will not be equal in equilibrium, resulting in inefficient allocation of water.

This statement in the Act does not require a district to price discriminately but certainly leaves the door open for the districts to do

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<sup>117</sup> Interview with Robert Hilbert and examination of some district records.

as they desire. A case in point is the Weber Basin Conservancy District.<sup>118</sup>

The Weber Basin District both wholesales and retails water to municipal industrial, agricultural, and other beneficial users, throughout the counties of Weber, Davis, Morgan, and part of Summit. For each use, a different price is established. This is justifiable to the extent that the difference in price reflects the difference in cost of supplying the users. For instance, water sold to industry is approximately half the price of water to municipalities, the difference being the cost of finishing the water, since industrial usage does not always require high quality water. Considerable inefficiency is evident, however, when irrigational use is considered.

As was earlier pointed out, the price of water for irrigation is dependent on the increased productivity generated by the increased water supply, as computed by the Bureau of Reclamation. This price is considerably below the price set for industrial users utilizing the same quality of water. This results in a subsidy to agricultural users and an inefficient allocation of the water resource.

Optimum pricing is further restricted by the presence of a "quota" system on water for agriculture which would prevent consumers from pushing consumption to the point where value of the marginal product equals marginal price.

As previously noted, the Weber Basin District is unable to sell enough water to meet its obligations due the Federal Government and its bond holders. At present, they are supposed to receive an additional 6,000

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<sup>118</sup> Interview with Winegar.

acre feet in 1966. At the same time the number of new contracts for water has not been increasing.<sup>119</sup>

First observation would indicate that either the price is set too high or supply far exceeds demand. In the field of water development it would be highly inefficient to produce only those units of water needed at the present time. Therefore, it is possible that supply, at least in the short run, could exceed demand. An investigation of the municipalities within the district, however, shows considerable interest in developing new supplies. Many are drilling wells and some investigating the possibility of building their own water purification plants.<sup>120</sup> Apparently the demand for water is increasing right along with the supply.

The obvious alternative to lack of demand is too high a price. The users can produce their own water less expensively than they can buy it from a district. This explanation seems satisfactory until the pricing policy of a similar institution is considered. The Salt Lake County Water Conservancy District, serving a similar market, charges municipalities \$12.50 more per acre foot and industrial users considerably more.<sup>121</sup> Even at their higher rates, the Salt Lake District has no trouble contracting water sales to meet increasing demand. This comparison may be misleading because the two markets are obviously not the same. Nevertheless, it seems reasonable that some other factors, such as the greater security associated with owning its own supply or inflexible negotiating

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<sup>119</sup>Ibid.

<sup>120</sup>Ibid.

<sup>121</sup>Interview with Hilbert.

policies of the district may be causing this problem.

An interesting study would be to determine statistically if the cities within the Weber Basin District can develop their own supplies at a lower cost than by buying them from the District. If not, what explanation can be given for the reluctance of these municipalities to contract for Weber Basin water?

The Water Conservancy Act has greatly expanded the potential for efficient allocation of water. A conservancy district has the advantage, like the metropolitan water district, of traversing large areas, facilitating transfers within that area. The conservancy district has the added advantage that no priority system is written into the Act. Another advantage of the district is its low taxing power. This should force it to rely more on a market allocation of water and attempt to maximize the rent on the water supplies it controls.

The water conservancy district could be the best attempt, thus far, to remove transfer restrictions and facilitate greater flexibility and overall efficiency in allocating water. At present these goals are not being fully achieved but the potential remains for an efficiency-conscious management to implement.

#### The Mutual Irrigation Company

##### Origin and development

The mutual irrigation company had its origin in the small community canal built and used cooperatively by the Mormon pioneers. Being isolated from other communities and depending greatly on each other, local control of the ditches presented no serious problems. But as towns and

cities grew they came to include many inhabitants who were not farmers and had little interest in or even sympathy with farming operations. Hence, for most ditches separate organizations were eventually developed to include only the water users directly involved.<sup>122</sup>

The first irrigation company, the Provo Canal and Irrigation Company, was incorporated by the Terretorial Legislature in 1853 and was granted all the powers of a corporation.<sup>123</sup> A few other companies were established by the Terretorial Legislature but extensive organization of such companies did not come until the water law of 1880 provided that irrigation companies could be formally incorporated under the corporate laws of the state for irrigation purposes.<sup>124</sup>

#### Organization and practices

The mutual company consists of several water users utilizing the same water system for essentially the same purpose. These organizations may or may not be incorporated depending upon the demands made upon the company and the congeniality of the membership. Where membership is large or where the organization might be subject to litigation, they are usually incorporated.<sup>125</sup>

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<sup>122</sup> Hutchins, Mutual Irrigation Companies in Utah, pp. 16-18.

<sup>123</sup> George Thomas, The Development of Institutions Under Irrigation (New York: The MacMillan Company, 1920), p. 48.

<sup>124</sup> Hutchins, Mutual Irrigation Companies in Utah, p. 24.

<sup>125</sup> Orson W. Israelsen, et al., Irrigation Companies in Utah: Their Activities and Needs, Utah Agricultural Experiment Station Bulletin 322, March 1946, p. 11.

It is very important to note that a mutual company is not, strictly speaking, a public institution delivering water to a public use. It is a private, non-profit organization established to supply water at cost to members only. As such, they are not subject to public control beyond those applicable to any other commercial enterprise in the state. A board of supervisors or other public body has no power to fix rates or charges of the company. Nor can a company be forced to supply water to anyone not owning stock in the company.<sup>126</sup>

The company assets include ditches, canals, laterals, reservoirs, and other works necessary to deliver water to the members. More important, the water rights are owned in most cases by the company. Each member is entitled to receive the proportionate share of water carried by the company system which his stock bears to the capital stock of the company. The shares of stock held by each member, at least initially, are dependent on any one or a combination of the following factors: (1) the amount of capital or labor contributed toward the initial construction of the company facilities, (2) the quantity of water held by rights transferred to the company, or (3) the number of shares purchased from the company or other stockholders.

In a few cases the water rights are not owned by the company, but are held by the members in the same manner as before the company was formed. In such a case the only function of the company is to provide means of transporting water from its source to point of use. This system has not proven conducive to a flexible water market and today is the

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<sup>126</sup> Weil, Water Rights in the Western States, Vol. II, p. 1159.

exception rather than the rule.<sup>127</sup>

Even where water rights and other water works are held as assets of the company, they are not managed the same as other corporations. Instead of charging for the water furnished and applying the sale or rental revenues to pay the maintenance and operational expenses and dividends on the stock, no charge whatsoever is made for water. The expense of management and maintenance of the company is to be met by assessments on the stock which may be paid in cash or labor.

The stock certificate entitles its owner to receive a portion of water in the company which may be used at the discretion of the stockholder on any lands which can be serviced by the company ditches. Whether or not these shares of stock, representing water, may be bought, sold, rented, or otherwise exchanged within the company, is a policy to be decided upon by the stockholders. Some companies require all transfers of water to be made prior to the opening of the irrigation season and permit no changes thereafter; others allow a change once during the season; still others permit changes more often or have no restrictions whatever. But all companies do allow stock to be transferred within the company.<sup>128</sup>

When transferring water between users the market value of the stock or the price becomes the basis upon which such transactions are nego-

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<sup>127</sup>Wells A. Hutchins, Mutual Irrigation Companies in California and Utah Farm Credit Administration, Cooperative Division Bulletin 8, (Washington, D. C.: October 1936), pp. 29-33.

<sup>128</sup>Hutchins, Mutual Irrigation Companies in Utah, p. 40. Mutual Irrigation Companies in California and Utah, pp. 54, 76, 124. Israelsen, Irrigation Companies in Utah, p. 53.

tiated. Market value is a function of demand and supply, dependent upon the forces at work in the market. When water supplies are short, price has a tendency to rise. Expected high prices for farm products will have the same effect. Prices may be depressed by excessive precipitation or early frosts. In essence, the market value of the stock is dependent on a combination of factors which affect in some way the supply of water or potential production associated with that supply. The important point is that this value is variable and is determined by those wishing to use the water in production.<sup>129</sup>

Incorporation of the mutual company overcomes one of the serious problems faced by the more informal organizations--collection of assessments. A Utah law allows the corporations to sell the shares of stock upon which assessments are not paid.<sup>130</sup> This furnishes a strong inducement to meet the assessments since much of the land in Utah, without shares of stock representing water, is worth considerably less.

Management of a company rests with a board of directors selected by the stockholders from the membership of the company. Even though corporate law places the minimum number of directors at three, the tendency is to have larger boards with five to seven members. The directors are elected for a one-year term and are responsible for all functions of the company, such as assessing the stock and determining improvements to be made. The board may appoint a secretary-treasurer, water-master,

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<sup>129</sup>Hutchins, Mutual Irrigation Companies in Utah, pp. 34-36.

<sup>130</sup>Elwood Mead, Irrigation Institutions, (New York: The MacMillan Company, 1903), pp. 235-238.



and such other employees as may be necessary.<sup>131</sup>

The fact that the mutual company has been so adaptable to irrigation problems in Utah has led to its most serious shortcoming. At first communities were small and very few primary dtiches could adequately serve all water users in the area. These situations were readily organized into a mutual company. As the state developed additional settlers would move into the already well established communities. At first they were readily accepted and given shares in the company merely on the promise that they would do some work on the ditch in the future. As the supplies became more fully utilized, this policy changed. Rather than develop new supplies and build new ditches, the companies merely restricted membership.<sup>132</sup> This forced the organization and development of additional companies to service acreages contiguous to those already being serviced by a mutual company. Today it is not uncommon to have three, four, five, or even more companies serving one common area. In many cases several ditches, each belonging to a different company, often run parallel to each other for several miles, resulting in excess land in ditches and considerably greater water losses due to seepage and evaporation.

Evaluation of the mutual  
irrigation company

The degree of efficiency of the mutual irrigation company depends on whether they are evaluated individually or in relation to other companies. Considered individually the mutual company offers perhaps the

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<sup>131</sup>Hutchins, Mutual Irrigation Companies in Utah, pp. 34-36.

<sup>132</sup>Ibid., p. 18.

best example of a flexible, market allocation of water of any institution in the state. Intracompany transfers can be made almost completely at the discretion of the water user.

Security of tenure is no problem within a mutual company since stock in the company is real property and can be lost only by the owner's own choice to sell or by failure to meet assessments, which is in essence also his own choice, since he realizes that delinquent assessments could result in loss of stock in the company.

Another desirable quality is that management of the district is maintained by those who are directly concerned and acquainted with the local problems.

By joining together to develop a common supply the early pioneers increased the efficiency of their operations by spreading the cost of building and maintaining a water distribution facility over many individuals. Also conveyance losses were reduced because of the use of a common canal rather than separate canals of smaller dimensions. Although some savings have been realized, they have been and are considerably less than they could have been had their members been able to anticipate the potential future growth of irrigation and expand rather than restrict their company's growth. Therein lies the primary inefficiency of the mutual company.

There are, as of 1959, 967 mutual irrigation companies serving 1,178,034 of the 1,300,483 acres of irrigable land in Utah.<sup>133</sup> This places an average of 1,218 acres of land under each company. This is a

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<sup>133</sup>United States, Census of Agriculture, 1959, p. 333.

deceiving figure since some companies in the Delta area, for example, service approximately 20,000 acres each. Therefore, the median acres of land under each company would be considerably less than 1,211 acres, probably about 400 or 500 acres. Whatever their exact size may be, several companies now service an area which could probably be more efficiently serviced by one mutual company.

Having stated that intracompany transfers can be easily made, it must be remembered that maximum efficiency also dictates that water should be able to move to the use of greatest marginal productivity. This would necessitate water being able to move to any use or point of use within a common area; i.e., between companies. This condition is not widely achieved.

Utah law provides that one company may own shares of stock in another<sup>135</sup> but the articles of incorporation of most companies do not allow this. Even when provided for by the articles of incorporation, it is not uncommon to charge an unrealistically high fee to transfer water into another company ditch, further restricting flexibility.

The problem of flexibility as between uses within an irrigation company does not seem to be significant since very few companies supply water for household use, other than lawn watering.

A mutual company may also have problems with security. Security against physical uncertainty is common in the smaller companies because of their inability or reluctance to initiate capital investment in water storage, ditch lining or other means of better utilizing a company's

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<sup>135</sup>Utah Code, 73-1-13.

water rights.

There are some problems of tenure uncertainty arising between companies. Because many companies function in a common area, it is inevitable that the actions and decisions of one company will affect other companies on the same system. This has led to extensive litigation. The common law of Utah, with respect to water, has developed almost exclusively from suits between mutual companies. Litigation is both expensive and time consuming and results in waste of resources. There is evidence that mutual companies are moving to correct these inefficiencies, primarily by consolidation. The number of mutual companies in Utah declined by 73 between 1949 and 1959.<sup>136</sup> This is even more significant by noting that the number of incorporated companies actually increased by 17 while unincorporated companies decreased by 90.<sup>137</sup> Even where actual consolidation has not been accomplished, some companies have reached a stage where they are enjoying all the advantages of consolidation except for actual management.

There is, however, still considerable opposition to the consolidation of companies. As explained in a paper by Dudley Crafts, this stems partly from the particular nature of irrigation farming under mutual irrigation companies.<sup>138</sup>

The farmer is interested in the company only as it affects him personally. He is primarily interested in the water delivered to him at his headgate and his actions

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<sup>136</sup>U. S., Census of Agriculture, p. 333.

<sup>137</sup>Ibid.

<sup>138</sup>Dudley Crafts, "Problems in the Reorganization of Irrigation Companies in the Sevier River Basin, Utah." (Unpublished paper)

are governed by that interest. He seldom refers to himself as a stockholder, but rather an owner of a water right within the company. That is why he will join readily with others and put forth an incredible effort to build a reservoir. He knows that the building of the reservoir will increase the quantity or dependability of the water at his headgate, or it might do both. But when it comes to the actual delivery of water at his headgate the more weight his voice carries the better. For this purpose he tends to favor small organizations. He regards a portion of the water owned by the company as his own personal property and he wants to have as much to do with its management as possible. . . . Most of all the farmer wants to protect his water rights. He feels that this will best be accomplished by some one in his immediate neighborhood. . . .

There is no getting away from the conclusion that generally small mutual irrigation companies are wasteful, expensive, and inefficient, but the farmer sticks by them because he enjoys the feeling that he is managing his own affairs.<sup>139</sup>

Increased demand upon the water resources of the state may force mutual companies to sacrifice some of their independence for increased efficiency. If consolidation can be achieved, the mutual company could well be the most efficient institution in the state for servicing agricultural users.

### Irrigation Districts

#### Evolution of the irrigation district

Irrigation (sometimes called water conservation) districts, as they are provided for by Utah law, had their beginning in the Utah Irrigation District Act of 1865. This Act was an attempt to provide for greater development of water for irrigation by organizing persons in a common area, usually a county or some part thereof, into an irrigation district.

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<sup>139</sup> Ibid., pp. 33-34.

Ditches, reservoirs, and other necessary works were to be built cooperatively by the land owners within the district and to be financed by taxes placed upon the lands. No provision for bonding was included.<sup>140</sup>

Despite continued revisions of this statute, only a few districts were organized and none of them were successful. In 1897 the Act was repealed.<sup>141</sup>

Twelve years later in 1909 a new act was passed. This legislative move was in response to those who wanted to follow along the lines of the Wright Act of California and bond the land for construction of reservoirs, dams, and canals. The legislation providing for irrigation districts in Utah today is an evolution of this Act, having undergone considerable amending.<sup>142</sup>

#### Establishment of an irrigation district

Under the law a district may be formed if and when the governor, upon recommendation of the State Engineer, or 50 or a majority of land owners within the proposed district, so request.<sup>143</sup> The request must come in the form of a petition and state the proposed means of water supply as well as the name proposed for the district.<sup>144</sup> After preliminary water surveys and allotments and after publicizing the irriga-

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<sup>140</sup>Hutchins, Mutual Irrigation Companies in Utah, pp. 20-23.

<sup>141</sup>Ibid.

<sup>142</sup>Thomas, The Development of Institutions Under Irrigation, p. 126.

<sup>143</sup>Utah Code, 73-7-1.

<sup>144</sup>Ibid., 73-7-2.

tion district proposal, land owners within the proposed district decide by public election whether or not a district will be formed.<sup>145</sup> Land owners are entitled to one vote for each acre foot of water allotted to them with a majority of votes cast being necessary to create a district.<sup>146</sup>

Management of the district resides in a three man board of directors elected by popular vote of the water users within the district. The district will employ a secretary and whatever attorneys, agents or employees that are required.<sup>147</sup>

Generally, there is a particular water supply in mind for allocation by the district when it is proposed. The district becomes the owner of that right by application to the State Engineer and can construct or acquire by contract purchase, or condemnation, canals, ditches, reservoirs, reservoir sites, irrigation systems or works, and any other land or facilities the directors deem necessary for attainment of the district goals. The district may also use any of the above mentioned methods to increase their water supply.<sup>148</sup>

The law passed in 1909 differed substantially from the Irrigation District Act of 1865 in only one way; the power to issue bonds. Prior to issuing bonds, the directors must make an estimate of the amount of money necessary to enlarge or construct the system and submit all per-

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<sup>145</sup> Ibid., 73-7-3.

<sup>146</sup> Ibid., 73-7-3; 73-7-4.

<sup>147</sup> Ibid., 73-7-11.

<sup>148</sup> Ibid.

inent information to the water users in the district for consideration.<sup>149</sup> After 20 days an election is held, two-thirds of all votes cast affirmatively being necessary to authorize the bond issue.<sup>150</sup>

Repayment of the bonds as well as the interest thereon and any other maintenance or construction expenses not covered by the bond issue is to be met by assessment levies against the land owners within the district.<sup>151</sup> Those assessments are in the form of a tax levy and are to be collected by the county treasurer in like manner to other taxes.<sup>152</sup> These taxes constitute a first lien upon the property assessed, providing for their sale to pay the taxes, if delinquent.<sup>153</sup> The district may also fix rates of tolls and charges to be collected from the landowners directly by the district to meet any additional expenses.<sup>154</sup>

#### Allocation of district water

During the initial organization of a district the State Engineer is required to make an allotment of the available water supply to the land within the district. This allotment is supposed to represent the maximum quantity of water which could be beneficially used on each tract of land.<sup>155</sup> After organization is complete and the directors know the

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<sup>149</sup>Ibid., 73-7-14.

<sup>150</sup>Ibid.

<sup>151</sup>Ibid., 73-7-17.

<sup>152</sup>Ibid., 73-7-20.

<sup>153</sup>Ibid., 73-7-21.

<sup>154</sup>Ibid., 73-7-24.

<sup>155</sup>Ibid., 73-7-2.



quantity of water available within the district, they are to make a revision of the water allotment, provided that they do not increase the allotment made by the State Engineer without his permission.<sup>156</sup> An exception to this rule can be made when additional water is obtained by the district.<sup>157</sup>

When there is surplus water in the district, the board of directors may lease or rent the use of that water to municipalities, corporations, associations, or individuals within or without the district. However, no lease or rental agreement may run for more than five years in time and no vested right to the use of that water will accrue to the users.<sup>158</sup>

The Act also provides that any landowner within the district may assign the whole or any portion of the water apportioned to his land, to any other landowner within the district. Such a transaction can be accomplished only with the consent of the board.<sup>159</sup>

Miscellaneous provisions of  
irrigation districts

Generally speaking, formation of an irrigation district offers a means of organizing all water users within a given area, even those not wishing to participate, into a cooperative effort to develop land for irrigation. The law does provide that any landowner within the district

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<sup>156</sup> Ibid., 73-7-11.

<sup>157</sup> Ibid.

<sup>158</sup> Ibid.

<sup>159</sup> Ibid.

may petition the district to exclude his land from the district.<sup>160</sup> The decision to grant or reject such a petition rests with the directors, the best interest of the district being their criterion.<sup>161</sup> Similar procedures govern the inclusion of lands not within boundaries of the districts.<sup>162</sup>

#### Evaluation of the irrigation district

For the most part irrigation districts have not been successful in Utah. In addition, there is little likelihood that they will play much of a role in the future, since any additional water development will probably take place under one of the more popular institutions already in operation. Nevertheless an attempt will be made to evaluate the potential efficiency of an irrigation district as they are provided for by law.

Probably the most advantageous characteristic of an irrigation district is that it makes possible a cooperative effort to develop land and water within a common area. The boundaries of a district may follow the county lines or any part thereof, but would generally be large enough to include all land within an area depending on a common water source. This would reduce duplication of effort and facilities that have continually resulted when individuals or mutual water companies have developed water for irrigation.

The Act makes an attempt to establish flexibility within a district by providing that a water user can assign the whole or part of his water

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<sup>160</sup>Ibid., 73-7-39.

<sup>161</sup>Ibid., 73-7-42.

<sup>162</sup>Ibid., 73-7-29, 73-7-34.

to another user. This would help to establish a market within a district since the user being able to utilize water to its greatest productivity would be able to bid the resource away from other users. This apparent flexibility is restricted somewhat, however, by a requirement that all such transactions must be approved by the board of directors. Whether or not this proved to be a serious barrier to flexibility would depend on the attitudes of the water users within the district since they elect the board of directors and actually set such policies.

The security of tenure granted a water user is somewhat insecure because of the power granted the board of directors to reduce any land owner's water allotment. It is not likely, however, that the directors would do this, except proportionately throughout the district to compensate for a varying quantity of water in the system. Nevertheless, this power is vested in the board of directors.

Other uses within the district and all uses without have no security beyond a five year contract. In addition there are no provisions for compensation to cover investment if contracts are not renewed. This could result in substantial underinvestment in ditches and other water works facilities necessary to achieve maximum productivity from the water supply.

Even though this is a barrier to efficiency, the situation is much improved over earlier legislation. The initial legislation providing for irrigation districts prohibits them from leasing or renting water to any use or user outside the district or any use other than agriculture within the district for a period of time greater than one year. In addition, the fee charged must be one and one-half times that assessed

against water users within the district.<sup>163</sup> Irrigation district legislation, at least in this instance would satisfy Wantrup's criterion that the important point in resource allocation is movement toward a more efficient allocation.

Another admirable feature of the irrigation district is that making voting rights a function of water used. Since the purpose of a district is water development, this gives each landowner a say in the district activities proportionate to the amount of his water allotment, one vote per acre-foot of water.

Assessments are also to be made in a like manner. The board of directors must decide each year how much money is necessary to retire the debt, pay the interest, and cover other maintenance and operation costs. This amount is levied equally against each acre-foot of water supplied. This policy could result in maximum efficiency if the consumer (farmer) were allowed to push consumption to the point where marginal revenue equals marginal cost (price). Since the maximum amount of water the consumer can use depends on the maximum allotment decreed by the State Engineer and the subsequent allotment of the board of directors, the potential for a more efficient allocation of water is greatly impaired.

The irrigation district has both strong and weak points when comparing it to other institutions employed in developing and allocating water for agricultural use. It has, however, had little effect on the water policy of the state. It would seem that the farmers have not been willing to bind themselves so thoroughly to the dictates of a three-man

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<sup>163</sup>Thomas, The Development of Institutions Under Irrigation, pp. 128-129.

board as they have historically favored the smaller mutual company. Also the security offered by an irrigation district has generally been insufficient to create a very good market for their bonds.

### The Municipal Water Department

#### Responsibilities of municipal water departments

For the most part each city, town or village in the state attempts to supply its residents with an adequate quantity and quality of water for domestic needs. This responsibility is generally vested in a department of water supply, an agency of the municipal government.

The municipal water department is most often headed by the city engineer who has primary responsibility for maintaining the physical plant; i.e., pipe lines, storage reservoir, meters, and treatment plant.<sup>164</sup> There is generally a crew of engineers and common laborers, depending on the size of the department and the type of water works, employed to maintain and operate the system.

Policy matters associated with developing additional supplies and allocating water among users, is the responsibility of the mayor and city council. Depending on the size of the town, an administrator may be hired to manage the water department, or one councilman may be given that specific responsibility. Some cities in Utah employ a city manager, who would be responsible for administering the water department as well as other departments of city government. He may be given authority to employ

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<sup>164</sup>Hirshleifer, Water Supply, p. 176.

whatever system of allocation he feels will be most efficient, but final responsibility rests with the elected city officials.

Of the many sources of water which are utilized by Utah cities, by far the most extensive are the waters from mountain streams. The early settlements in Utah were generally situated near the mouth of a canyon so the high quality stream water could be utilized for domestic use before flowing on to other uses.<sup>165</sup> Since water rights accrue to those employing water beneficially, stream water comprises at least part of the water supply of most Utah municipalities.

Springs and artesian wells are often sources of municipal water. Deep wells, from which water is pumped from underground aquifers, are being increasingly utilized, especially along the Wasatch Front.<sup>166</sup>

As demands have increased relative to the supply of water from mountain streams, steps have been taken to utilize lower quality water from whatever source is possible. Water treatment makes the source safe, but also increases the burdens on municipal water departments.

Water for domestic use must exceed specific minimum standards, set by the State Department of Public Health. These standards have become increasingly important as population and industrial growth have expanded both the demand for water and the possibilities of pollution. At present the state requires that the dissolved solids in the water not exceed 500 milligrams per liter (mg/l).

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<sup>165</sup>Hutchins, Mutual Irrigation Companies, p. 23.

<sup>166</sup>Interview with Winegar.

To achieve this minimum standard, many municipal water departments maintain some type of treatment plant. These range from simple chlorination to a complex system of sedimentation, coagulation, filtration, aeration, softening, and disinfection.<sup>167</sup> Although most domestic water passes through some treatment, a few water supplies are sufficiently pure to meet standards without.

#### Allocating the water resource

For the most part, the allocation process employed by municipal water departments follows quite closely the typical allocating system used in our society for other consumption commodities in the market. Anyone in the system is entitled to use whatever amount of water he wants, at the established price. The efficiency of this allocation system depends primarily on the pricing mechanism employed and whether or not quantity is determinable.

Basically all municipalities in the state<sup>168</sup> use either a fixed surcharge or a block system to price domestic water.<sup>169</sup> Generally, when water is not metered a fixed surcharge system is used. With this system a set price is charged each customer regardless of the quantity used. Sometimes the size of the payment is a function of the water using facilities in the home. The significant point is that only one price is charged

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<sup>167</sup> Hirshleifer, Water Supply, p. 176.

<sup>168</sup> At least those along the Wasatch Front and it is assumed others in the state will not differ substantially.

<sup>169</sup> B. Delworth Gardner and Seth H. Schick, Factors Affecting Consumption of Household Water in Northern Utah, Utah Agricultural Experiment Station Bulletin 449, November, 1964, p. 6.

each customer; the price does not vary with the quantity used.<sup>170</sup>

The "block" or "multiple price" system requires that water be metered to each household, the customer being charged only for that quantity he uses. Generally a minimum surcharge is made to cover consumption up to a certain level with successive blocks of water above that minimum being subject to a schedule of prices, referred to as "block" or "marginal" prices.<sup>171</sup> Sometimes these marginal prices are the same for each successive block of water, but generally they diminish as the quantity of water increases.<sup>172</sup>

#### Evaluation of the municipal water department

The pricing policies of the municipal water departments<sup>173</sup> could be their greatest claim to efficiency. Unfortunately, this is not the case. The method of employing a fixed surcharge invites inefficient allocation of water. An unmetered customer will use water until its marginal value is zero, corresponding to its zero marginal cost. This is wasteful because the water department cannot provide the commodity at zero cost, and society will lose the difference between cost of delivery and the value in the use of excess units of water consumed.

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<sup>170</sup>Ibid.

<sup>171</sup>Ibid.

<sup>172</sup>Ibid., p. 7.

<sup>173</sup>Several of the institutions already discussed retail some water to households and employ the above mentioned pricing policies. However, there has been no discussion of this problem in preceding sections. This discussion will apply to all such institutions.



This method could be justified if the system were so small (and supply so abundant) that increased savings from more efficient utilization of the water were less than the cost of metering equipment necessary to determine quantities used. However, it seems that the system would need to be very small with little prospect for growth, and that the water has no economical alternative use to justify such inefficiency.

Most municipalities in Utah that employ marginal pricing, charge diminishing marginal prices on successive blocks of water used. When diminishing block pricing is used the consumer will equate marginal value to marginal cost. Such a system would not reduce efficiency if there were only one user in the system or all users consumed water in equal quantities. This situation would seldom occur. When consumers use quantities in different blocks they pay different prices on marginal units, violating the criterion of equimarginal allocation and thus reduce efficiency.

An argument sometimes made in defense of this policy is that reduced prices for larger quantities of water will encourage heavier use in the watering of lawns, building water fountains, and other community beautifying endeavors. Those who pose this argument feel the loss in efficiency is offset by increased value of property and community esteem. There is little doubt that diminishing block pricing does expand consumption, but nevertheless, is inefficient because of the reasons already discussed.

Optimum economic efficiency can be achieved if only one marginal price is set for all units of water consumed. Under such conditions the consumer will push consumption only to the point where the value of

marginal utility equals marginal cost (price). Since only one price faces all consumers, values of marginal utility are equal for all consumers and no reallocation of water can increase the total value of community utility. There is a considerable opportunity to increase efficiency by establishing a constant water price, open to all water retailing institutions of the state, but primarily in the municipal water departments. Implementation of such a policy, it would seem, would be relatively simple.<sup>174</sup>

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<sup>174</sup>Hirshleifer's Water Supply contains an excellent discussion of water rates, pp. 87-113.

## CHAPTER IV

## CONCLUSIONS

This study has attempted to evaluate the water institutions within the state upon their own merits, as provided by legal foundation, statements of intended policy, and actual practice. Focus has been on barriers to economic efficiency within individual institutions. Little has been said about the interplay and overlapping of all these institutions, collectively. While some of these institutions may be conducive to efficiency by themselves, when operating simultaneously together, the result may be extensively inefficient because of duplication of administrative structure and facilities, and possibly even conflicting objectives and practices.

Duplication of Facilities

The mutual irrigation companies have already been discussed in this context. Intracompany transactions are rather flexible while excessive barriers exist for intercompany negotiations. Consolidation of many neighboring companies should result in substantial increases in efficiency, due to the following reasons:

1. The area of transfer flexibility would be expanded.
2. Fewer and larger ditches would reduce water losses due to seepage and evaporation, land devoted to ditches would decline, and maintenance expenses would fall.

3. Larger companies could afford to employ more efficient, progressive management, and all company resources, human and capital, could be employed more intensively.

4. Fear of litigation because of adversely affecting neighboring companies through transfer policies would be greatly reduced.

The trend seems to be toward consolidation of companies, or at least, incorporation. A concerted effort should be made by state and local government officials and all interested private parties to explore the possibilities for facilitating this movement. Perhaps a detailed study which pinpoints the effect of consolidation upon the individual income of each stockholder would help to convince users of water of the desirability of such a move.

Not only agricultural uses experience this type of inefficiency. Indeed, urban water allocation often furnishes examples of duplication of effort and facilities. However, the urban problem is generally one of different types of institutions attempting to accomplish the same purpose within a metropolitan area.

The best example of duplication of facilities is Salt Lake County, but these arrangements may typify many other localities in the state as well. There is no intent here to outline specific recommendations to correct specific problems in Salt Lake City. It is hoped, however, that this discussion will help point out some serious inefficiencies that are prevalent throughout the state that need to be studied further, and may guide, to some degree, future institutional development and/or reorganization.

Within Salt Lake County there are three major water institutions that service urban users: (1) The Salt Lake City Water Department

develops, processes, and distributes water to residents of Salt Lake City and a few other users throughout the County who have been without a source of supply. (2) The Metropolitan Water District wholesales water to Salt Lake City and several other users throughout the valley. This water is finished in a large ultra-modern treatment plant, built and operated by the district. (3) The Salt Lake County Water Conservancy District supplies water to uses and users through the remainder of the County. They have developed part of their supplies and purchase the rest from the Metropolitan Water District.

In addition to these, many municipalities throughout the county--Sandy, Murray, Granger, Magna, etc.--maintain water departments. Many of them develop and treat their own water supplies and supplement those supplies, when necessary, with water purchased from the Conservancy District or Metropolitan Water District.

Also, there are approximately 10 private water companies in existence from early days in the area southeast of Salt Lake City. These are mutual companies furnishing water for domestic use to stockholders in a small area.

All in all there is a wide diversity of institutions trying to develop and distribute water in Salt Lake County. It seems reasonable to believe that inefficiency must result from such a conglomeration of institutions. Some possible reasons are:

1. Area of responsibility is often small limiting free movement of water between all users in the metropolitan area.
2. It is reasonable to believe that there would be economics of scale in water development, treatment, and allocation. This might be

due to the fact that some physical plant is necessary to handle water and administer its distribution, each of which requires personnel and insures maintenance costs which should decline as water quantity increases. In addition, specialized personnel can be hired for development, treatment, and maintenance purposes if companies are large.

The Ogden area has many of these same problems. For instance, Ogden City maintains water treatment plants. However, Since the creation of the Weber Basin Conservancy District, Ogden purchases a good share of their finished water from the District. Still at times of peak use, the city operates its treatment plant rather than purchase additional water from the District, but this means the plant is seldom used at full capacity.

A recent study of water treatment costs conducted in California,<sup>1</sup> concluded that unit construction costs decreased with increasing capacity between 1 and 300 acre feet capacity. Also, operation and maintenance costs per unit processed decreased with increasing flow capacity within the same range.

In light of this study it is difficult to see why both treatment plants must be operated. Whatever the reason, efficiency would be increased by a reduction of duplicate facilities.

Generally, the problem of duplication is not so prevalent in smaller, less populated cities and towns. In these types of towns the responsibilities for providing domestic water generally resides in only one

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<sup>1</sup>Gerald T. Orlab and Marvin R. Lindorf, "Cost of Water Treatment in California," Journal of American Water Works Association, L (January, 1958), pp. 45-55.

institution, the municipal water department. As was previously discussed, distribution of water by water departments is somewhat free from many of the inefficiencies experienced by other institutions. In some cases, cooperation with neighboring municipalities or other types of institutions in developing and distributing water supplies may result in reduction of operating costs as well as the possibility of adverse third party effects.

#### Institutional Development

An overall evaluation of the water institutional structure in Utah over time gives cause for optimism about the future of water allocation in the state. From the very beginning it seems that these institutions have been used as vehicles for permitting greater transfer flexibility.

The mutual irrigation company provides irrigators the option of transferring water within the company to the uses and points of use realizing the greatest marginal productivity of water. The municipal water department offers this same opportunity to domestic users.

Growth and development of the state have considerably enhanced the desirability of increased transfer flexibilities, and have put new demands on the water allocating institutions. It is just as important now that water be able to move freely to uses or users across the valley as it used to be for a farmer to rent water to his neighbor. To facilitate these types of transfers, institutions such as the metropolitan and conservancy districts have been established. These institutions traverse city and even county lines to add considerable flexibility to the system.

It is true that some of these institutions are less likely to be efficient than others. Also, establishment of new institutions has often

not resulted in abandonment of older, less efficient ones. This has resulted in much of the duplication already discussed. But the water users in the state have been continually attempting to achieve greater flexibility and resulting efficiency by establishment of new institutions.

Indeed, it would seem that the answer to the states water allocation problems lies in the establishment of larger more efficient institutions. However, the primary function of these larger institutions must be to create an atmosphere wherein the free market will be, in so far as possible, relied upon to allocate the water resources. This is so because of the distinct advantages of free market allocation, some of which are summarized below.

1. Flexibility. Water users would be free to transfer water between users and uses at their discretion so that the value of the marginal product of water in all uses and among users will be equal. Third party effects must not be overlooked but the parties in question should be free to negotiate a transfer that is acceptable to all.

2. Security. The proprietorship of a water right must be such that the owner will be able to determine final usage of the water. This will facilitate optimum investment in the water rights, use facilities, and management programs. If rights are sold in the market voluntarily, the market price constitutes compensation for one party giving up the right to another.

3. Marginal pricing. It is important for optimal allocation that the price of water be a function of the quantity used. Optimum efficiency requires that one marginal price be set for all units of water consumed and that that price be equal to all users, insofar as the costs associa-



ted with distribution are equal. In pushing consumption to the point where price equals value of marginal utility, all consumers will have equal values of marginal utility since they face equal prices.

The trend throughout the development of Utah's water resources has been toward increased flexibility and resulting economic efficiency. The role of institutions in this positive development has been considerable. Every encouragement should be given by the State Legislature, by the executive department of state government, by the judiciary, and by citizens alike for this trend toward efficiency to continue and even be accentuated. The entire economy of the state, and the well being of its people will thus be greatly enhanced.

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