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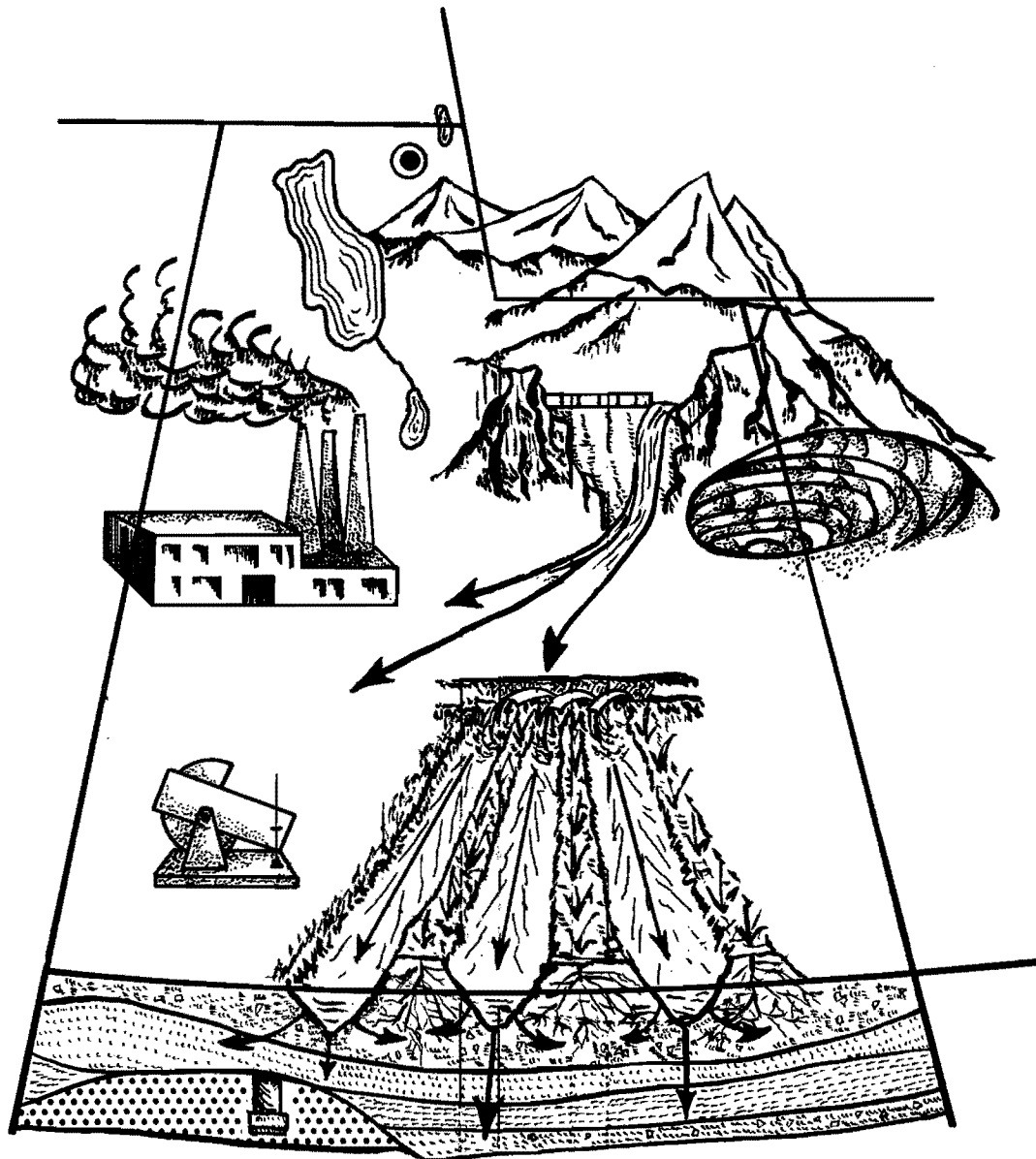
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Organizational Alternatives To Achieve Greater Uniformity In Statewide Water Rights Management In Utah

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Utah State University
Logan, Utah 84322

June 1982

WATER RESOURCES PLANNING SERIES
UWRL/P-82/03

ORGANIZATIONAL ALTERNATIVES TO ACHIEVE
GREATER UNIFORMITY IN STATEWIDE
WATER RIGHTS MANAGEMENT IN UTAH

by

Daniel H. Hoggan
Kirk R. Kimball
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ABSTRACT

In the distribution of water among users in the State of Utah there is lack of organizational uniformity. On some rivers, the state engineer is assisted by river commissioners who have been appointed to measure and monitor water deliveries. On other rivers there are no commissioners; problems and disputes must be settled on a case by case basis by the state engineer. The responsibilities, arrangements, salaries, and methods of payment for commissioners vary from basin to basin. A more unified distribution organization composed of state-employed water commissioners would have several advantages over the existing system of commissioners employed by local water users. Advantages would include the development and retention of a higher level of expertise, improved record keeping and reporting, more complete geographical coverage of river systems, and better balance of commissioner work loads. These advantages would come at a higher cost, but the impact on water users could be mitigated by dividing the cost of the system between the users and the general public in a dual financing arrangement.

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CHAPTER 1

INTRODUCTION

Problem Description

The role of the State Engineer is to oversee the appropriation, transfer, and distribution of water. As individual right holders seek entitlements from a common transient system, the State Engineer, in his capacity as a quasi-judicial officer serves as a referee. He assures that individual rights maintain their relative standings and that water is distributed according to these rights.

The organizational arrangements to administer the distribution of water have evolved over time and generally as an outgrowth of disputes among users of a common supply. The resolution of conflicts has often led to organizational arrangements with operating authorities tailored to prevent the reoccurrence of past distributional problems. Thus, management practices grew over time more out of responses to localized problems rather than from a thoughtfully conceived central framework. Different problems led to different arrangements in different parts of the state. Consequently, in the distribution of water among users there is lack of organizational uniformity.

On some rivers, the State Engineer is assisted by river commissioners who have been appointed to measure and monitor water deliveries. On other rivers, there are no commissioners; problems and disputes must be settled on a case by case basis by the State Engineer.

Ordinarily, river commissioners are selected by the water users and approved by the State Engineer. However, courts have sometimes appointed commissioners as a result of water rights litigation. The responsibilities, arrangements, salaries, and methods of payment vary from basin to basin. River commissioners in some basins are funded directly by the water user organizations. In most basins, users pay annual fees into a trust fund administered by the Office of the State Engineer for the purpose of paying the river commissioners. Many river commissioners have responsibility only for surface water, some have responsibility only for groundwater, and a few have responsibility for both.

The diversity of administrative arrangements among river basins in the state may or may not be justified. Streams without a river commissioner often lack records of priorities and established operating rules which lead to disagreements and difficulties during droughts and other emergencies. The question is: Would a more uniform statewide system for monitoring the water distribution function reduce inefficiencies and provide increased benefits to water users and the public in general?

Research Objectives

The overall objective of this study is to analyze the organizational framework for distributing water in Utah through: 1) analysis of Utah's administrative system, 2) comparison of the Utah approach to that of other

selected states, and 3) identification of modifications in Utah's administrative or operating structure that would improve or perfect the distribution function.

Scope

Although the concepts of conjunctive use of groundwater and surface

water and integrated water quality-water quantity management are topics of current interest, they are not within the scope of this study. This study deals with the organizational aspects of the distribution function under the current administrative arrangements; i.e., with groundwater generally handled separately from surface water and water quality regulated by a different agency than water quantity.

CHAPTER 2

UTAH FRAMEWORK FOR ADMINISTERING

THE DISTRIBUTION FUNCTION

Organization

The State Engineer, as administrator of the Division of Water Rights, has responsibility for the administration of groundwater and surface water rights. His office is divided into a headquarters office with four operational sections--appropriation, adjudication, water management distribution, and dam safety. Seven area offices are located throughout the state (Figure 1), each one organized with the same four operational sections.

Functional Organization

Applications to appropriate new water are processed by the Appropriation Section of the Division of Water Rights. To facilitate review, an appropriation policy is established for each area of the state based upon the availability of water. Each application is carefully analyzed for adverse impacts on existing users. Where hydrologic impacts cannot be predicted with reasonable certainty, approval is held until better information becomes available.

Since there is little unappropriated water available in the state, most applications currently are for a change of use.

Utah has a statutory procedure for the adjudication of existing surface or groundwater rights. Statutory adjudication can be initiated by the State Engineer upon petition of water users; or the court can, in litigation

involving water rights, order a general adjudication.

The Adjudication Section assists the district courts in collecting, compiling, analyzing, and evaluating claims to the use of water. A statement of claim is taken from each water user and checked with compiled data. The State Engineer then prepares a "proposed determination of water rights" and provides a copy to each water user and the district court. Water users who are dissatisfied with the Division's proposed determination may file a protest. After all protests have been heard and resolved, the court signs the amended Proposed Determination of Water Rights into an Interlocutory Decree. The decree sets out all the water rights so that individual entitlements are specified and their relationship to all other rights can be seen.

The Dam Safety Section of the Division is responsible for reviewing plans and specifications on new dams as well as performing regular inspections on existing dams.

The Distribution Section, which is the primary focus of this report, supervises the distribution of water according to adjudicated and decreed rights in the 34 state groundwater and river systems supervised by a commissioner and handles distribution problems as they arise in other areas.

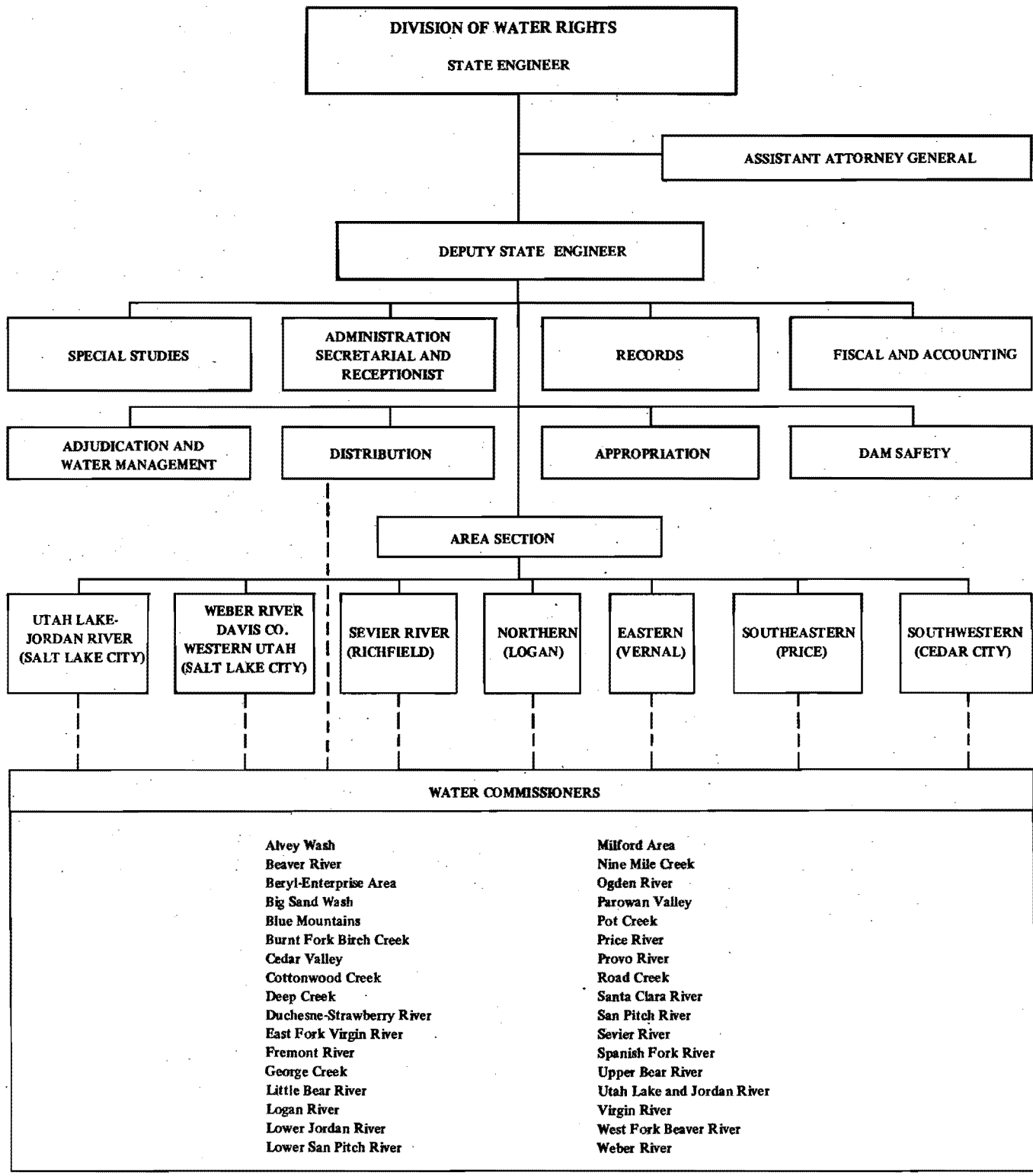


Figure 1. Organization chart of the Utah Division of Water Rights.

Geographic Organization

Utah is divided into seven geographic regions for water rights administrative purposes as indicated in Figure 1. The geographical boundaries of these areas are shown in Figure 2. The area offices, each supervised by an area engineer, are located in Salt Lake City (two offices), Logan, Vernal, Cedar City, Richfield, and Price. Most of the work of the Division of Water Rights is accomplished via the area engineers with supervision and technical assistance from the State Engineer and his headquarters staff. Each area office has essentially the same organizational structure as the headquarters office. Each has the four operational functions of adjudication and water management, distribution, appropriation, and dam safety.

Water Commissioners

To assure proper distribution of existing water supplies, the State Engineer, after consulting with affected water users, has the authority to appoint a water commissioner to distribute the water among the various users according to their decreed rights. The salary and expenses of the commissioner are paid by the water users on a pro rata basis according to the quantity of water used, the acreage of land which is supplied water, or a formula combining the two. To assure an accurate apportionment of the water, the State Engineer may require users to install appropriate measuring devices and control structures.

The State Engineer also administers groundwater basins through the appointment of water commissioners, and determines if the supply is adequate to meet existing rights. He may stop further appropriation in basins where mining of groundwater is occurring or can be expected to occur with additional development. Basins that are closed to filing of applications are shown in Figure 3.

Water commissioners who have been appointed to supervise the distribution of water within a river or groundwater system constitute an additional subdivision of the State Engineer's organization. These commissioners, though not direct employees of the Division of Water Rights, measure and monitor water deliveries in accordance with State Engineer directives.

Canal companies established during the early settlement period of Utah history employed "ditch riders," to distribute water. Initially, with only a few companies involved on a water course, conflict was insignificant. However, as development proceeded, numerous new companies were formed and conflict emerged. After 1901, when the State Engineer was given authority for general supervision of water distribution, conflicts were brought to him for resolution. Difficulties in resolving all the conflicts centrally led to the enactment of legislation (Utah Code 73-5-1) in 1919 which gave the State Engineer authority to appoint and supervise water commissioners.

Commissioners are appointed in river basins where water distribution tends to be complex and cooperative operation among interested parties is difficult to sustain under all circumstances. Desisions to establish commissioners results more from the need for conflict resolution than according to some carefully conceived statewide plan. Furthermore, the experience, qualifications, responsibilities, and salaries of water commissioners vary from basin to basin. It is not uncommon for a local resident with no training or experience in water management to be employed by the local users. Low salaries limit the quality of help that can be employed. The time commitment of commissioners varies from basin to basin. Most of the commissioners work only during the summer irrigation season. On few major rivers having winter water rights to be distributed,

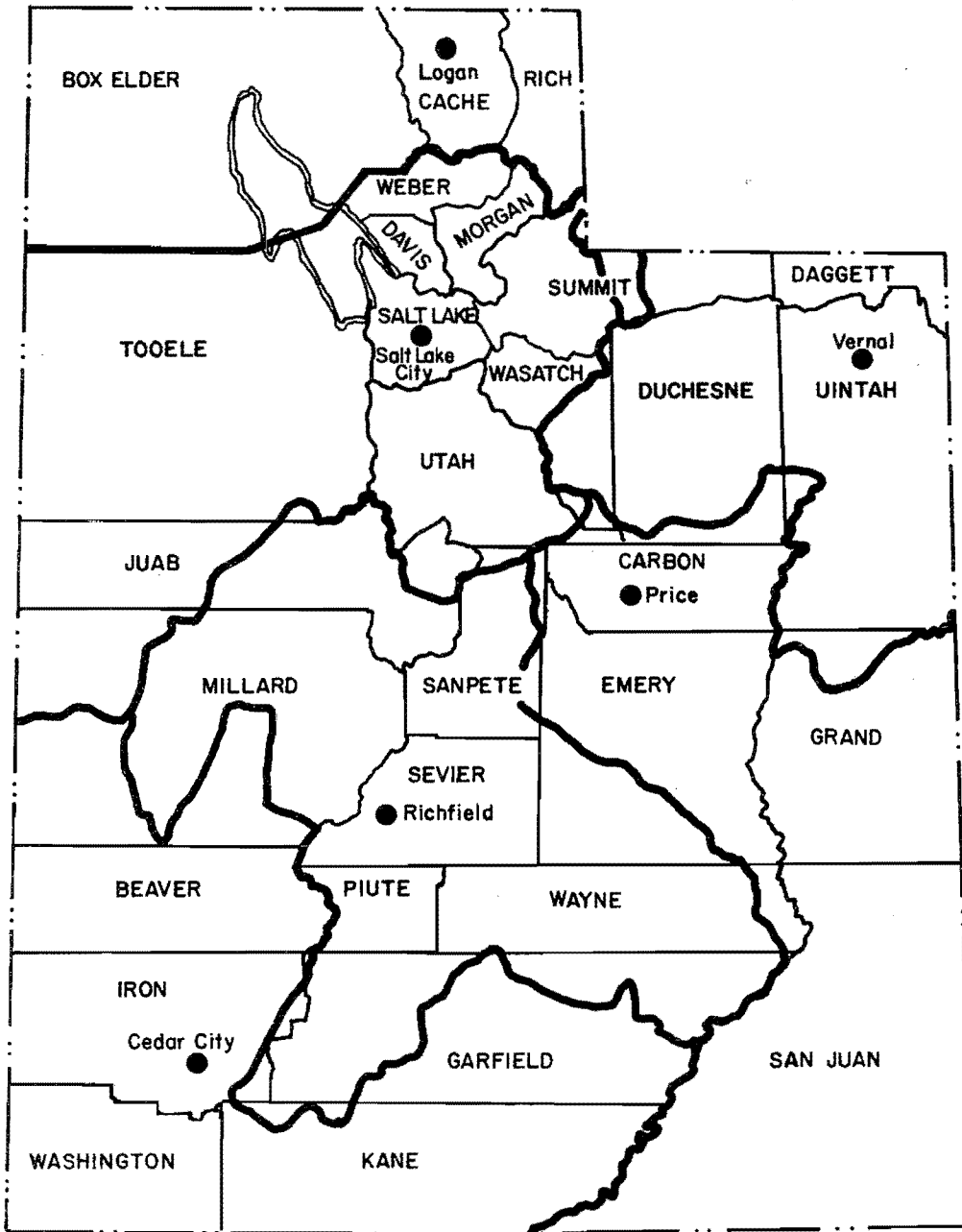


Figure 2. Administrative areas and location of area offices under the Division of Water Rights.

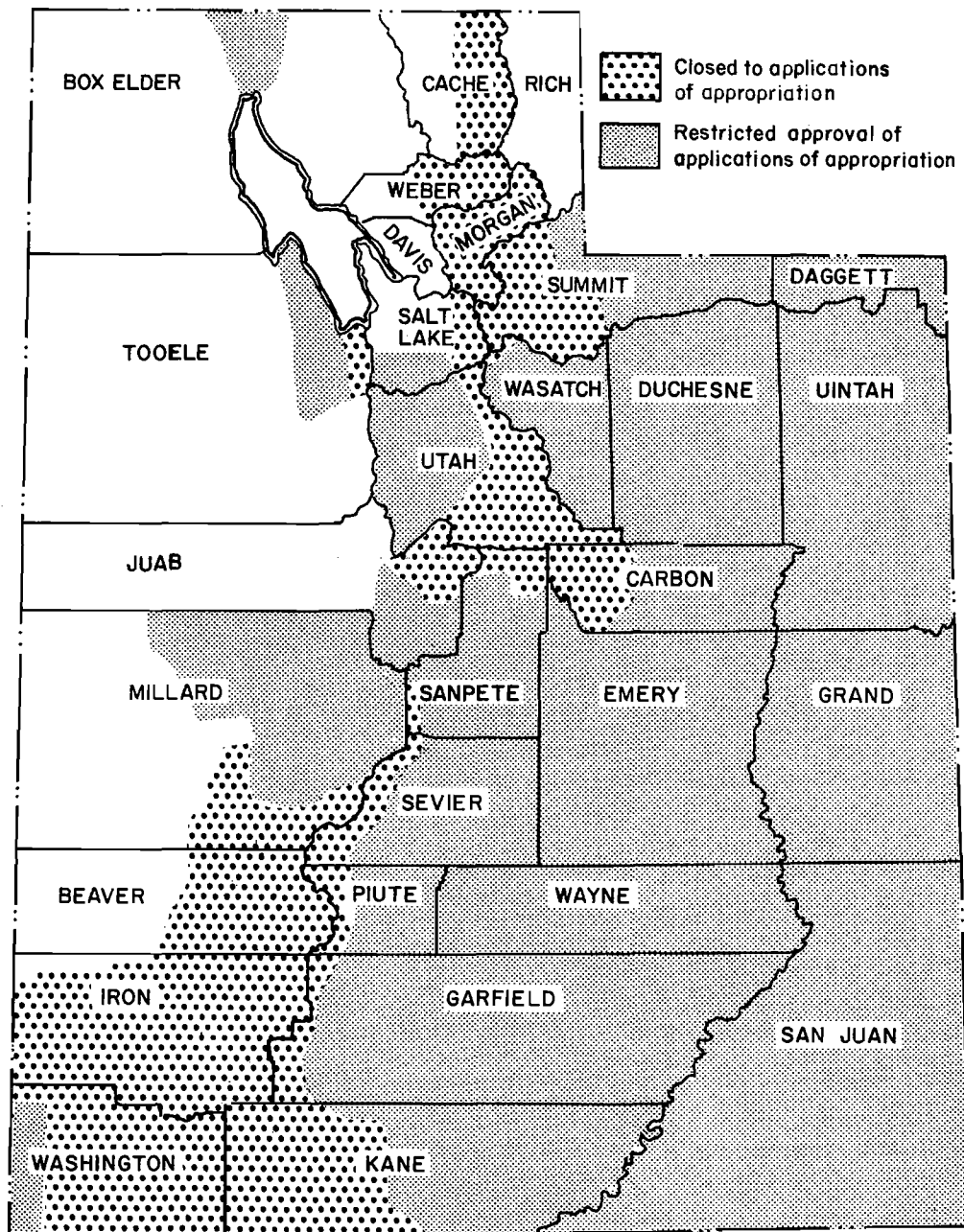


Figure 3. Areas in Utah closed to groundwater appropriation and areas with restrictions on appropriation.

the commissioners work through the entire year.

The statutes state that it is a commissioner's duty to distribute the water to the right holders. A commissioner has little discretionary authority. He must distribute water according to decree, and on questions of interpretation he consults with the State Engineer or his representative. He may arrest any person violating provisions of the water law and turn that person over to the county sheriff.

The State Engineer appoints a water commissioner after consultation with water users in a particular river basin. Selection of a commissioner, the duties he will perform, and the compensation he will receive are determined by majority rule of the water users unless the majority cannot agree. Then, the State Engineer has the authority to make these determinations. In practice, these administrative matters are taken care of in an annual water user's meeting in which a State Engineer representative is present. Not all water users are invited to these meetings, rather they are represented by an elected distribution committee. These committees are not established uniformly; in some basins the committee is composed of a representative from each canal company, in others the users select a few members at large to represent them.

Although local water user groups enjoy considerable autonomy in the appointment of commissioners and the assignment of their duties, the rule making authority of the State Engineer serves to temper this. In Section 73-2-1, he is given "the power to make and publish such rules and regulations as may be necessary from time to time to fully carry out the duties of his office, and particularly to secure the equitable and fair apportionment and distribution of the water according to the respective rights of appropriators." Thus, there is sufficient legal basis for the State Engineer to establish

performance standards for commissioners, including requirements for data acquisition and reporting.

The salary and expenses of commissioners, which are set by the distribution committees, are borne pro rata by the water users served. The cost sharing in most river basins is on the basis of the preceding year's water use; the total amount of water allocated in the preceding year is divided into the total amount of money budgeted for the current year to obtain a per acre-foot cost. This cost per acre-foot is multiplied by the number of acre-feet used by each water user in the preceding year to determine the assessment for that user. Per acre-foot costs for each river system using this basis for allocation are shown in Table 1. As indicated in Table 1, a few basins use land acreage and other bases for allocating costs.

The Division of Water Rights provides an accounting service to the water users for water commissioner budgets and assessments. The Division prepares the budgets and assessments, makes the collections, pays the commissioner salaries, and prepares an annual financial report for each commissioner operation. This service is provided without charge to the water users. Paying for this service out of general state revenues is justified by the State Engineer as a payment for social benefits accruing to the public from commissioners services.

The primary purpose of appointing a water commissioner is to assist in carrying out court decrees. A commissioner has the authority and the duty to distribute water to the various water users according to the amounts to which each is entitled. He is an arm of the State Engineer in enforcing and protecting water rights.

The Division of Water Rights provides the commissioners each year

Table 1. 1980 budget and prorated assessment.

	1980 Budget	Total ac-ft 1979	Assessment \$/ac-ft (Surface Water)	Assessment \$/ac-ft (Ground- water)	Miles Travelled Annually
Alvey Wash	600				1,000
Beaver River	9,512	b			10,000
Burnt Fork	540				-
West Fork Beaver Creek	370	b			-
Beryl-Enterprise	3,000	87,371 ^a		.034	3,000
Cedar Valley	3,989	44,858	.089		
	3,141	26,004 ^a		.121	3,500
Cottonwood Creek	7,299	56,517 ^g	.128		3,000
Deep Creek	4,265	5,367	.795		4,167
Duchesne River	14,665	264,594	.055		10,000
East Fork Virgin River	828	b			1,250
Fremont River ^c	3,073	16,024	.192		
	542	6,669	.081		5,000
Little Bear River	1,265	55,538	.023		-
Lower Jordan River	5,261	b			7,600
Logan River	5,131	b			3,000
Lower San Pitch River	4,050 ^d				
	4,050	189,493	.021		10,000
Milford	3,544	47,552 ^a		.075	1,500
Ogden River	10,176	f			3,850
Parowan Valley	4,776	29,048	.164		625
Pot Creek	e				-
Price River	12,625	77,078	.164		14,651
Provo River	28,000	b			8,871
San Pitch River	4,800	38,389	.125		2,833
Santa Clara Creek	6,702	b			12,333
Sevier River	56,900	f			43,333
Spanish Fork River	21,000	122,978	.171		12,423
Upper Bear River	5,000	f			-
Utah Lake-Jordan River	34,562	283,254	.12		7,500
Virgin River	2,600	b			4,000
Weber River	42,210	450,226	.09		23,303
George Creek	1,520	2,980	.51		-
Total					

^aVolume pumped.

^bAssessment not based on ac-ft delivered.

^cGroup A and Group B

^dAssessment based 50% on land acreage and 50% on ac-ft diverted

^eNo assessment in 1980.

^fAssessment divided among different classes of users

^gEstimated ac-ft used

with the distribution data according to water rights, and in turn each water commissioner submits to the State Engineer periodic reports on water deliveries and an annual report. The annual reports vary considerably in scope and detail. At one time, written instructions and format for the reports were provided to the commissioners by

the Division of Water Rights, but this practice was discontinued several years ago. Reporting requirements are conveyed to commissioners verbally now. On the larger, more complex systems, commissioners are required to report daily water deliveries every two weeks. On small systems, weekly deliveries are required to be reported.

CHAPTER 3

COMPARISON OF DISTRIBUTION ARRANGEMENTS

IN SELECTED STATES

The organizations for water distribution in three neighboring states--Wyoming, Colorado, and Idaho--were examined and compared to Utah's distribution arrangements.

Wyoming

The water rights laws in Wyoming are in many respects similar to those in Utah. A Board of Control composed of the State Engineer, as president, and four superintendents of geographical water divisions, supervise the appropriation, distribution, and diversion of the waters of the state. By law the board's power was later extended to include groundwater as well as surface water.

Water rights in Wyoming can only be acquired by permit. This permit is obtained through the State Engineer who has general supervision of all water in the state. The water right is attached to a specific parcel of real estate and cannot be transferred except under certain specified conditions and with approval either of the Board of Control or of the state engineer.

The superintendents of each water division and the state engineer are appointed by the governor but must first qualify by examination on knowledge of water laws and technical expertise. It is the duty of each superintendent to regulate and control the storage and use of water under all rights of appropriation, whether adjudicated or not, including the water used under permits

approved by the state engineer. He also has control over the water commissioners of the several districts within his division.

The Board of Control has the responsibility to divide each of its four divisions into districts, with each district to be so constituted to administer water rights as economically as possible. The governor appoints a water commissioner for each district so formed. Some of the commissioners are county employees, and some are employed by the state. In the case of those employed by the county, the superintendent, with the advice and approval of the county commissioners, recommends to the governor candidates for water commissioners. Such water commissioners are part time employees and paid by the county from property tax revenue. The commissioners employed by the state are full time employees known as hydrographer-commissioners. These commissioners are appointed by the governor upon the recommendation of the state engineer, with the approval of the division superintendent, and are paid from state funds.

It is the duty of a water commissioner to divide, regulate, and control the use of the water from all streams within his district so as to prevent waste or water use in excess of the appropriated right. A commissioner can also regulate the filling of reservoirs when water is available and when water rights to storage have been established. He must interpret the priority schedule

and divide the stream among the various water right holders. During drought he regulates the flow from reservoirs and the division of water among multiple users including incorporated ditch companies. He has the power to arrest violators of the water laws and to turn them over to the county sheriff and to make complaints before the local justice of the peace.

The Board of Control has jurisdiction over groundwater, but the water commissioners have no authority to regulate wells. Instead of using the commissioners for this purpose, each division has an advisory committee on groundwater.

Colorado

Water administration in Colorado is different from some other western states because water rights are not granted under a permit system. Instead the water is "appropriated" by the user who then deals with the courts in the determination and assignment of priority. The state engineer's function is to regulate the headgates and apportion the available water after the rights have been decreed. Colorado statutes charge the state engineer with general supervisory control over measurement, record keeping, and distribution of the public waters of the state. Public waters include both surface and groundwater, and the legislature has made it clear that conjunctive use is to be emphasized. A 12-member groundwater commission, whose membership includes the state engineer, has primary responsibility and authority for administering groundwater water rights.

Headgate regulation and record keeping by water commissioners began in Colorado in about 1881. In the beginning the district courts had jurisdiction in these matters but since 1969, the state has been divided into seven water divisions which follow natural hydrologic boundaries. A water court has been established for each

division. Division engineers employed by the state have authority to establish field offices wherever needed within their divisions and to appoint a water commissioner for each of these offices. The commissioners' salaries and expenses are paid from state general funds. In 1971 there were 130 water commissioners functioning in the state to distribute water to 6529 active ditches. Currently, every major river in the state has a water commissioner that distributes water and keeps daily records. Daily information is transmitted to the state engineer's office and recorded in a computerized data system; thus, there is a complete daily record of diversions available through the computer. Ditch records, which go back to 1881, are in process of being entered in the computer data system. Recent records have been placed in standard summary form under the direction of the state engineer.

Idaho

General administrative supervision of the waters of the State of Idaho is vested in the director of the Department of Water Resources. Appropriations of water must be initiated by filing an application with the director and receiving his approval.

Among his duties, the director has the responsibility of distributing water from all of the streams in the state according to the doctrine of prior appropriation. For administrative purposes, the state is divided into three water divisions by statute, and the Department of Water Resources is authorized to further subdivide the state into water districts. A statutory procedure provides for the selection and compensation of watermasters (similar to water commissioners in Utah) who distribute the water in each district according to priority of rights.

The director also has authority to administer groundwater use in the state. He may require that measuring devices

and control structures be installed on wells and use them to administer groundwater rights within the available supply. He has the power to make an administrative determination resolving conflicting claims between surface and groundwater users.

Watermasters are nominated by the water users of each district at an annual meeting. They are formally appointed by the director of the Department of Water Resources and submit reports to the department. The amount of compensation is fixed by the users. Watermaster's duties are to determine decrees, regulate streamflow, and transfer the water of decreed rights to appropriate diversion points.

Some water districts appoint an advisory committee of representative water users to assist the watermaster. Such committees have no authority except to offer advice and may not direct the watermaster in his duties or interfere with department supervision.

Compensation of watermasters and their assistants is assessed as a charge against the land of the users. A bill for the services performed by the watermaster and his assistants is presented at a regular meeting of the board of county commissioners. The county commissioners authorize payment from the current expense fund of the county and add the amounts charged to the taxes on the users' land and ditches to be collected along with other taxes. An alternate plan for collecting funds for the compensation and expenses of watermasters is provided under the law. Water users may authorize the watermaster to collect his compensation and expenses directly from the water users and withhold water deliveries from those users who do not pay their pro rata share of the cost. The pro-rated share is based on a 3-year cost/acre-foot average of diversions. The first billing, in March of each year, is based upon the average of the three previous years. At the end of each

year, these figures are adjusted according to actual diversions and any corrections are applied to the following years balance.

Where there is an organized group of water users such as a canal company, assessments are generally collected directly from the canal company. In District 1, located in the Upper Snake River Valley, numerous large canal companies pay directly 90 percent of the assessments to support watermasters.

Summary Comparison of Commissioner Arrangements

Comparison of the organizational arrangements for distribution in Utah and the three neighboring states of Colorado, Idaho, and Wyoming indicates that there are a number of similarities. The powers and duties of water commissioners are essentially the same. All have responsibility for distributing water according to rights determined by the courts and under the direction of the State Engineer or equivalent administrative official in each state. With a few exceptions, the commissioners duties are limited to surface water distribution. Local input to operating policy is generally unstructured and informal; however, user groups and county commissioners (in Wyoming) provide counsel and advice. Qualifications for employment tend to be unspecified with an emphasis placed on experience in water measurement and control in the hiring and advancement of commissioners. Graduate engineers are employed on the larger, more complex river systems.

The greatest differences in organization and mode of operation for water distribution among the four states exist in the areas of financing, data acquisition, and record keeping. Utah is the only one of the four that relies entirely on user assessments to fund its commissioners. Idaho employs user assessments and county property taxes;

Table 2. Summary comparison of commissioner arrangements.

	UTAH	COLORADO	IDAHO	WYOMING
Authority/Powers Accountability	An arm of the court and the State Engineer in the distribution of water and in enforcing and protecting user rights. Appointed by the State Engineer upon recommendation of interested water users. Receives direction from State and Area Offices of State Engineer. State Engineer may remove for cause. Users may initiate action to remove for cause by petitioning District Court. No authority or responsibility for groundwater unless specified by the State Engineer and/or District Court.	Water Commissioners selected and employed through the State Civil Service Commission, and responsible to a Division Office of the State Engineer. Function is to distribute water according to court determination under supervision of the Division Office.	Duties statutorily defined as administering decrees, regulating flows and transfers to appropriate diversion points. Selected by water users of each District and appointed by State Engineer. User groups may not interfere with State Engineer Supervision. State Engineer may remove for cause.	Graded positions under state classification. Hydrographer-Commissioners appointed by Governor and supervised by a water "Board of Control." Operates in an assigned District with duty to divide, regulate, and control use of all water from all streams. No authority over wells and groundwater. Regulates filling of reservoirs. Receives direction from a Division Superintendent in Office of State Engineer. Commissioners serve under Superintendent or Hydrographer-Commissioner and may be full or part time. Gage readers may assist Commissioners.
Financing/Assessment Mode	User Committee negotiates salary or fee to be paid from water user assessments. State Engineer employs in non-classified position or contracts for services, collects user assessments, disburses salary and contract payments.	Salaries and expenses paid from state general funds as part of State Engineer appropriation. No user assessments.	User groups set salary. Watermasters locally paid from: (1) taxes collected by County from water users on a pro rata basis. Compensation through County; (2) Watermaster compensated directly from water user assessments with costs distributed on pro rata basis.	Hydrographer-Commissioners are regular state employees and compensated from general fund. Full and part time commissioners and gage readers compensated from county property tax revenues with remuneration negotiated with County Commissioners.
Local Input/Voice in Operating Policy	Unstructured and ad hoc. User annual meetings provide forum for rehearsing operating problems/interpretations with State Engineer and Commissioner.	Water user associations meet informally with commissioners to work out exchanges and other operating arrangements.	Most Districts appoint an advisory committee to watermaster. Committee function is to counsel and advise. No authority to direct duties. However, committees may exert substantial influence on operating policy.	County Commissioners submit recommendations to State Engineer for concurrence. Water user recommendations/objections may be voiced to County Commissioners.
Requirements/Standards for Data Collection and Reporting	No rigid standards for measurement, recording, and reporting. Periodic reports of deliveries confirming distribution in accordance with decrees are required. Wide variation in quality and quantity of information and data submitted in Commissioner reports.	Daily records kept and transmitted to the State Engineer for inclusion in computerized data system. Data and information placed in standard summary format as prescribed by State Engineer.	Variable with complexity of river system distribution and whether operation is computerized. Computerized distribution systems require daily measurements, telemetered data, and decreed distributional orders. Water master reports annually in standard format the volumes of water used by each water user.	State Engineer requires report from all Commissioners. Hydrographer-Commissioner submits annual report to proper Division Superintendent for compilation into state record.
Employee Qualifications	No set standards for competency but credentials must generally match job complexity. Mostly part year and part time positions. No merit incentives or standard state fringe benefit package.	High school education with experience in water diversion work required. Senior commissioner in each district is full time; junior commissioners or assistants are part time.	No specified qualifications. Education and training generally matched to particular job need. State Engineer may reject if deemed unqualified.	Hydrographer-Commissioner is state civil service employee and must have background of education and experience in water measurement. County employees temporary and part time with qualifications not specified.

Wyoming uses county property taxes and state general funds; and Colorado draws from state general funds exclusively for this purpose. Colorado appears to have the most detailed and sophisticated data acquisition and recordkeeping system with more than 100 commissioners recording and transmitting daily measurements to a computerized data system.

However, Idaho's computerized system on the Upper Snake River is also a highly advanced system. Data acquisition and record keeping otherwise tend to be less formal and vary greatly with the size and complexity of the distribution system. Annual reports of the commissioners to the state engineer are commonly required.

CHAPTER 4

ALTERNATIVES FOR ACHIEVING GREATER UNIFORMITY IN ADMINISTERING DISTRIBUTION

Organizational Support

Standardization or unification of water distribution management in the various river systems in the state may require expanded governmental support. Organizational support currently comes from the Office of the State Engineer. This office provides enforcement for the river commissioner actions, monitors the record keeping and other activities of commissioners, provides accounting services and guidance in the financing of commissioner operations, and provides information concerning the distribution of the water rights among various users. Two alternatives to the current organizational arrangement for river commissioners are considered in this study. One is out-of-house service contracts, and the other is in-house modifications to the State Engineers organization.

Distributional Service Contracts

In lieu of expanding the state engineer's staff to achieve more uniformity and effectiveness in the distribution function, one possibility is to contract with outside entities such as consulting engineer firms and water districts for these services. Some consulting firms have already been utilized to perform river commissioner functions. Greater use of consulting firms would be a possible alternative.

There also are numerous water service agencies authorized under state law that could be considered

for service contracts, two directed toward the needs of incorporated communities are:

1. The Metropolitan Water District
2. The Municipal Improvement District

Since these types of districts serve only municipal water needs in a restricted geographic area, they would not seem appropriate for local administration of a statewide distribution system. Agencies designed to meet the needs of countywide or subcountywide areas include:

1. The Irrigation District
2. The Water Improvement District
3. The Special Service District
4. The Water Conservancy District

Of these agencies, the irrigation district has the most limited jurisdiction and function. It is designed to provide irrigation water to specified parcels of land. Although the law might be broad enough to provide for other uses, the clear intent of the enabling legislation is to provide irrigation water supply. Thus, it, too, would seem inappropriate to provide organizational support for a unified distribution system providing water for a wide range of uses.

The Water Improvement District and Special Service District are similar adjuncts of county government. They differ in that a Water Improvement District must provide its service to all requesting users within contiguous boundaries while a Special Service District may omit service to areas within its boundaries. The latter has been called a "Swiss Cheese District" because of this feature. The Water Improvement District generally provides a potable water supply to the unincorporated areas and sewer services to both the unincorporated and incorporated areas of a county. The Special Service District generally has the same relationship to the county as does the Water Improvement District, but the provision to omit services allows it to exempt cities or other areas which do not or cannot participate in the service offered.

The Special Service Districts are of rather recent origin so there is no long term experience with this form of organization. Although it may be theoretically possible to utilize this organizational form to support a unified distribution system, the fact that only one water service district exists in the state may rule it out. It would not seem practical to establish a large number of additional districts solely for water distribution.

Another organizational alternative for support of a unified distribution system might be Water Conservancy Districts (WCDs). The WCD, originally intended as a local repayment organization for federal reclamation projects, has been given broad powers to achieve an equally broad mandate. Moreover, state water development projects have been turning in increasing numbers to WCDs for support. As a consequence, most counties now have a WCD, and these might serve as water distribution agents similar to the function now provided by water commissioners.

The existing water conservancy districts provide a distribution function for their members. That is, the WCD distributes the water it receives under its own water right to member users. While the State Engineer officially considers the WCD only as another water right holder, the WCD does in fact perform a distribution function similar to that of the State Engineer or his water commissioner, for users under its jurisdiction. A distribution service contract would be quite complementary to the measurement and monitoring activities already undertaken by a number of the larger WCDs. Consequently there could be scale economies in this combination.

There are important drawbacks to the use of the Water Conservancy District for support of a unified distribution system:

1. River system boundaries do not coincide with county district boundaries. Some of the larger rivers, like the Sevier, pass through several counties, and coordination of distribution among county districts in such a situation could pose a problem.

2. Some modification of WCD law may be necessary to permit the district to engage in the provision of technical or managerial services.

3. Nondistrict water right holders may view a district as having a conflict of interest in the distribution of water to both members and nonmembers of the district.

Although consulting engineering firms and some forms of water districts might be utilized to perform the distribution function under contract to the state engineer, because of the numerous entities that probably would be involved statewide, uniformity may not be enhanced as much as it would under an in-house modification of the State Engineer's organization.

In-House Modifications of the State Engineer's Organization

The employment of water commissioners in-house as state civil servants under the State Engineer is an organizational alternative that has been adopted by Colorado and Wyoming and merits considerations in Utah. An organization of state-employed commissioners might take one of several forms. The number of commissioners employed, their duties, method of appointment, annual employment periods, the organizational hierarchy, geographical coverage, financing arrangements, and other matters would need to be considered. The change to a system of state-employed commissioners could be minimal or substantial depending on the precise form of organization to be adopted. It is not within the scope of this study to evaluate in detail all possible organizational variations; however, a number of options will be discussed.

A minimal change could be envisioned if the state merely took over the function of employing the water commissioners and kept them as they are now assigned. That is, the number of commissioners would remain essentially the same, as would the groundwater and surface water systems they supervise.

Improved quality of performance

In lieu of each water user group employing a commissioner, resulting in a wide variation of qualifications, responsibilities, and salaries; employment of all commissioners by the Division of Water Rights and compensation of commissioners according to state government salary schedules would improve consistency. Standardization of water measurements and record keeping statewide would be facilitated. In the Division of Water Rights organizational hierarchy, the formal line of authority would not change. Each commissioner would be directed in his responsibilities by an area engineer with staff support from the central

office distribution section. A committee of water users in each basin, similar to the distribution committees, could be elected or appointed to advise the area engineer on distribution matters.

More uniform and workable financial base

The costs of maintaining the water commissioners could come from state general tax revenues, from water user fees, or from a combination of the two. In Utah, water user assessments are used for this purpose, but in some states such as Colorado the water distribution organization is financed entirely from general tax revenues. Distributional equity of the benefits and the tax burden is a key issue. The fact that every citizen is a water user of one kind or another is justification for some if not all support of this function from general tax monies. The improvement in water management resulting from a more unified, efficient system would constitute a substantial benefit to all citizens. Although agricultural uses may be the primary beneficiaries in most systems, municipalities are also served. Since there are direct benefits to identifiable water users of each system in the form of more secure rights and resolution of conflicts, a combination of user fees and general tax revenues may be most equitable.

The functions of appropriation, adjudication, and dam safety carried out in area offices of the Division of Water Rights may be scheduled to use state-employed commissioners during off-season periods. The utilization of commissioners in these other activities would further justify payment of a portion of their salaries from general funds rather than all from user fees.

The additional cost to general state funds would depend on the policies adopted for record keeping, salary increases, off-season employment of commissioners, training programs, and so

forth. Some changes may tend to reduce costs while others result in increases. For example, the consolidation of some river systems under fewer commissioners may reduce costs. The addition of rivers or groundwater basins not now governed by commissioners would increase costs.

Since the Division of Water Rights, as a service to the water users, is already preparing water commissioner budgets, determining and collecting water user assessments, and paying commissioner salaries; it would appear to be a relatively easy transition to convert to state user fees to partially support state-employed commissioners. On the other hand, collection of assessments has been a problem under the existing system. According to state officials, there have been some delinquent payments in every distribution system every year requiring action by the State Engineer and the Assistant Attorney General. This problem could be expected to continue unless a different method for collecting user fees were implemented. The utilization of tax collecting machinery already existing in other units of government outside of the Division of Water Rights is an alternative that should be considered.

Some water assessments are already collected through county property taxes. For example, the Water Conservancy Act (Utah Code, 73-9-15) provides for raising revenues for water conservancy districts through county property tax levies. Different types of water users including municipalities, irrigation districts and private entities, are taxed according to appropriate methods classified respectively as Class B, C, and D.

Although the practice has been discontinued, the counties at one time collected a state property tax in the form of a mill levy. Thus, it would seem that the administrative machinery is available to collect state user fees to support water commissioners if the

legislature were inclined to adopt such an approach.

If a dual financing arrangement is used, the appropriate division of commissioner financial support between user fees and general revenues would have to be determined. One possibility would be to continue user assessments in total at approximately the current level and to pay for additional costs of the new arrangement from general funds.

Even if the total amount of water user financial support for commissioners in the state were to be maintained under a new system, the charges to water user groups could be made more uniform. Currently, the cost per acre-foot of water delivered varies widely among river basins even though all of the assessments cover the same basic commissioner expenses--salaries, overhead, and travel. For the river basins that base their assessments on the total acre-feet of water delivered annually, the assessment in dollars per acre-foot varied from \$.02 to \$.80 in 1979 (see Table 1). Since volumes of water delivered vary from year to year, assessment rates also vary.

Examination of 1979 assessments reveals that the variation is not significantly related to the volume of water delivered or to the number of miles travelled by a commissioner, which might be expected to reflect the size and complexity of a river system. Figures 4 and 5 are scatter diagrams of these two relationships. Another factor which adds to the complexity of a water commissioner's job is the number and size of the storage reservoirs. Comparison of the assessment rates for basins with storage reservoirs vs those for basins without revealed that storage is not significantly related to assessment rates either. Since these three variables are the system characteristics most likely to affect management cost, it is reasonable to conclude that the variation is due more to differences in the ways the user groups are organized.

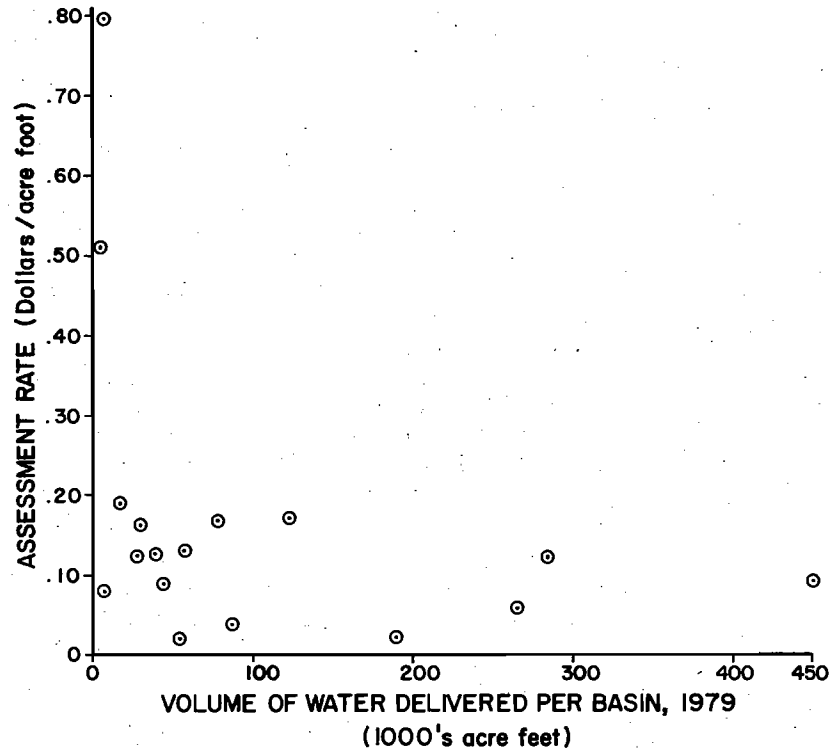


Figure 4. Scatter diagram of volume of water delivered per basin versus assessment rate.

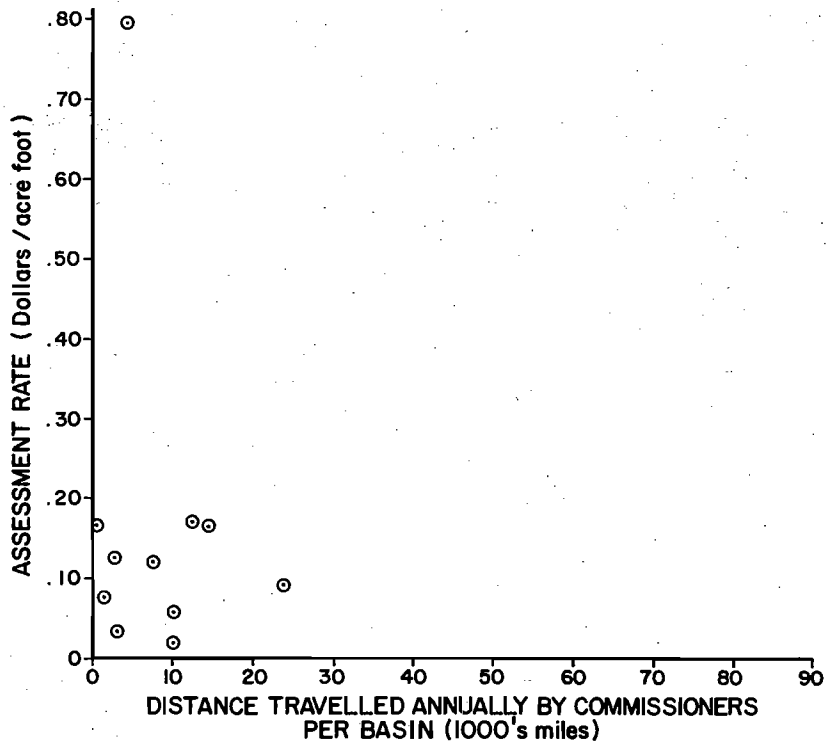


Figure 5. Scatter diagram of distance travelled annually by commissioners versus assessment rate.

For example, the availability of retired individuals and others who are willing to work at low pay and on a part time basis can have a significant effect on the salary requirements in the smaller basins. The two systems in Table 1 with the highest assessment rates--Deep Creek and George Creek are both small, isolated systems. The inavailability of local personnel to serve as commissioners is reportedly a key factor in the higher costs.

One way to allocate the total state budget for distribution uniformly among the river basins, would be to use the same assessment per acre-foot of water delivered in all basins of the state. This could be achieved by using the following formula:

$$B_B = \frac{V_B B_S}{V_S} (1 + I) \quad (1)$$

where

B_B = current budget or cost allocation for the basin

B_S = total distribution system budget for the state in the previous year

V_B = volume of water delivered in basin in the previous year

V_S = total volume of water delivered under the distribution system in the state in the previous year

I = average annual rate of inflation during the past year

and

$$\frac{B_S}{V_S}(1 + I) = \text{uniform per acre-foot fee for the state}$$

Applying these equations to the basin data contained in Table 3 and assuming an inflation rate of 8 percent yields a uniform fee of \$0.0867 per acre-foot.

Because of the lack of readily available information on total water deliveries in the several river basins that do not base their assessments on the annual volume of water delivered these basins were not included in this comparison.

The volume of water delivered could be considered a reasonable measure of benefit to the water users of the distribution system. By allocating the total budget for the state in the uniform manner suggested herein, the cost of the distribution function per acre-foot of water is equalized among basins. In this process it was assumed that the total existing budget should be allocated among the basins. This, of course, would require larger contributions from some basins and smaller contributions from others as indicated in Table 3. For the 18 basins listed, assessments or fees for seven would increase and eleven would decrease. The relatively large magnitude of the changes reflects the large disparity that exists among current rates. Whether the current budget is the appropriate amount to allocate or some other figure would have to be determined in the course of deciding how much of the costs of the new state-employed commissioner system should be borne by the water users and how much should come from general tax revenues.

Since many of the water user groups differentiate between different classes of water users in dividing their total assessments, it may be advisable to give a distribution advisory committee in each river basin the latitude to continue to divide the total assessment for the basin as they see fit. In other words, after the total fee for the basin is set by whatever manner, a river basin distribution committee could allocate the fee among users in the basin according to different classes as is done now. However, if the county property tax method of collecting assessments as described previously were adopted, this procedure would not be practical. County assessors would

Table 3. Comparison of 1980 assessments with user fees calculated by Equation 1.

	1980 ^a Budget	1979 Total Acre-feet Delivered	1980 ^b Assessment Rate (\$/ac-ft)	1980 ^d Computed fee	Percent Increase (Decrease)
Beryl-Enterprise	\$ 3,000	87,377	.034	\$ 7,575	153
Cedar Valley	7,130	70,862	.101	6,144	(14)
Cottonwood Creek	7,299	56,517	.128	4,900	(33)
Deep Creek	4,265	5,367	.795	465	(89)
Duchesne River	14,665	264,595	.055	22,940	56
Fremont	3,616	22,693	.159	1,967	(46)
Little Bear	1,265	55,538	.023	4,815	281
Lower San Pitch	4,050	189,493	.021	16,429	306
Milford	3,544	47,552	.075	4,114	16
Ogden River	7,305	144,142	.051	12,497	71
Parowan Valley	4,776	29,048	.164	2,518	(47)
Price River	12,625	77,078	.164	6,683	(47)
San Pitch	4,800	38,389	.125	3,328	(31)
Spanish Fork	20,990	122,951	.171	10,660	(49)
Upper Bear	4,770 ^c	142,908	.033	12,390	160
Utah Lake-Jordan	34,562	283,254	.122	24,558	(29)
Weber	42,210	450,226	.094	39,035	(8)
George Creek	1,520	2,980	.510	258	(83)
Total	\$182,392	2,090,963		\$181,276 ^e	

^aMinimum assessment charges and power charges are not included.

^bOverall assessment rate (col. 1 ÷ col. 2) lumps different classes of users together.

^cDoes not include distribution to Meadowville Group.

^dComputed with Equation 1 assuming an 8 percent inflation rate and the 1979 distribution budget for the state at 92 percent of the 1980 budget. This results in a uniform fee of \$0.0867 per acre-foot.

^eThe same as actual 1980 budget (col. 1) except for rounding error.

allocate the water assessments among the water users according to a schedule of charges provided by the State Engineer. If distinctions were to be made among different classes of users, it would have to be done by the State Engineer in the process of arriving at the appropriate charge to be assessed each water user. If the uniform per acre-foot fee found by Equation 2 were used, it could be weighted according to different classes of users. Of course, irrigation companies, municipalities, and other entities holding water rights for the distribution of water to numerous stock holders or customers would have to

allocate the total charge to its members in the form of individual water user assessments or rate surcharges.

Instead of basing user charges on the volume of water delivered, the charges could be based on entitlement as a method of encouraging right holders to give up unused rights. That is, water users could be charged for the amount of water they have right to use irrespective of the amount that they actually use. A precedent for this approach has been set in the Province of British Columbia, Canada, which charges an annual fee for storage and diversion

rights for a wide range of uses payable whether the right holder exercises his rights or not (Hoggan et al. 1977). The Beaver River system in Utah already assesses fees based upon the individual ownership of court decreed water rights and not upon actual delivery of water.

To demonstrate how user fees might fund a state-employed river commissioner system, the major steps of a method based on entitlements might be as follows:

Division of Water Rights:

1. Computes average total annual flow in river system from historical record.

2. Based on 1), determines entitlement of each right holder in river system in total ac-ft/year.

3. Computes assessment of each right holder by multiplying entitlement from 2) above by uniform fee in \$/ac-ft (Equation 2), and applying weights for different classes of users as may be deemed appropriate.

4. Transmits schedule of assessments to appropriate county commissioners for adding to property tax levies.

County Commissioners and Assessor:

5. Adds assessment to water right holder's tax levies.

6. Collects taxes, and returns appropriate portion to State Engineer.

An alternative method based on volume of water delivered to each right holder would eliminate steps 1 and 2 above; and the assessment in step 3 would be found by multiplying the annual volume of water used in previous year or several years (average) by the uniform fee.

Better balance in commissioner workload (territory)

Preliminary investigation of relative size, location, and other characteristics of existing river systems, indicates that a number of consolidations of commissioner jurisdictions and operations could be considered. Figure 6 (see Table 4) shows basins currently administered by water

Table 4. Legend of distribution system names for map (Figure 6).

Distribution System	No. on Map
Alvey Wash	1
Beaver River	2
Burnt Fork	3
West Fork Beaver Creek	4
Beryl-Enterprise	5
Cedar Valley	6
Cottonwood Creek	7
Deep Creek	8
Duchesne River	9
East Fork Virgin River	10
Fremont River	11
Little Bear River	12
Lower Jordan River	13
Logan River	14
Lower San Pitch River	15
Milford	16
Ogden River	17
Parowan Valley	18
Pot Creek	19
Price River	20
Provo River	21
Upper San Pitch River	22
Santa Clara Creek	23
Sevier River	24
Spanish Fork River	25
Upper Bear River	26
Utah Lake-Jordan River	27
Virgin River	28
Weber River	29
Blue Mountain	30
George Creek	31
Mill Creek	32

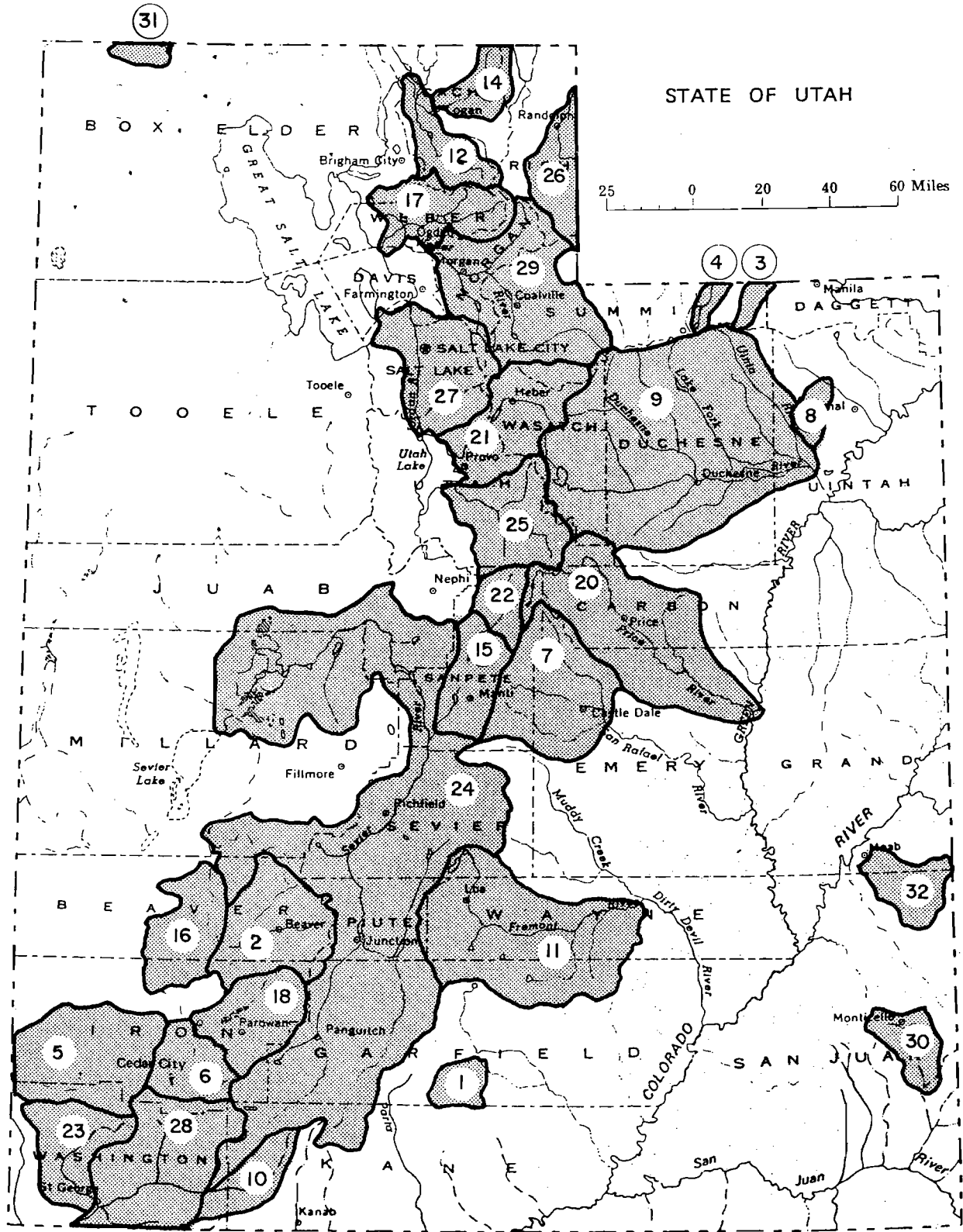


Figure 6. Existing distribution systems boundaries.

commissioners. It appears that several of the smaller basins could be consolidated or adjoined with adjacent larger basins under unified water commissioner administration. For example, in Cache Valley the Logan River and the Little Bear River might be administered by a single commissioner operating out of the Northern Area Office in Logan.

More complete geographical coverage

The possible expansion of water commissioner supervision of distribution in the state ought to be considered on the basis of several criteria, which are listed in Table 5. Significant rivers and creeks that might be considered for adding commissioner supervision are shown in Table 5 and Figure 7. Others might be added solely for the purpose of establishing good records. The organization of existing water distribution systems and prospective new ones under the Division of Water Rights Area Offices would be as shown in Table 6 assuming that the jurisdictional boundaries of the Area Offices remain the same.

Improved records and data acquisition

Although the State Engineer requires periodic reporting of water deliveries, record keeping by water commissioners is not consistent. The main purpose is to provide information for an annual report required by the State Engineer. Since the commissioners are not provided with guidelines or required to submit their annual reports according to a prescribed format, the reports vary greatly in size and content. Information contained in the more sophisticated reports for large basins may include the following:

1. Minutes of annual water user meeting.
2. Physical description of the river system.

3. Description of the system organization and water user committee.

4. Narrative description of the water supply situation in the river system.

5. History of distribution actions such as cutting back water deliveries according to priority dates.

6. Annual record of natural flow and storage water deliveries.

7. Annual record of exchanges.

8. Annual budget and basis of assessment.

9. Snow survey data.

10. Comparative streamflow data.

11. Weather data from nearby weather stations.

12. General crop conditions.

13. Description of diversion structures and measuring devices.

14. Discharge records for streamflow and storage.

15. Pump discharge records.

16. Summary of water rights.

17. Map of area.

18. Identification or problems needing attention such as cleaning and adjusting measuring devices.

For smaller basins, the report may cover only one or two of the above items and that in very little detail. Discharge records, for example, are compiled on a daily basis in some basins but biweekly or monthly in others. An examination of the annual reports suggest that record keeping and reporting receives minimal effort in a number of basins. In a more unified

Table 5. Potential additions to statewide distribution system.

Number on map (Figure 7)	River system	Urbanizing area	Interstate river	Potential site for major water projects	Major economic growth area (energy, etc.)	Near to system currently administered by a commissioner
1	Muddy Creek		✓	✓	✓	
2	San Juan River		✓	✓		
3	Castle Valley Creek		✓			
4	Kane Springs		✓	✓		
5	Escalante River		✓	✓		✓
6	Kanab, Paria, and Johnson Creeks		✓	✓		
7	Ashley and Brush Creek	✓	✓		✓	✓
8	Grouse Creek					
9	Blue Creek					
10	Malad, Lower Bear and Cub Rivers	✓	✓	✓		✓
11	Blacksmith Fork	✓		✓		✓
12	Salt and West Creek					
13	Chalk Creek					
14	Corn Creek			✓		

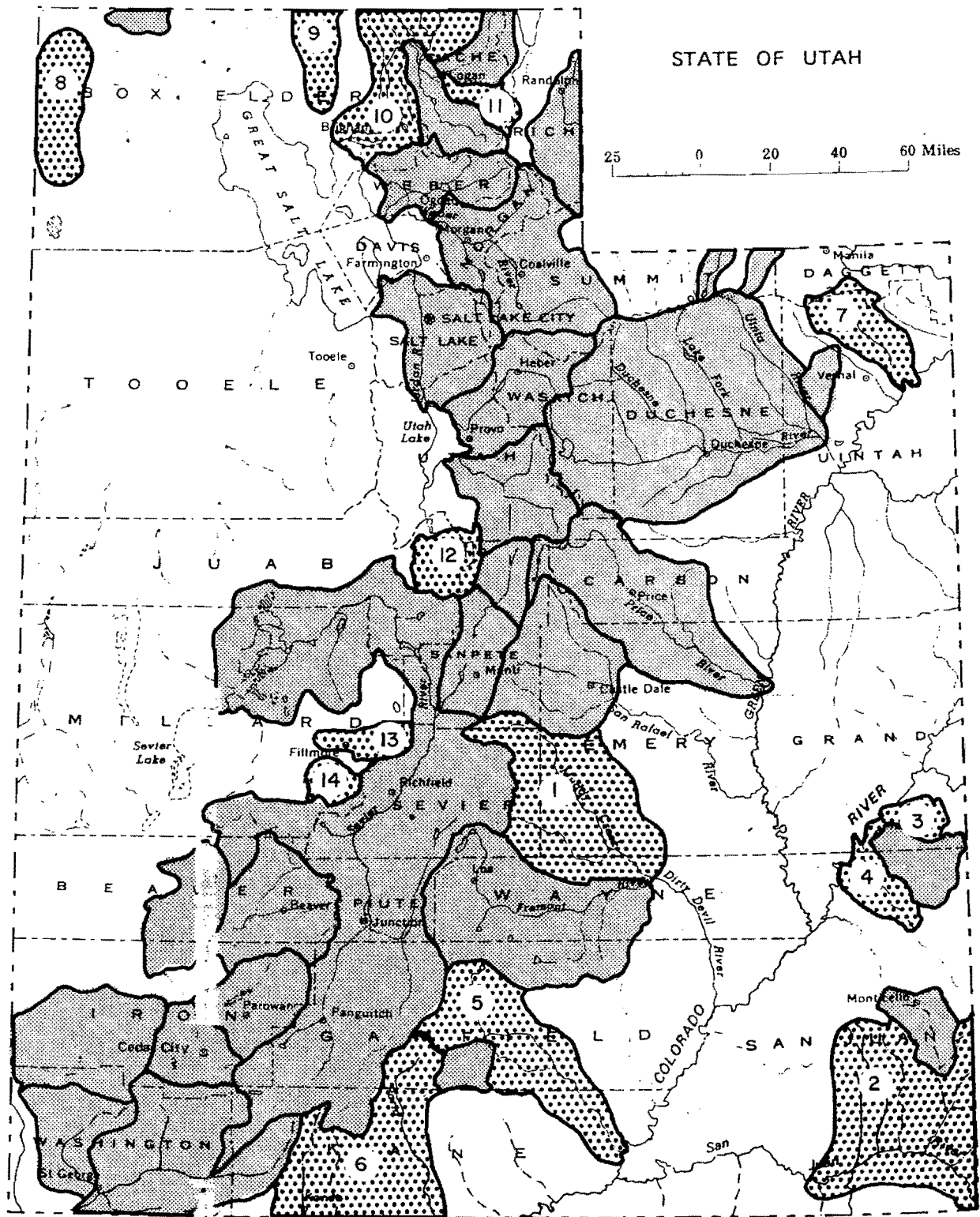


Figure 7. New distribution systems that might be added.

Table 6. Assignment of distribution systems to Area Offices.

AREA SECTION						
UTAH LAKE- JORDAN RIVER (SALT LAKE CITY)	WEBER RIVER DAVIS CO. WESTERN UTAH (SALT LAKE CITY)	SEVIER RIVER (RICHFIELD)	NORTHERN (LOGAN)	EASTERN (VERNAL)	SOUTHEASTERN (PRICE)	SOUTHWESTERN (CEDAR CITY)
Existing distribution systems:	Existing Distribution systems:	Existing distribution systems:	Existing distribution systems:	Existing distribution systems:	Existing distribution systems:	Existing distribution systems:
Utah Lake-Jordan River Provo River Spanish Fork River	Weber River Ogden River	Lower San Pitch River San Pitch River Sevier River Fremont River	Upper Bear River Lower Bear River Logan River George Creek	Burnt Fork West Fork Beaver Creek Deep Creek Duchesne River	Price River Cottonwood Creek	Alvey Wash Beaver River Milford Parowan Valley Cedar Valley Beryl-Enterprise Santa Clara Creek Virgin River East Fork Virgin River
Prospective new systems:		Prospective new systems:	Prospective new systems:	Prospective new systems:	Prospective new systems:	Prospective new systems:
Salt Creek West Creek		Muddy Creek ^a Chalk Creek Corn Creek	Blacksmith Fork River Malad-Lower Bear-Cub Rivers Blue Creek Grouse Creek	Ashley Creek	San Juan River Castle Valley Creek Kane Springs	Escalante ^b Paria, Kanab, and Johnson Creeks

^aUpper part of Muddy Creek is in closer proximity to Price Area Office than the Richfield Office.

^bThe location of the Escalante is not too convenient to any area office, but may be more readily supervised out of Richfield Office, which handles the Fremont drainage.

organizational arrangement, it could be upgraded significantly.

Data collection and record keeping by water commissioners should be geared primarily to the needs of the State Engineer in administering ground and surface water rights. The river distribution system comes into existence after the issuance of a river decree or completion of the adjudication process, so the commissioner is concerned primarily with records necessary to enforce rights.

Since change-of-use actions are likely to be the major concern of the State Engineer, the river commissioners should be concerned primarily with the following records:

1. Stream or source of right
2. Flow or quantity
3. Point of diversion and nature of diversion works
4. Time, place, purpose, and extent of use

It is not practical to use the same degree of detail in all record keeping and reporting. Records for small rural basins obviously do not need to be as detailed as those for larger more complex basins. Nevertheless, standardized records for elements considered essential in all basins would add greatly to overall reporting usefulness. Access to and analysis of the data by the State Engineer and others would be facilitated. For basins which currently do not have records sufficient to meet the minimum needs of the State Engineer the standardization and upgrading would be most beneficial.

Conclusions

Either out-of-house service contracts or an in-house modification of the state engineer's organization could be used for improving the water

distribution function in the state. The in-house approach appears to be the best suited for achieving statewide uniformity.

A more unified distribution organization composed of state-employed water commissioners would have several advantages over the existing system of commissioners employed by local water users. The more consistent financial base associated with this arrangement would enhance the prospects of employing and retaining a higher overall level of expertise. The increased stability and advancement opportunity for commissioners that would be associated with a more consistent set of employment conditions for commissioners would provide for the development and accumulation of greater knowledge and expertise concerning local problems. Improvement in quality of data acquisition, record keeping, and reporting would be facilitated. Standardization of procedures and formats for processing water distribution information, would enhance the effectiveness of the overall system. Information utilized by the State Engineer and others would be more comprehensive, reliable, and accessible. More complete coverage geographically of river systems in the state and better balance in commissioner work loads could be considered in any reorganization implemented.

The achievement of the aforementioned benefits, however, would not be without cost. How great the additional cost, of course, would depend on how extensive the changes made are to the existing distribution system. It would depend, for example, on how much the data acquisition and record keeping activity is increased and improved, to what extent the level of commissioner qualifications and competence is raised, and what economies of scale can be achieved through consolidating, streamlining, and otherwise reorganizing water commissioner areas of operation. Although there would no doubt be significant additional costs entailed in the

implementation of a more unified, efficient distribution system, the costs to the water users could be held to existing levels if a dual pricing scheme were utilized. Such a scheme would divide the costs of the distribution system between the water users and the public. The water users portion would be paid by them in the form of user fees similar to the assessments which they now pay, and the remaining portion would be drawn from the state's general funds. County property taxes might serve as a useful taxing mechanism for the collection of the users portion. The justification for drawing from general funds would be the social benefits of improved water management to the public throughout the state.

Although there are significant potential benefits to be achieved through a more unified water distribution system in the state, opposition

to such a change must be anticipated. Water users who perceive a loss of local control and/or increased water costs will oppose it, and other citizens may object to paying even a portion of the costs for a system which they perceive primarily benefits particular water users.

If the change has merit, and it appears that it has from the analyses made in this study, ways should be sought to overcome or satisfy the opposition. To begin this process, the State Engineer should consider the appointment of a task force to work out the organizational, financial, and legal details connected with the employment of state water commissioners. When a precise plan has been prepared it should be presented to the water users, the public in general, and to the legislature for implementation.

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