

**LEGAL, FINANCIAL, AND ECONOMIC
ANALYSIS OF A WATER SUPPLY BANK
IN IDAHO**



by

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ABSTRACT

In most areas of the United States the allocation of water is conducted according to legal rather than economic principles. Changes - economic, social, and technological - occur which require accommodation in the use and allocation of water to achieve the maximum economic value from the water supply. Water banking has evolved as a concept to facilitate the flexibility of water use via market forces while recognizing existing legal water rights as secure property rights. Recognizing the inflexibility and inefficiency of water use and the constraints on water transfers in Idaho, the Idaho state legislature authorized the establishment of a Water Supply Bank to be operated by the Idaho Water Resource Board. This study explores the legal, financial, and economic feasibility of the Water Supply Bank in Idaho.

Issues addressed are: Describing and evaluating the irrigation and water delivery organizations in Idaho with particular focus on the arrangements which accommodate or constrain water transfers. Reviewing the water law of Idaho with attention to legal interpretations affecting water transfers, and the potential for the Water Supply Bank to overcome previous legal constraints. A formal analysis of the economic criteria for achieving an efficient allocation of water. An appraisal of water banking as an evolutionary institution to facilitate the development of rational markets for water. Attitudes toward water banking from water delivery organizations and water users in Idaho. An assessment of the administrative, operational, and procedural form of and processes of the Idaho Water Supply Bank.

It is concluded that a Water Supply Bank has the potential for facilitating voluntary participation in markets for water rights equities, rentals, or leases. The Water Supply Bank will not replace completely the de facto water transfers which are managed by existing water management and delivery organizations - irrigation districts, canal companies, and storage rental committees. The Water Supply Bank will supplement these organizations and provide a mechanism to widen access to markets for water. Institutional peculiarities and encumbrances such as the fixed price for rental of storage water may limit potential water market participants and constrain the rationality of the market. Encouraging compensation of third-party interests to any water transfer is recommended, rather than the present outright prohibition. The ability of the Water Supply Bank to utilize the services of Department of Water Resources specialists with technical knowledge of hydrologics, legal requirements, and economic externalities that can accompany water transfers should expedite the resolution of these complications.

The procedures adopted by the Water Resources Board to operate the Water Supply Bank are attempts to facilitate market transfers. These procedures require verification of title, enforcement of contracts, and protection of third-party interests. Pricing procedures are modified principles of a free market mechanism. The administrative charge for Water Banking services has been set at ten percent of the sale or lease price of water for the Water Supply Bank. While a negotiated transaction cost would be preferable, without actual experience to determine the transacting cost the fixed percentage is a first approximation. As experience and evidence evolves, the fixed percentage could be amended.

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CHAPTER I

INTRODUCTION

With very few exceptions, the allocation of water in most areas of the United States is conducted according to legal rather than economic principles. However, changes - economic, social, and technological - occur which require changes in the use and allocation of water to achieve its maximum economic value. When water is fully appropriated, it can continue to function as an essential resource in the attainment of well-being. But it must be transferable to various uses according to contemporary preferences and values.

An important aspect of preventing water resources from becoming a factor limiting regional growth and well-being would be reliance on the market mechanism to permit the transfer of water from low valued uses to higher valued ones. Reliance on market mechanisms would generate prices for water which would help decision makers in the use and allocation of water, maximizing society's overall well-being.

A variety of legal and institutional constraints exist which hamper the transfer of water through market forces. In particular, the law has had difficulties reconciling the concept of legal property rights to the common property characteristics inherent in ground and surface water systems. The physical interdependence of water users has precluded easy development of property right systems which exist for most other productive resources or assets. Because of these "externalities" or "third party effects" and the high transaction costs associated with water transfers, there is often a tendency to bypass the market system when pressures upon water use increase.

These difficulties have often been identified as an explanation for the paucity of market transactions in the allocation of water.

The concept of water banking¹ or water brokerage has evolved as a proposed means to expedite the transfer of water via market forces. It would be an evolutionary institution recognizing existing water rights and the security of those property rights, but facilitating the flexibility of water use through the economic forces of the market. The concept of water banking offers potentials for improving the marketing process and the allocation of water according to economic efficiency criteria. Water banking also offers potentials for lowering the transaction costs of water transfers by providing a centralized source of information about specific water availabilities and demands. It also offers the potential for expediting the internalization of "externalities" in water transfers into market transactions. In providing access to market process for water rights and water use, flexibility can be achieved without threatening the security or certainty of existing water rights. Most significantly, the water banking concept has the potential to yield market prices for water which will make the opportunity cost of water explicit. Explicit prices for water will guide decision makers in its use and allocation to its highest value. The resulting prices will, as part of the profit motive calculus, encourage efficiency in the use of water.

Several studies at the University of Iaho and the Idaho Department

¹Angeledes, Sortiros, and Eugene Bardach; Water Banking; How to Stop Wasting Agricultural Water; Institute for Contemporary Studies, San Francisco, California, 1978.

of Water Resources² have documented the physical inefficiency of water use in irrigated agriculture in southern Idaho. Most of the authors have concluded that there is potential for improved efficiency in water use in irrigated agriculture (the specifics of some of these studies are summarized in the following chapter). Given the constraints on marketing conserved water, the farmer or water delivery organizations' incentives to increase water efficiency are thwarted because they can not capture the benefits they create by water conservation. The water banking concept will provide them a means to capture those benefits by being able to sell their excess water. Increased water use efficiency in existing use will tend to extend the available water supply to satisfy supplemental or new uses.

Recognizing the inflexibility of water use and the difficult constraints on water transfers in Idaho, the Idaho Water Plan recommended the establishment of a water supply bank.³ In 1979 the Idaho state legislature authorized by statute⁴ the establishment of a Water Supply Bank to be operated by the Water Resources Board. The purposes

²Claiborn, B. A.; "Predicting Attainable Irrigation Efficiencies in the Upper Snake River Region;" M.S. thesis, Water Resources Research Institute, University of Idaho, (Moscow, Idaho, 1975).

Hammond, J.; "A Program to Promote Irrigation Conservation in Idaho," State of Idaho Department of Water Resources; Improved Water Use Efficiency; Project # 535, Final Report, (Boise, Idaho, 1978).

R. G. Allen and C. E. Brockway "Relationships of Costs and Water Use Efficiency for Irrigation Projects in Idaho;" Research Technical Completion Report, Project B-039-IDA; Idaho Water Resources Research Institute, University of Idaho, Moscow, Idaho, August, 1979.

³Idaho Resource Board; Idaho State Water Plan-Part Two; July 1977, Boise, Idaho. The Water Plan was adopted by the Second Regular Session of the 44th Idaho Legislature in 1978.

⁴As provided in Sections 42-1716 to 42-1766 of the Idaho Code.

of the Water Supply Bank are to encourage the highest duty for beneficial use from water, provide a source of adequate water supplies to benefit new and supplemental water uses, and provide a source of funding for improving water users' facilities and efficiencies.

The basic purpose of our study was to investigate and analyze the legal, economic and financial feasibility of water banking in the state of Idaho. Specifically, the objectives of the research were:

1. Describe and evaluate the existing institutional water allocation system in Idaho.
2. Describe and analyze the irrigation and water delivery organizations in Idaho, focusing on the arrangements which accommodate or constrain water transfers.
3. Review Idaho water law with particular attention to the interpretations affecting water transfers, and the ability of water banking to improve upon the previous legal constraints.
4. Provide a formal analysis of the economic criteria for achieving and efficient allocation of water and an appraisal of water banking as an evolutionary institution to facilitate the development of a rational market for water.
5. Produce a summary of attitudes toward water banking among water delivery organizations and water users in Idaho, based on survey data.
6. Give an assessment of the procedural and operational form of the Idaho Water Supply Bank.

The format of the study follows the objectives outlined above. The following chapter briefly describes the present water allocation system in Idaho. Since irrigated agriculture is dominant in the

history of water allocation in Idaho, the focus will be on irrigation. Evidence on physical efficiency of water use in irrigated agriculture will be summarized to indicate the potential for conservation. Chapters III, IV and V are primarily legal; the analysis focuses on the legal issues of water transfers, and also evaluates the legal constraints removed by the water banking statutes. In Chapter VI the economic principles of allocation of water are presented, incorporating the third party effects or externalities which occur in transfers of water. Chapter VII presents the results of surveys conducted in the fall of 1979 showing attitudes toward water banking among water delivery organizations and other water users in Idaho.

Chapter VIII evaluates the Water Supply Bank in Idaho. Rules and regulations which were issued by the Idaho Water Resources Board in May 1980 are incorporated into the analysis although there is little operational evidence to verify the analysis. The final chapter, Chapter IX, presents conclusions on the feasibility of the Water Supply Bank.

CHAPTER II
WATER ALLOCATION AND EFFICIENCY IN IRRIGATED AGRICULTURE

Irrigation - Brief History

Most of the development of surface irrigation in Idaho is concentrated in southern Idaho, which is traversed by the Snake River, the largest river system in Idaho, having a drainage of approximately 87 percent of the state.⁵

Irrigation is the principal use of water from the Snake River system, accounting for an estimated 99 percent of the consumptive use. Municipal and industrial uses account for the remainder. Flows of the Snake River are also used for non-consumptive uses: power generation, navigation, recreation, and wildlife habitat.⁶

The first permanent agricultural settlement based on irrigation in Idaho was established by Mormon pioneers in 1860 near the Bear River. By 1863 irrigation began to operate in the Boise valley, and eventually irrigated agriculture was functioning along other Idaho rivers and streams. These early irrigation programs were entirely dependent on surface water supply. They developed along the Bear River and upper Snake River drainages in the east and the Boise River Basin in the west. Canal companies formed as early as the 1860's when settlers started small scale gravity fed irrigation systems.

Several governmental policies contributed to irrigation development and water projects in Idaho and the West in general - the Homestead

⁵Idaho Water Resources Board; The State Water Plan - Part Two (Boise, Idaho, July, 1977); p. 13.

⁶Ibid., p. 19

Act of 1862, the Desert Land Act of 1877, and the formalization of the appropriation doctrine for water rights in 1881. The Homestead Act and the Desert Land Act provided means for private acquisition of western lands. The appropriation doctrine provided legal security for assuring access to available surface water. Under the appropriation doctrine the water right was acquired by use, the only qualification being "beneficial use." Under this legal doctrine the earliest water right on a given watercourse has preference or priority over later users, i.e. "first in time means first in right." The appropriation doctrine gave legal certainty of the water right, which was important in providing incentives to initiate and invest in water resource development.

The Carey Act of 1894 aided irrigation development by establishing a procedure to convert arid federal lands to private development. The Reclamation Act of 1902 was another major form of support to irrigation projects and development since it provided direct federal assistance to the construction of projects and water storage facilities that provided a means of augmenting the physical limitations of the natural streamflow during the irrigation season. American Falls, Jackson, and Arrowrock dams are but a few of the storage reservoirs constructed by the Bureau of Reclamation. Eventually, as more storage reservoirs were constructed, the Bureau of Reclamation storage became a significant reserve supply of water for irrigation companies and districts. Ultimately, surface storage for canals and pump distribution in southern Idaho irrigation projects exceeded seven million acre-feet through major dam construction.

With nearly 4 million acres of irrigated land in southern Idaho, mostly within the Snake River Basin, the river flow is depleted by

approximately 6 million acre-feet of water per year. About one-quarter of this is withdrawn as groundwater.⁷

Water Delivery Organizations

Water delivery organizations consist of irrigation districts and companies, although a variety of organization names are used such as "ditch company" or "lateral company." The water districts is another organizational label used in Idaho: its purpose is to provide the State with an orderly means of distributing water to right holders according to the specifications of each right. The operation of the water district is supervised by a watermaster. Watermasters are bonded by the Idaho Department of Water Resources and thus act under the supervision of the state agency as mandated by law⁸ to enforce water rights, both on natural flow and stored water.

At least seventy percent of the land irrigated in Idaho has water delivered through some type of water organization. Water delivery organizations are responsible for distributing water to their members based on water right priority dates, with the volume regulated by the doctrine of beneficial use. There are two major types of water delivery organizations in Idaho - irrigation districts and mutual irrigation companies.⁹

⁷ Ibid., p. 19.

⁸Section 42-605, Idaho Code. For a description of the duties and functions of the watermaster see "Duties and Functions of the Watermaster," by A. L. Larson, Watermaster, Water District No. 36, State of Idaho, unpublished monograph.

⁹Source of the following discussion - W. A. Hutchins; "Irrigation Districts, Their Organization, Operation, and Financing;" Technical Bulletin No. 254, (United States Department of Agriculture, Washington, D.C., June 1931).

While they are similar in function and purpose, there are differences in their organizational structure. Both forms were established to divert and deliver irrigation water to farms and other water users.

Irrigation districts Irrigation districts are public or "quasi-municipal corporations" organized under Idaho law for the purpose of providing a water supply for the lands within their boundaries. They are empowered by the state to issue bonds and derive revenue primarily from assessments levied upon the land within the district. As quasi-public entities, irrigation districts are created with the consent of a specified portion of resident landowners or water users. They have an established taxing power with assessments able to serve as liens against district land. Districts are also able to generate revenue by charging users for water use and, in some cases, by sale or rental of water or power outside the district. In many irrigation districts the district rather than its individual members holds the water rights.

Mutual irrigation companies The mutual irrigation company or water company is a voluntary organization of landowners formed for the purpose of supplying irrigation water at cost to lands of company members who own its stock. The mutual company is a nonprofit corporation that derives its operating funds from assessments levied against the shareholders. The most common apportionment of stock among company shareholders is to issue one share of stock for each acre of land to be irrigated. The irrigator is entitled to the proportion of the water available to the company that his land or stock bears to the company's total. In some cases, however, the shares of stock entitle the holder to a specific quantity of water or a specific proportion of

the total water available to the company, regardless of the acreage irrigated. Since shares represent the right to receive water, the water rights are held by individual members rather than the company. Financial arrangements of mutual companies are based on its capital stock and do not involve the land of the owners as in the irrigation district. The distinctive feature of the mutual irrigation company is that land need not be encumbered to finance irrigation works - the irrigation works themselves constitute the collateral. Mutual irrigation companies are less numerous than irrigation districts because the financial or capital requirements associated with Bureau of Reclamation projects were not suited to the collateral basis of mutual irrigation companies, and the Bureau of Reclamation favored the formation of irrigation districts to assure the federal assistance.

Water Transfers

A temporary (seasonal) transfer and a transfer of a water right differ in that a transfer of a water right constitutes:¹⁰

1. A change in the point of diversion,
2. A change in the place of use, and
3. A change in the nature of use (e.g. from agricultural to municipal).

A temporary transfer is the giving or selling of available water; the water right itself is not affected.

Water transfers do occur among agricultural irrigators in Idaho, but their rarity suggests institutional impediments or difficulties.

¹⁰Hammond, John; A Program to Promote Irrigation Conservation in Idaho; Idaho Department of Water Resources, Boise, Idaho; March, 1978.

The State Department of Water Resources surveyed agricultural water distribution organizations and users in late 1977 and early 1978.¹¹ These surveys sought to determine evidence of water transfers and water user attitudes toward transfers. The surveys specifically attempted to document the extent of temporary and permanent water transfers. Over half of the responding organizations did not allow the transfer of water from one member to another on a permanent basis. Over three quarters of the districts or companies did not allow permanent transfers of water from a member to a non-member. Temporary or seasonal water transfers are often ill-defined, and fears of forfeiture of water-rights inhibit users from participating or taking advantage of water supplies through these types of transaction. Less than half (47.1%) of the organizations allow the transfer of water on a temporary basis between members. Less than fifteen percent (14.3%) allow temporary transfer of water from a member to a non-member.

The survey results suggest that the factor limiting the amount of transference of water rights among users is not the individual farmers' lack of desire to conduct such transactions, but rather the legal prohibitions and institutional constraints that inhibit them. Overall, these surveys indicate that farm operators would like to realize the benefits of a water market, but do not participate because they believe transfers are not legal or may result in a forfeiture of their water rights.

Disparities between existing conditions and the socially optimum

¹¹Idaho Department of Water Resources; "Summary Analysis of Water Organization Survey" (Boise, Idaho, December, 1977) and "Temporary Transfer Survey" (Boise, Idaho, April, 1978).

conditions might be resolved if water law had more flexibility to facilitate water transfers. Access to water transfers via a market mechanism would benefit both society - in the form of increased efficiency in water use - and participants - through mutually advantageous voluntary transactions.

Besides the outright prohibition on water transfers which are part of the provisions governing some irrigation districts or companies, the interpretation of the "beneficial doctrine" may act as an impediment to mutually advantageous transactions. The "beneficial doctrine" has been interpreted to limit all water rights to amounts "reasonably required for a beneficial use." While the doctrine was adopted as an attempt to limit the wasting of water, it now may have the effect of inhibiting voluntary reallocation of existing allotments to others who place a higher value on the water.

Idaho water law¹² does permit transfer or lease of water rights. Transfers require petition to, and approval by, the State Department of Water Resources. In matters involving a change in point of diversion, or place or method of use, the Director of the Department of Water Resources may hold formal or informal hearing; procedure requires thirty days public notice to inform parties who might be adversely affected by the transfer. Decisions by the Department of Water Resources may be appealed to the appropriate district court.

While these procedures are critical in assuring the security of water rights, they also tend to create rigidity in water use. Economic security requires that the appropriator be certain that all deferred

¹²Idaho Code: 42-2501-42-2608.

revenues and costs will be taken into account and fully compensated if his right is transferred to other users. Voluntary transfer of water rights through buying and selling is the obvious mechanism to assure flexibility as well as security. Strict adherence to "first in time, first in right" interpretation of the appropriation doctrine - without the market mechanism - assures security but not economic flexibility.

An example of transfer¹³ Since the establishment of the Boise Project Board of Control in 1926, temporary transfers have been allowed. They can occur between individuals, between canal companies, and between individuals and canal companies. Water can be transferred in any amount and can be moved among the five irrigation districts.

To initiate a transfer, a "temporary water transfer" form is filed with the project manager. This form specifies the amount of water to be transferred, to whom it is being transferred, the account serial numbers of the parties involved, and the legal description of the lands involved. Approval of the irrigation district and the project manager are required. Generally the decision to transfer water is made by the parties involved, but occasionally the project manager acts as a water broker.

Records from the transactions are generally kept no longer than three to five years or until stored water allotments are depleted. No filing fees are involved in making a transfer.

As shown in Table I, the temporary transfer market activities vary, depending on water supply and demand. The year 1977 was the most active

¹³S. Koehler Kennedy and J. C. Wrigley; An Economic Water Market as an Alternative to Reduce Return Flow from Irrigation; Idaho Department of Water Resources (Boise, Idaho, February, 1979), pp. 51-53.

in terms of quantity because it was one of the driest years on record; 1973 and 1976 were considered normal, and 1974 and 1975 were considered "wet" years.

TABLE I

Boise Project Board of Control
Temporary Transfers Between Individuals

Year	Quantity of Water (acre feet)
1977	18,480.57
1976	758.92
1975	0.00
1974	0.00
1973	3,057.35

Source: Boise Project Board of Control

During the 1977 irrigation season, the average value was \$22.41 per acre foot of water. The highest price paid was \$50.00 per acre foot; the lowest price was \$0.00.

Irrigation Water - Efficiency in Idaho

Researchers at the University of Idaho and the Idaho State Department of Water Resources have conducted several major investigations and studies of water use efficiency in irrigation projects in Idaho. Claiborn¹⁴ analyzed irrigation water use efficiency for six irrigation projects in the

¹⁴Claiborn, B. A.; "Predicting Attainable Irrigation Efficiencies in the Upper Snake River." M.S. thesis, Water Resources Research Institute University of Idaho (Moscow, Idaho, 1975).

Upper Snake River Region of southern Idaho for the year 1974. These irrigation projects were selected as typical of irrigation systems in southern and eastern Idaho. River diversion data, conveyance system seepage loss data, and return flow data were compiled. Deep percolation losses and irrigation efficiencies were derived using an inflow-outflow water balance analysis. Farm efficiencies for the projects in 1974 varied from 11 to 62 percent, with project efficiencies ranging from 10 to 42 percent.

Low farm efficiencies were attributed by Claiborn to over-irrigation caused by long field runs combined with high intake soils. Claiborn concluded that large decreases in river diversions could be obtained by increasing farm irrigation efficiencies.

In 1975 the Idaho Department of Water Resources, using a survey of 640 farm operators in regions of southern Idaho, obtained ratings concerning water use efficiency from 14 irrigation water delivery organizations. This study¹⁵ concluded that organizations should institute greater control over diversions to decrease farm water use inefficiency. Hammond,¹⁶ in summarizing the Idaho Department of Water Resources' study, concluded that the irrigator is most responsible for decisions related to the application of water to the production of crops and that improved on-farm management is dependent on the initiative and effort expended by the individual farmer. Hammond did recognize that the water delivery

¹⁵Kerpelman, L. C., A. L. Gettleman, and B.E. Rovin; "Incentives for Improving Water-Use Efficiency;" Idaho Department of Water Resources (Boise, Idaho, 1976).

¹⁶Hammond, J.; "A Program to Promote Irrigation Conservation in Idaho," State of Idaho Department of Water Resources; Improved Water Use Efficiency, Project No. 535, Final Report (Boise, Idaho 1978).

organizations could improve water use efficiencies through more intensive management practices and technology by adopting operating policies which would encourage efficient use of water by member farmers. Hammond also concluded that the lack of incentive mechanisms such as a water market may be important barriers to irrigation conservation.

Allen and Brockway,¹⁷ in a detailed study completed in late 1979, evaluated the relationship between water delivery organizations' operating and maintenance costs for seventeen irrigation projects in Idaho for the 1977 season. While these projects were diverse in location, age, size, and origin (private versus federal), they were representative of most irrigation systems in southern Idaho. Project irrigation efficiency* of water ranged from 12 to 59 percent efficiency with the mean efficiency for the projects considered 35 percent. Water diverted to projects in this cross-sectional sample ranged from a high of 12.55 acre feet per acre to a low of 2.62 acre feet per acre; the mean was 6.15 acre feet per acre. Farm deliveries per acre, in the same sample, varied from 10.30 acre feet of water to 2.43 acre feet with a mean of 4.29 acre feet of water per acre. Irrigation requirements ranged from 2.49 acre feet per acre to 1.33 acre feet per acre with the average being 1.80 acre feet per acre. Total project operating costs (a composite of administrative, water

¹⁷R. G. Allen and C. E. Brockway; "Relationship of Costs and Water Use Efficiency for Irrigation Projects in Idaho;" Research Technical Completion Report, Project B-039-IDA. Idaho Water Resources Research Institute, University of Idaho, Moscow, Idaho (August 1979).

* Project irrigation efficiency is the percent of water diverted by a project used to fulfill consumptive irrigation requirements of irrigated cropland.

control, and maintenance costs, including reservoirs) ranged from \$61.30 per irrigated acre to \$1.85 per acre; on an acre feet basis the costs ranged from \$0.126 per acre foot of water to \$23.41 per acre foot on the seventeen projects considered, with the average at \$3.39.¹⁸

Utilizing regression analysis, Allen and Brockway found that the water delivery organizations' operating and maintenance costs were directly related to project water irrigation efficiency and project conveyance efficiency.**¹⁹ Their analysis also found that projects raising high value crops tended to have relative higher water operational and maintenance costs than those raising low valued crops. Gross crop values for the 1977 season in the projects considered varied from \$15 per acre foot of water delivered, to a high of \$225, with the average crop value \$59 per acre foot of water.²⁰

Allen and Brockway concluded that water-use efficiencies of all projects could be increased.

Deep percolation losses would be decreased and project application efficiencies could be increased by increased monitoring levels and crop water requirements and use of irrigation scheduling service. Because most percolation loss was caused by over-application of water . . . amounts

¹⁸Ibid. Derived from evidence in Appendix B.

¹⁹Ibid.; Table 26, p. 119.

²⁰Ibid.; Table 26, p. 119

** Project conveyance efficiency is defined as the percent of water supplied or diverted by a project's distribution conveyance system; it is indicative of the magnitude of seepage, evaporation and operational losses from the distributional system in proportion to volumes of water conveyed.

of water applied per irrigation and frequencies . . .
could be decreased with relatively small increases in
total per acre operating costs.²¹

Using physical criteria, these studies have documented the apparent over-use of water in irrigation. The evidence summarized above and the studies' conclusions strongly suggest potential improvements in irrigation water efficiency or conservation in Idaho. The critical issue is why the potential improvements in water efficiency aren't realized. The explanation appears to be related to economic incentives, the nature of institutional arrangements, and constraints embodied in water law. Under the "appropriation doctrine" and "beneficial use" principle for allocating water which is operative in Idaho (see legal section, Ch.III) and much of the West, security of a water right can usually be assured only through use of the water. Without a market for water, the benefits of conservation of water can not be realized by the irrigator or the water delivery organization. Without a positive price for water as reflected in a market, the opportunity cost of water is perceived as zero by decision makers.

²¹Ibid.; p. xiv.

CHAPTER III

THE LEGAL FRAMEWORK OF WATER TRANSFERS IN IDAHO

Water is unlike any other form of property. A house, a car, or a coat may be bought and sold with little effect on other persons. But when water is sold, the property rights of others are affected. Downstream users may suffer a loss of return flow, and in certain circumstances may legally prevent the sale of water.

One irrigator's waste water may become another irrigator's valuable irrigation water which might later emerge as cold, pure spring water that a third household could use for domestic purposes. The law recognizes this hydrologic interdependence, and tries to protect all users. In its effort to protect, certain constraints to free water transfers are introduced, and these constraints reduce the efficiency of water use.

This chapter will examine Idaho law in an effort to identify particular legal constraints to efficient, economic transfers of water in Idaho.

Western water law was developed largely to protect the rights of water users; efficiency of use was merely a secondary consideration. It is, therefore, not surprising to discover that our present legal scheme here in the West does not make most efficient use of this increasingly scarce and valuable resource. Particularly in the area of free transferability of water, legal safeguards sometimes lead to inefficiency and even waste.

Economic efficiency suffers when free transferability is impaired. Scarce resources cannot be applied to their highest and best use, and surplus quantities cannot flow to areas of shortage.

The Beneficial Use Doctrine

The beneficial use doctrine lies at the core of western water law. It is incorporated in Idaho's State Constitution in Article XV, sec 3:

The right to divert and appropriate the unappropriated waters of any natural stream to beneficial use, shall never be denied ...

To possess a water right is not the same thing as to possess the water described in that right. Possession of a water right merely bestows a right to take up to a certain amount of water if the user can apply it to the beneficial use for which he has appropriated it.²² The Idaho Supreme Court has stated the rule as follows:

it is against the public policy of the state ... for a water user to take from an irrigation canal more water, of that to which he is entitled, than is necessary for the irrigation of his land and for domestic purposes ...²³

Ownership of water is more complex than ownership of other forms of property. While water is flowing in a public source of supply, such as a stream, it belongs to the State of Idaho.²⁴

When a water user diverts water from a public water supply into his own works, he becomes the owner of the water diverted, if he can apply the water to beneficial use.²⁵

²²Bradshaw v. Milner Lowlift Irrigation District, 85 Idaho 528, 381 p. 2d 285 (1963).

²³Coulson v. Aberdeen-Springfield Canal Co., 39 Idaho 320 @ 323, 227 Pac. 29 (1924).

²⁴Coulson v. Aberdeen-Springfield Canal Co., supra, note 23. The state's ownership is not ownership in the normal sense of the word, but rather a holding of title in trust for all the citizens of the State.

²⁵Washington County Irrigation District v. Talboy, 55 Idaho 382, 43 p. 2d 943 (1935).

The purpose of the beneficial use doctrine is to encourage efficient use of water and discourage waste.²⁶ However, the contrary result may occur. A farmer concerned over the possible loss of his water right through statutory forfeiture might be encouraged to use his total allotment, even though he did not need the full amount.²⁷ A prospective participant in a Water Supply Bank would be discouraged from participation if his participation could later be held by a court to constitute a non-beneficial use, which would lead to forfeiture.²⁸

The Idaho Supreme Court has recently demonstrated a liberal view towards what constitutes a beneficial use of water.²⁹ It ruled that a preservation of aesthetic values and recreational opportunities was a beneficial use which supported an appropriation of water. Nevertheless, because beneficial use is critical to the maintenance of existing water rights, specific statutory recognition of Water Supply Bank activity as a beneficial use should be obtained before even a limited, experimental Water Supply Bank should attempt to function.

A state statute which declared Water Supply Bank activities to be a beneficial use might be attacked on grounds of unconstitutionality. The U.S. and Idaho State Constitutions contain provisions forbidding the taking of private property by the government without due process and just

²⁶Twin Falls Land and Water Co. v. Twin Falls Canal Co., 7 Fed. Supp. 238 (D. Idaho, 1933). See Hutchins, Wells Water Rights Laws in the 19 Western States, Volume 1, p. 12 (1971).

²⁷See: A Program to Promote Irrigation Conservation in Idaho, Idaho State Department of Water Resources (1977).

²⁸Idaho Code, sec. 42-222(2)

²⁹State Department of Parks v. Idaho Department of Water Administration 96 Idaho 440 530, p. 2d 924 (1974).

compensation.³⁰ Since the Water Supply Bank involves transfers of water, and transfers sometimes have harmful effects on return flows to downstream users, adversely affected downstream users might argue that a state statute recognizing Water Supply Bank operations as beneficial use violated their constitutional rights. However, as long as the statute authorizing Water Supply Bank operations contained provisions for the protection of those constitutional rights, the attack based on unconstitutionality would probably fail. Moreover, Idaho's Constitution, Article 15, section 1 provides:

The use of all waters . . . originally appropriated for private use, but which after such appropriation has heretofore been or may hereafter be sold, rented, or distributed, is hereby declared to be a public use, and subject to the regulation and control of the state in the manner prescribed by law.

This section could arguably provide the constitutional basis for legislation authorizing Water Supply Bank operations and declaring them a beneficial use. So long as established property rights were recognized and respected, and any unavoidable private losses were compensated fairly and with due process, the constitutional attack upon enabling Water Supply Bank legislation would very likely fail.

Abandonment and Forfeiture of Water Rights

Under Idaho law water rights can be lost through abandonment or forfeiture.³¹ A prospective participant in a Water Supply Bank program

³⁰U.S. Constitution, Amendment 14, sec. 1; Amendment 5; Idaho Constitution, Article 1, section 14; Article 15, sec. 4.

³¹Idaho Code, Sec 42-222. Joyce v. Murphy Land and Irrigation Co.
35 Idaho 549, 208 Pac. 241 (1922).

might fear that his own non-use of his full water right might result in its total or partial loss through abandonment or forfeiture.

Abandonment and forfeiture are two separate and distinct legal concepts. Abandonment consists of non-use accompanied by an intent to forsake or desert the water right.³² The water right is abandoned and lost the instant that the two elements, non-use and intent, take place.³³ Intent is a private, mental operation known only to the person involved, but it may be proven through an examination of the conduct of the individual.³⁴ Nevertheless, the burden of proving an abandonment is on the party alleging that abandonment has occurred, and this burden is substantial.³⁵ The alleging party must show, by clear and convincing evidence, that an intent to abandon was present, as well as non-use.³⁶ The Idaho Supreme Court is not sympathetic to claims of abandonment, and has stated that "it requires very convincing and satisfactory proofs to support a forfeiture by abandonment of a real property right."³⁷

Forfeiture is an entirely different concept and presents different problems. The Idaho forfeiture statute is contained in sec. 42-222 (2) of the Idaho Code:

³²Joyce v. Murphy, supra.

³³Hutchins, Wells: The Idaho Law of Water Rights, 5 Idaho Law Review 1 (1968).

³⁴Syster v. Hazzard, 39 Idaho 580, 229 Pac. 1110 (1924).

³⁵Carrington v. Crandair, 65 Idaho 525, 147 p. 2d 1009 (1944).

³⁶Carrington v. Crandair, supra. Gilbert v. Smith, 97 Idaho 735, 552 p. 2d 1220 (1976).

³⁷Perry v. Reynolds, 63 Idaho 457, 122 p. 2d 508 (1942).

All rights to the use of water acquired under this chapter or otherwise shall be lost and forfeited by a failure for the term of five (5) years to apply it to the beneficial use for which it was appropriated ...

This statute provides for the loss of water rights via statutory forfeiture if non-use continues for a period of 5 years. This loss of water rights would result even though the holder of the rights never intended to give them up.³⁸ The burden of proof in establishing a statutory forfeiture is again on the party claiming that a forfeiture has occurred,³⁹ and the judicial hostility to abandonment extends also to forfeiture.⁴⁰ Nevertheless, the risk of loss of water rights by statutory forfeiture is a substantial danger.

In the recent (1976) case of Gilbert v. Smith,⁴¹ the Idaho Supreme Court emphasized the distinction between abandonment and forfeiture:

Abandonment is a common law concept involving the concurrence of an intention to abandon and the actual relinquishment or surrender of the water right ... It is not dependent necessarily upon the length of time but upon the essential element of intent. (citing cases) Such intent may be evidenced by non-use for a substantial period of time but mere non-use is not per se abandonment ... In contrast, the doctrine of forfeiture is predicated upon a

³⁸Hutchins, Wells. supra, note 33; Gilbert v. Smith, supra note 36.

³⁹Perry v. Reynolds. supra, note 37.

⁴⁰Application of Boyer, 73 Idaho 152, 248 P. 2d 540 (1952).

⁴¹Supra, note 36.

statutory declaration that all rights to use water may be lost where an appropriator fails to make beneficial use of the water for a statutory period, regardless of the intent of the appropriator ... (citing cases). The effect of this provision is that an appropriator who failed to apply his water right to a beneficial use for a continuous five years period is regarded as having lost all rights to the use of such water.⁴²

Federal-State Problems of Water Transfer

A situation is likely to come about where a farmer has (or could have with improved efficiency of use) surplus water which he would like to sell. However, if the water-course from which he draws his water is also drawn upon by federally owned land, a question of the federal government's water rights presents itself. What makes this matter difficult is that the full extent of the federal government's water rights are, in most cases, undetermined. If the federal government has a prior right which it chooses to exercise, our farmer may find that he has no surplus water left to market; instead, he might even find himself going to the Water Supply Bank as a buyer, not as a seller. Uncertainty as to whether he actually does have surplus water to market might deter a prospective participant from transferring his water. The magnitude of this problem can be appreciated when we realize that fully 61% of western natural runoff occurs on federal lands.⁴³ Sixty-four percent of Idaho's land area is federally owned.⁴⁴

This problem of uncertainty results from the Reservation Doctrine, also called the "Winters doctrine." In 1908 the U.S. Supreme Court

⁴²Supra, at page 738.

⁴³Public Land Law Review Commission, One Third of the Nation's Land, 141 (1970).

⁴⁴Idaho State Water Plan - Part Two, supra, note 1.

decided the case of Winters v. U.S.⁴⁵ Winters has appropriated water from the Milk River in Montana. Downstream from Winters was an Indian reservation that had been created prior to Winters' appropriation. When the federal government created the reservation, no specific appropriation of water was made. Nevertheless, the U.S. Supreme Court ruled that Congress must have intended to reserve water for use on the reservation, and it granted the government an appropriation priority dating from the creation of the Indian reservation. Winter's priority date was later, and he was left with inadequate water to meet his needs.⁴⁶

From 1908 to 1963 the reservation doctrine was applied only to Indian lands. However, in 1963, the case of Arizona v. California⁴⁷ expanded the doctrine to apply it to any federally owned land. In the recent case of Cappaert v. U.S.⁴⁸ the U.S. Supreme Court said:

this court has long held that when the federal government withdraws its land from the public domain and reserves it for federal purpose, the government by implication reserves appurtenant water then unappropriated *to the extent needed to accomplish the purpose of the reservation*. In so doing, the U.S. acquires a reserved right in unappropriated water which vests on the date of the reservation and is superior to the rights of future appropriators ... the doctrine applies to Indian reservations and other federal enclaves, encompassing water rights in navigable and non-navigable streams⁴⁹ (*italics added*).

⁴⁵207 U.S. 564 (1908).

⁴⁶Water and Watercourses-Limiting the Reservation Doctrine, 13 Land and Water Law Review 501 (1978).

⁴⁷373 U.S. 546 (1963).

⁴⁸426 U.S. 128 (1976).

⁴⁹Supra, note 48.

The reason why the reservation doctrine is a source of uncertainty is that we are often left guessing as to what the original purpose of the reservation was. Both Arizona v. California⁵⁰ and Cappaert v. U.S.⁵¹ rely on the government's intended purpose at the time of the original making of the reservation as the controlling factor. If the Federal Government's purpose at the time of the creation of the federal enclave included use of water, then the federal government possesses water rights sufficient to meet those needs, generally with very early priority dates. Further complicating the problem is the fact that these federal water rights are usually unrecorded and unquantified.⁵² These unrecorded rights have been called "Wild Cards"⁵³ and have a recognized deterrent effect on private projects requiring water.⁵⁴

A Water Supply Bank operating near federally owned lands will have to take these "wild cards" into consideration. The federal government might be willing to cooperate with a state Water Supply Bank and quantify its reservation doctrine rights as a gesture of federal-state cooperation in increasing the efficient use of our nation's water.

⁵⁰Supra, note 47.

⁵¹Supra, note 48.

⁵²Supra, note 46.

⁵³Trelease, Federal-State Relations in Water Law (1971), at p. 160: Rights created by the Reservaiton Doctrine... are wild cards that may be played at any time, blank checks that may be filled in for any amount, or that may never be cashed. They deter other uses and cause losses of benefits, and they may encourage or permit federal uses that are financially possible with the money at hand but economically undesirable because more is lost than is gained.

⁵⁴National Water Commission, Water Policies for the Future, 469 (1973).

Irrigation Districts

Irrigation districts are created and regulated by state statutes. Under the provisions of Idaho Code, sections 43-304 and 43-322, the directors and other officers of an irrigation district are limited in their actions. Any act by the officials of an irrigation district that is in excess of the express or implied provisions of the Code is ultra vires: beyond their authority and therefore void.⁵⁵

As we have seen irrigation districts must strictly comply with state laws regulating them. One of these laws is I.C. sec. 43-316, which provides that all property acquired by an irrigation district, including water rights, is vested in the district and held by the district in trust for the uses set forth in the Code. The Code does not authorize transfers of irrigation district water for use outside of the district.

Applying the above reasoning, the Idaho Supreme Court has ruled that a contract entered into by an irrigation district which bound the district to supply its waters to a customer outside of the district was ultra vires and void.⁵⁶

This same rule has been followed in the more recent case of Jones v. Big Lost River Irrigation District.⁵⁷ Justice Donaldson, writing the opinion of the Idaho Supreme Court in that case said:

Supporting our conclusion that a contract, which would obligate an irrigation district to deliver any dedicated water for use outside the district in ultra vires and void, and that estoppel can not be invoked in aid of such a contract, are

⁵⁵ Jensen v. Boise-Kunna Irrigation District, 75 Idaho 133, 269 P. 2d 755 (1954).

⁵⁶ Jensen v. Boise-Kunna Irrigation District, supra, note 55, @ p. 141.

⁵⁷ 93 Idaho 227, 459 P.2d 1009 (1969).

the following authorities: Jenison v. Redfield 149 Cal. 500, 87 p. 62; Maclay v. Missoula Irrigation District, 90 Mont. 344, 3 p. 2d 286; Koch v. Colvin, 110 Mont. 594, 105 p. wd. 334 ... (citing cases)⁵⁸

As we have seen, Idaho case law prohibits transfers of dedicated irrigation district water to a user outside of the district. The only exception involves surplus or waste waters, which may be transferred outside the district so long as they are not needed within the district.⁵⁹

This is a legal constraint of the first magnitude. Interdistrict transfers of surplus or waste water are permitted, but all other transfers are prohibited. An interdistrict transfer of surplus or waste water would be likely to occur only in a year of abundant supply. In a drought, there would probably be little or no surplus or waste available. And it is precisely under drought conditions that transfers assume their greater importance, because if water is limited, it should be applied where it is needed most. Under present law, high value crops in one irrigation district might be forced to wither and die, while in an adjacent irrigation district low value crops enjoy plentiful water.

Since the constraint in this particular situation was legislatively created, it could as easily be legislatively removed. But until its removal, it presents a serious obstacle to effective and efficient water transfers, whether Water Supply Bank related or otherwise.

⁵⁸Supra, note 57, at page 230.

⁵⁹Supra, note 57, at page 229.

Changes in the Purpose of Use of Water

A Water Supply Bank contemplated by this research project would operate to effect water transfers only between agricultural users. The question of whether changes in the purpose of use of water are now legally permitted in Idaho is, therefore, not immediately relevant to our project. However, as our state continues to grow the question of transferring agricultural water to domestic or industrial uses will inevitably present itself. As one writer pointed out:

In the absence of new sources of low cost water, ways must be found for supporting more people with a given quantity of fresh water if the growth of the West we anticipate is to be accommodated ... The pattern of water use in the West must change. In 1955 almost 90% of the withdrawals in the eleven western states were for irrigation purposes and less than 9% were for industrial uses. In the future it seems certain that these proportions will be altered significantly in view of the fact that an acre foot of water dedicated to industrial use and possibly to recreation will provide more income and employment and thus support more people than an acre foot dedicated to irrigation.⁶⁰

Because this will be an important issue in the near future, and because a future state-wide Water Supply Bank might be involved in water transfers in which a change in the purpose of use of water might be considered desirable, the legal status of such transfers under present Idaho law will be examined.

There is no specific statutory authority either authorizing a change in the purpose of use of water or forbidding such a change. The statutes

⁶⁰Fox, Water: Supply, Demand and the Law, 32 Rocky Mt. Law Review 452, p. 456 (1960).

controlling changes in the use of water are Idaho Code sections 42-108 and 42-222. These deal with changes in the point of diversion and place of use of water - they are silent regarding changes in the purpose of use of water.

This silence has been variously interpreted by different parties. One writer feels that such changes are not now legally permitted.⁶¹ An opposite opinion was expressed by a different authority.⁶²

In two other areas of water law,⁶³ the Idaho Supreme Court has ruled that the absence of statutory authority did not prohibit appropriate action. The first area of water law dealt with the control of ground waters. In the case of Silkey v. Tiegs⁶⁴ the Idaho Supreme Court reviewed a case in which the District Court had issued a decree which included a provision for the commissioner of reclamation to supervise the use of ground water. Under the statutes then existing, the Department of Reclamation has authority over "all of the streams to the canals and ditches diverting therefrom."⁶⁵ The Court admitted that this statute

⁶¹A Program to Promote Irrigation Conservation in Idaho, State of Idaho, Department of Water Resources (1977), p. 24 states:

Under present Idaho statutes, only changes in the point of diversion or place of use can be made as there is no statutory authority for making a change in the nature of use. This means that if an irrigator wishes to sell his water right he may only sell it to another irrigator. This limitation on transferability may act as a disincentive to more efficient use by the irrigator to the detriment of the welfare of the state.

⁶²In an interview in August 1978, Douglas Grant, Professor of Law at the University of Idaho Law School, expressed the opinion the I.C. sec. 42-222 did not necessarily prohibit judicial authorization of changes in the purpose of use of water.

⁶³Control of ground waters and rotation of use. See discussion which follows.

⁶⁴51 Idaho 344, 357-58, 5 P. 2d 1049 (1931).

⁶⁵C. S. Sec. 5606, cited in Silkey v. Tiegs, supra, note 64 @ p. 357.

"does not expressly contemplate its (the department) control of subterranean waters not in a defined stream."⁶⁶

The question faced by the court in Tiegs (supra) is analogous to our question of whether changes in the purpose of use of water are now legally permitted. There was no specific statutory authority then authorizing the department to control ground waters,⁶⁷ nor was there any specific statutory authority denying the department that authority. Under these circumstances, the court in Tiegs (supra) concluded that the department did in fact have authority to control ground water. The court said:

Nor does the fact that the legislature has not legislated on this particular branch of the subject tie the hands of the court here.⁶⁸

The second area of water law dealt with rotation. In the case of State v. Twin Falls Canal Co.⁶⁹ one of the issues presented to the Idaho Supreme Court was whether rotation in the use of water was legally permitted. There was then no specific statutory authority either permitting it or forbidding it. The court explained rotation as follows:

by concentrating the available supply in half or a third, or a less fraction of the canals, and giving the whole of it to the section whose turn it is to take water, the irrigation is made easy in consequence of the higher water levels produced in the canals...The

⁶⁶Supra, note 64, @ p. 357.

⁶⁷This authority was provided in 1963 and 1967 when additions to the Idaho Code, sec. 42-2239, were made. See Hutchins, supra.

⁶⁸Supra, note 64, @ p. 357.

⁶⁹21 Idaho 410, 121 Pac. 1039 (1911).

crops require water at certain times and not continuously. It is better for them, as soon as they have received a watering, that the water supply should be shut off ...⁷⁰

The court in State v. Twin Falls Canal Co. (supra) concluded that even though there was "no statute providing for use by rotation,"⁷¹ the practice was commendable and legally permissible.

In both Tiegs and Twin Falls Canal Co. (supra) the Idaho Supreme Court was faced with an absence of specific statutory authority either permitting or forbidding a practice which the court found to be desirable. If called upon to decide the question of the legality of changing the purpose of use of water today, the court might rule that it is likewise permissible, if it was persuaded that such changes were likewise desirable.

The foregoing is not meant as an argument in favor of the proposition that changes in the purpose of use of water are now legally permitted in Idaho or that they should be permitted. It is intended merely to show that substantial uncertainty exists over this important question. A pronouncement by the legislature resolving this uncertainty would certainly be welcome.

Legal Feasibility of a Water Supply Bank in Idaho

It is a well-established legal principle that the Constitution is the supreme law of the land.⁷² If a conflict should develop between a statute passed by the legislature and the Constitution, the statute must be declared offensive to the Constitution and, therefore, void. Such a statute is called "unconstitutional" and once a court of appropriate jurisdiction

⁷⁰Supra, note 69, @ p. 442.

⁷¹Supra, note 69, @ p. 443.

⁷²Marbury v. Madison, 1 Cr. 137 (1803).

has made a finding of unconstitutionality, the offending law is no longer in effect. In this manner the courts can override legislative action.

Critics of Idaho's new Water Supply Bank Statute⁷³ might attempt to defeat the legislation by attacking it on grounds of unconstitutionality. The Water Supply Bank is an administrative agency and, as such, must comply with the requirements of the due process clauses⁷⁴ of the federal constitution. These clauses state that no person shall be deprived of property without due process of law. The Due Process requirement has been interpreted as requiring basic fairness in administrative agency actions.⁷⁵ Persons who, for example, wished to object to a proposed sale or rental of water to the Water Supply Bank would have to have available a reasonable mechanism for having their complaints heard. A record of the proceedings⁷⁶ must be made, so that an unsatisfied party can appeal to the courts. The agency's actions must not be arbitrary or capricious. So long as the Water Supply Bank adheres to recognized procedures such as those contained in the Federal Administrative Procedures Act, it should be able to withstand a Due Process challenge successfully.

Another potential ground for constitutional challenge lies in the "taking" section of the Fifth Amendment of the U.S. Constitution. That section states "...nor shall private property be taken for public use, without just compensation." This section is the basis for condemnation

⁷³Title 42, Idaho Code.

⁷⁴14th Amendment, 5th Amendment, U.S. Constitution.

⁷⁵Beltone Electronics Corp. v. Federal Trade Commission, 402 F. Supp. 590 (1975).

⁷⁶Citizens of Overton Park, Inc. v. Dept. of Transportation, 401 U.S. 402 (1971).

proceedings. The government, both state and federal (and this power can even be delegated to a private firm), can take property from a private citizen but only for a public purpose, and only if "just compensation" is paid to the owner. Idaho's State Constitution also incorporates this principle.⁷⁷ This constitutional limitation on the taking of property is a parameter within which the Water Supply Bank must operate.

The Idaho Constitution does not pose any direct obstacles to the operation of a Water Supply Bank and, in fact, sanctions the sale or rental of water.⁷⁸ We may therefore conclude that there is no constitutional obstacle that would preclude the concept of a Water Supply Bank.

However, one significant legal obstacle to water transfers in Idaho does exist with regard to storage water developed by the Federal Bureau of Reclamation. The Bureau enters into contracts with water users using Bureau stored water, and these contracts contain a clause prohibiting the sale, lease, or transfer of Bureau of Reclamation stored water to another user. The irrigator is limited to using that water himself on the lands specified in the contract. The Bureau could waive enforcement of this clause, but current policy favors enforcement of it.

If the Bureau refuses to waive the clause prohibiting transfer, it is an absolute bar to any and all transfers, including sale or rental to a water supply bank. In areas where Bureau stored water is significant, this legal obstacle could impede efficient operation of a water supply bank.

⁷⁷Article I, Section 14, Idaho Constitution.

⁷⁸Article IV, Section 1, Idaho Constitution.

Water Districts and the Watermaster's Function

Idaho statutory law gives an important role to the water district and watermaster. Chapter Six of Title Forty Two of the Idaho Code governs this area of state water law. The Department of Water Resources is given the responsibility of establishing water districts.⁷⁹ These water districts are administered by a watermaster who is elected by the holders of water rights within the district.⁸⁰ The watermaster is not an agent of any water company or water user, but rather is a ministerial officer.⁸¹

The watermaster's duties include two functions which are of significance to the legal framework of water transfers in Idaho. The section on beneficial use discusses current administrative procedures required for a water transfer. As that section indicates, a permit from the Department of Water Resources is required before the transfer can be made. The Director of the Department of Water Resources is required to investigate the proposed transfer before issuing the permit, and an important, perhaps the most important, element of the Director's investigation consists of obtaining the recommendation of the watermaster regarding the proposed

⁷⁹Idaho Code Sec. 42-604. "Creation of water districts. - The department of water resources shall divide the state into water districts in such manner that each public stream and tributaries, or independent source of water supply, shall constitute a water district.."

⁸⁰Idaho Code Sec. 42-605. "District meetings - Watermaster and assistants - Election - Removal - Oath and bond. - There shall be held on the first Monday in March in each year, commencing at two o'clock p.m., a meeting of all persons owning or having the use of a water right, in the waters of the stream or water supply comprising such district, which right has been adjudicated or decreed by the court or is represented by valid permit or license issued by the department of water resources

...At such meeting there shall be elected a watermaster for such water district, and such other regular assistants as such meeting shall deem necessary, ..."

⁸¹Bailey v. Idaho Irr. Co. (1924), 39 Idaho 354, 227 P. 1055.

transfer.⁸² While the watermaster's recommendation is not binding, it does carry great weight in determining the outcome of the water transfer proposal.

A second function of the watermaster which affects water transfers is the watermaster's responsibility to determine who will obtain water in times of scarcity.⁸³ The watermaster must determine which water users have superior rights under the Appropriation Doctrine, which is based on first beneficial use. Thus, if water user A owns a 1910 water right to divert 5 cubic feet per second from a stream, and user B owns a 1905 water right to divert 5 cubic feet per second from the same stream, and there are only 5 c.f.s. in the stream, the watermaster will shut down A's diversion system

⁸²Idaho Code Sec. 42-222. "...Upon the receipt of any protest it shall be the duty of the director of the department of water resources to investigate the same and to conduct a hearing thereon. He shall also advise the watermaster of the district in which such water is used of the proposed change and the watermaster shall notify the director of the department of water resources of his recommendation on the application, and the director of the department of water resources shall not finally determine the action on the application for change until he has received from such watermaster his recommendation thereof, which action of the watermaster shall be received and considered as other evidence..."

⁸³Idaho Code Sec. 42-607. "Distribution of water. - It shall be the duty of said watermaster to distribute the waters of the public stream, streams or water supply, comprising his water district, among the several ditches taking water therefrom according to the prior rights of each respectively, in whole or in part, and to shut and fasten, or cause to be shut or fastened, under the direction of the department of water resources, the headgates of the ditches heading from such stream, streams or water supply, when in times of scarcity of water it is necessary so to do in order to supply the prior rights of others in such stream or water supply; provided, that any person or corporation claiming the right to the use of the waters of the stream or water supply comprising a water district, but not owning or having the use of an adjudicated or decreed right therein, or right therein evidenced by permit or license issued by the department of water resources, shall, for the purposes of distribution during the scarcity of water, be held to have a right subsequent to any adjudicated, decreed, permit, or licensed right in such stream or water supply, and the watermaster shall close all headgates of ditches or other diversions having no adjudicated, decreed, permit or licensed right if necessary to supply adjudicated, decreed, permit or licensed right in such stream or water supply..."

so that B, who owns a superior right, will get his full appropriation. A will get nothing, and B will be fully satisfied. It should be noted that only legally established and recognized water rights will be considered by the watermaster in allocating scarce water.⁸⁴ A user whose great-grandfather settled the family farm in say, 1880 and has beneficially used the water since that time, but who neglected to obtain a permit or court decree, will have the lowest status in being allocated scarce water by the watermaster.⁸⁵ If user A was proposing a transfer of his 5 c.f.s. to a third party, the watermaster's determination that A was not in fact entitled to 5 c.f.s. at that time would preclude that particular transfer.

⁸⁴Nampa & Meridian Irr. Dist. v. Barclay (1935), 56 Idaho 13, 47 P.2d 916. The watermaster's duties are to determine decrees, regulate flow of streams and to transfer the water of decreed rights to the appropriate diversion points. Jones v. Big Lost River Irr. Dist. (1969), 93 Idaho 227, 459 P.2d 1009.

⁸⁵Where water rights of parties have been adjudicated, it is duty of watermaster during scarcity of water to treat unadjudicated rights as inferior and subordinate to decreed rights. Big Wood Canal Co. v. Chapman (1927), 45 Idaho 380, 263 P. 45; State v. Hall (1966), 90 Idaho 478, 413 P.2d 685.

CHAPTER IV

THE RETURN FLOW PROBLEM - LEGAL AND PHYSICAL ASPECTS

The problem of return flow is the knottiest problem that a Water Supply Bank will face. As Dean Trelease has succinctly stated:

The principal difficulty in attempting to treat a water right as a salable property is that many water uses are subject to a peculiar interdependency. Since the same water can be used and reused by several persons, all may have water rights that entitle them to receive the same molecules of water. If the sale and transfer of one person's water right will result in making those molecules unavailable to another who also has a right to them, the first user has sold the latter's water as well as his own.⁸⁶

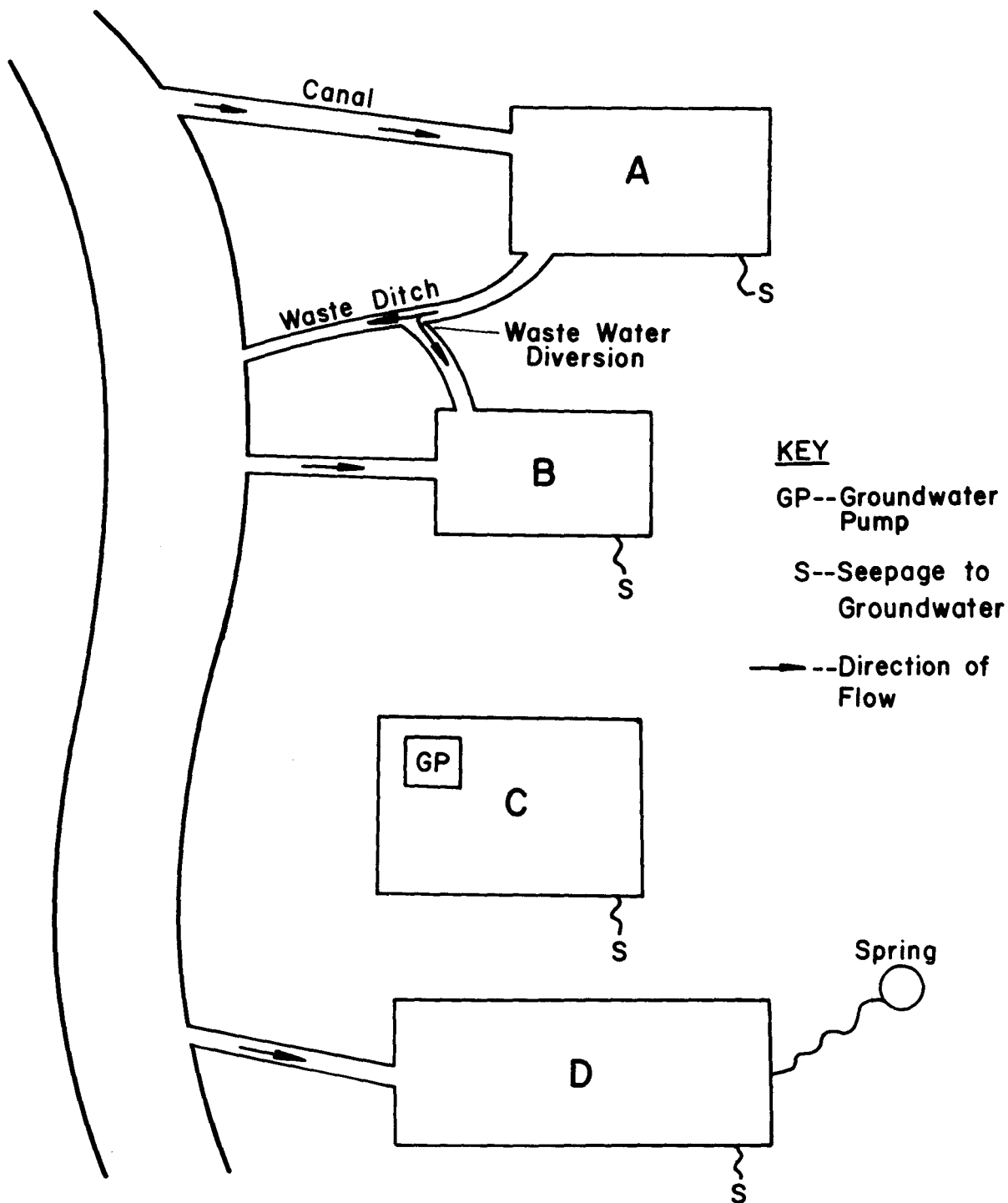
The interdependence of water users is illustrated by Figure 1. Four irrigators, A, B, C, and D are described. A, B, and D take their water from the surface flow of the river, while C pumps from a ground water supply that is hydrologically related to the river. As we see, B uses some return flow from A and also some water from A's waste ditch. C uses water which comes, in part, from seepage from A and B. D uses return flow from A and also spring flow that comes, in part, from seepage from A, B, and C. If, for example, A improved his efficiency and, as a result, returned less waste water and seepage to the hydro system, B, C, and D might suffer.

Current Water Transfer Procedure

Now let us assume that A wishes to sell his water to D. D may be

⁸⁶Trelease, Cases and Materials on Water Law, 2d edition @ p. 205.

FIGURE I. RETURN FLOWS



Source: A Program to Promote Irrigation Conservation in Idaho: State of Idaho Department of Water Resources, 1977. At page 6.

growing a high value crop, while A may be growing a low value crop. If water is in short supply, it would make economic sense to apply the available water to its most beneficial use.⁸⁷ Idaho law permits a change in the point of diversion or place of use of water.⁸⁸ But the statutes permitting such changes also protect the other water users affected, B and C.⁸⁹

The director of the Department of Water Resources must determine whether B and C will be harmed. He may approve the change in whole, in part, or upon certain conditions, or not allow any changes at all.

The statute⁹⁰ does not provide for compensation to be paid to B and C for their losses.⁹¹ Rather, the director is required to deny

⁸⁷Trelease, The Model Water Code, The Wise Administrator, and the Goddam Bureaucrat, 14 Nat. Resources J. 207-29 (1974).

⁸⁸Idaho Code sec. 42-222 (1); Idaho Code sec. 42-108: "the person entitled to the use of water...may...transfer the same to other lands, if the water rights of others are not injured by such change..." The Idaho Supreme Court has said: "One of the valuable incidents of this property right [water] of which the owner cannot be deprived is the right to use it where he will and to change its place of use, provided always that by such use or change in the place of use the rights of others are not adversely affected." First Security Bank of Blackfoot v. State, 49 Idaho 740, @ 722, 291 Pac. 1064 (1930). This same legal rule exists with respect to ground water. Noh v. Stoner, 53 Idaho 651, 26 P.2d 112 (1933).

⁸⁹Even if B and C hold appropriative water rights that are junior to A's, they have a vested right as against A to insist upon a continuance of the conditions that existed at the time their later appropriations were made, provided that a change would injure them. Bennett v. Nourse, 22 Idaho 249, 125 Pac. 1038 (1912). This rule was later expanded to include a vested right to the maintenance of subsequent conditions, in 47 Idaho 497, 277 Pac. 550 (1929).

⁹⁰Supra, note 88.

⁹¹Recommendation 7-28 of the report of the National Water Commission, 1973, recommends that the director be allowed to determine the value of B and C's losses, and award them compensation, in cases where the new use of water is substantially greater than the old use.

the change if losses to B and C will result. While the statutes do not provide for compensation, nothing prevents A, B, C, and D from coming to a private agreement where, for a mutually agreed upon price, B and C would withdraw their objections, thus allowing the change to take place. If such a private agreement could be reached, the scarce water would be allocated to its highest use, and all incidental losses would be fairly compensated.

Sales or rentals of water are taking place today using the above procedure.

However, this procedure suffers from two flaws which reduce its efficiency. First, it is a slow and expensive process and second, difficult physical problems of identifying return flows are present. A must come to an agreement with D on price, quantity, and time of delivery. An attorney may be needed to draw up a binding contract. Then A must go to the Department of Water Resources and apply for approval for the change. A filing fee of \$15 to \$35 must be paid. If A lacks the expertise to file the application, he may have to hire an attorney to do it for him. The Director must then advertise A's application for two weeks in a local newspaper. B and C must respond to this advertisement and file their notices of protest. They may need to hire lawyers to do this for them. Then the Director will have to schedule a hearing allowing time for all parties to prepare their cases. The Director must also notify the appropriate watermaster and get his recommendation regarding the change. The Director then holds a hearing, which is similar to a trial, and renders a decision. If the Director denies A's application, A still has 60 days in which to file an appeal to the District Court. If the Director approves A's application, B or C have 60 days

to appeal that decision. If an appeal is made, the District Court will start from scratch, disregarding all the proceedings that took place earlier and hear the case anew.⁹² Then the case will be treated like any other civil matter. If an appeal is taken from the district court's decision, it could be years before the matter is finally resolved. If D happens to own valuable grapevines that took years to develop but which are dying because of a drought, he would probably feel that the procedure was too slow.

The No Injury Rule

As we have seen, present Idaho law and procedure allows a water user to block another water user's proposed change of point of diversion and place of use of water, if that change would deprive other water users of return flow. This is a substantial right, but it is not absolute. One limitation upon this right is that the injury complained of must be substantial, this is, "not merely a fanciful injury but a real and actual injury."⁹³ Such a real injury would result if there were an increase in the burden on the stream or a decrease in the volume of water flowing in the stream.⁹⁴

Another limitation on a downstream user's right to return flow is the rule that an upstream user cannot be required to continue wasting water.⁹⁵

⁹²82-222(3), appeal de novo.

⁹³Beecher v. Cassia Cr. Irr. Co., 66 Idaho 1, 154 P.2d 507 (1944). To prevent a change in the point of diversion the injury must be to a water right, Colthrop v. Mountain Home Irrigation District, 66 Idaho 173, 157 P.2d 1005 (1945).

⁹⁴Wood River Power Co. v. Arkoosh, 37 Idaho 348, 215 Pac. 975 (1923); Crockett v. Jones, 42 Idaho 652, 249 Pac. 483 (1926).

⁹⁵Jones v. Big Lost River Irrigation District, 93 Idaho 227, 459 P.2d 1009 (1969).

In Colthrop v. Mountain Home Irrigation District,⁹⁶ the Idaho Supreme Court ruled that where the upstream user had been wasting 75% of the water applied to his fields, the downstream user, who had been appropriating this waste water, could not prevent the upstream user from changing his water use and discontinuing the waste. The Idaho Supreme Court followed the rule expressed in the Colthrop case (supra) in Application of Boyer,⁹⁷ and said:

The rule that a junior appropriator has the right to a continuation of stream conditions as they were at the time he made his appropriation could not compel respondent [upstream user] to continue to waste his water...⁹⁸

To sum up the foregoing, Idaho's present statutory scheme is somewhat cumbersome and slow, but it does operate to protect the interests of all water users. Downstream users can often block an upstream user's attempt to change his use of his water, unless the upstream user's change is to reduce or eliminate waste. And the harm that downstream users complain of must be real and substantial.

Physical Problems of Measuring Return Flow

Let us now turn to the second basic problem with current Idaho law and procedure: The physical problem of determining and quantifying the return flow itself. Subterranean flows are difficult to identify, and waters precolating through the earth might take undetermined amounts of time to affect other flows. This presents a problem to a prospective participant in a Water Supply Bank because the burden of proof is upon him: he must

⁹⁶66 Idaho 172, 157 P.2d 1005 (1945).

⁹⁷73 Idaho 152, 248 P. 2d 540 (1952).

⁹⁸Supra, Note 97, @ p. 162.

show that the change will not interfere with the rights of others.⁹⁹ An upstream water user seeking a change was unable to meet this burden of proof in Cariter v. Buck,¹⁰⁰ and therefore was denied the right to make a change. Let us examine this burden more closely.¹⁰¹

The Idaho Supreme Court has repeatedly ruled that an action (lawsuit) to ascertain, determine, and decree the extent and priority of an appropriative water right partakes of the nature of an action to quiet title to real estate.¹⁰² Such an action is civil in nature, and so the burden of proof is to a preponderance of the evidence.

So while our prospective Water Supply Bank seller must prove that other users will not be harmed, he need not prove this absolutely or conclusively, but merely to the degree that it is more likely than not that no harm to other users will result. Further assisting our prospective Water Supply Bank seller is the case of United States v. Haga.¹⁰³ In that case, an important issue was whether a downstream supply consisted of one party's return flow, and what the extent of that return flow might be.

⁹⁹Federal Land Bank of Spokane v. Union Central Life Insurance Co., 54 Idaho 161, 29 P.2d 1009 (1934).

¹⁰⁰9 Idaho 571, 75 Pac. 612 (1904).

¹⁰¹Burdens of proof differ in their size. In most civil cases, the burden of proof is to a preponderance, meaning just barely more proof than the opposition has mustered; numerically, perhaps the equivalent of proof to a 51% degree of likelihood. Criminal cases require proof beyond a reasonable doubt; numerically perhaps the equivalent of proof to a 98% degree of likelihood. See McCormick, Handbook of the Law of Evidence, @ p. 676 (1954) for an expanded discussion of burdens of proof.

¹⁰²Taylor v. Hulett, 15 Idaho 265, 97 Pac. 37 (1908); Harris v. Chapman, 51 Idaho 283, 5 P.2d 733 (1931); Olson v. Bedke, 97 Idaho 825, 555 P.2d 156 (1976).

¹⁰³276 Fed. 41 (D. Idaho 1921).

Regarding the technical problem of ascertaining the precise amount of return flow, the court said:

Identification of the water to which it is thus found to be entitled is necessarily attended with a measure of uncertainty, but an *approximation* is thought to be *practicable*,¹⁰⁴ (italics added)

The court then went on to decree water rights based upon those practicable approximations.

Judge Dietrich's practical approach in the Haga¹⁰⁵ case is consistent with the approach taken by courts generally, when faced with incomplete evidence in civil cases.¹⁰⁶

We may therefore conclude that the physical problem of determining and quantifying the return flow is serious but not insurmountable. At present, this determination is being made by the Director and by District Court judges.

A highly trained and specialized department within a Water Supply Bank would have to be developed in order to employ the most advanced technology in making determinations of return flows. There is every reason to believe that Water Supply Bank personnel with the requisite expertise could do at least as well as current fact finders in this area.

¹⁰⁴Supra, note 69, @ p. 48.

¹⁰⁵Supra, note 103.

¹⁰⁶See for example Bradford v. Simpson, 98 Idaho 830, 573 P. 2d 149 (1978). where in spite of conflicting and uncertain evidence, the defendant was found liable for flood damage.

CHAPTER V

A LEGAL ANALYSIS OF WATER TRANSFER ALTERNATIVES IN IDAHO

There is increasing emphasis on water conservation at the state and federal levels. Many states have adopted water plans with the avowed purpose of making efficient use of water and conserving where possible.¹⁰⁷ Modern sprinkler irrigation equipment is capable of using less water in servicing crops. This raises the question of what to do with the conserved water. Western water rights are predicated upon the Appropriation Doctrine which gives the holder of the right an absolute right to a certain quantity of water, conditioned only on his ability to use the water beneficially. If a user is entitled to 1000 acre feet but uses only 500 acre feet, what is he to do with the conserved water? This chapter will examine eight options, including the new option created by the state of Idaho - depositing the conserved water in the state water bank.

Here are the options facing an agricultural water user who has realized a water surplus through conservation:

1. Make no use of the water saved
2. Make use of the water saved to irrigate more acres
3. Sell the water (permanently) to another user
4. Rent the water to another user for one season
5. Use the water for other than agricultural use
6. Switch to a more water-intensive crop
7. Store the water
8. Deposit the conserved water in a water bank

¹⁰⁷ See, for example, the Idaho State Water Plan adopted by the Second Regular Session of the 44th Idaho Legislature (1978).

Alternative 1: Make No Use of the Water Saved

Since downstream users cannot compel A (our user with a surplus) to use his full appropriative right of 1000 acre feet, A is free to cut his use to 500 acre feet without interference from downstream users. However, if he continues to use only 500 acre feet annually for five years, he risks loss by statutory forfeiture,¹⁰⁸ resulting in a total loss to A of the water saved. The forfeiture statute requires five continuous years of non-use, however, and A might preserve his full 1000 acre feet water right by reverting to a more wasteful irrigation method and beneficially applying his full 1000 acre feet every fifth year. It would be a remarkable spectacle to see modern, expensive irrigation equipment sitting idle every fifth year and primitive methods reverted to in order to satisfy a legal requirement. Such a turn of events would likely evoke dumb amazement by the public at the curious working of our legal system.

Alternative 2: Make Use of the Water Saved to Irrigate More Acres

A might apply the saved 500 acre feet to new fields. This would involve a change of place of use of water and be, therefore, controlled by Idaho Code Sec. 42-222 and 42-108.¹¹⁰ The "no injury" test contained in those

¹⁰⁸Idaho Code Sec. 42-222(2). The alleging party must show, by clear and convincing evidence, that an intent to abandon was present, as well as non-use. Gilbert v. Smith, 97 Idaho 735, 552 P.2d 1220 (1976).

¹⁰⁹And even this device might fail, for downstream users could claim that A's relatively wasteful use of 1000 acre feet in the 5th year really constituted a waste of 500 acre feet; thus A's beneficial use was perhaps limited to 500 acre feet for five consecutive years, and he could lose 500 acre feet through statutory forfeiture.

¹¹⁰Idaho Code Sec. 42-222(1); Idaho Code Sec. 42-108: "the person entitled to the use of water...may...transfer the same to other lands, if the water rights of others are not injured by such change..." The Idaho Supreme Court has said: "one of the valuable incidents of this property right [water] of which the owner cannot be deprived is the right to use it where he will and to change its place of use, provided always (cont.)"

statutes could block A's plans here. Moreover, A must apply to the Department of Water Resources for a permit to change his place of use and irrigate additional acreage. This would probably be considered an enlargement of his water right and denied, even if other users are not directly harmed. This is still a viable alternative, but considerable uncertainty surrounds it. As a practical matter, A might simply bypass the permit requirement and go ahead and irrigate new fields without permission. He would be in violation of law, but enforcement is unlikely unless someone, probably a neighbor, informs on him. And his neighbor is not likely to be an informer if the neighbor is also doing the same thing, or contemplating it. So perhaps the option of applying the 500 acre feet of water saved to additional acreage is more attractive than it is legally entitled to be.

Alternative 3: Sell the Water, Permanently, to Another User

If A does not have (or can't acquire) additional acreage to irrigate, then a permanent sale of the 500 acre feet saved might defray part of the cost of installing the water-saving equipment. Sale of a water right apart from the land is recognized in Idaho,¹¹¹ but the "no injury" test will

that by such use or change in the place of use the rights of others are not adversely affected." First Security Bank of Blackfoot v. State, 49 Idaho 740, @ 722, 291 Pac. 1064 (1930). This same legal rule exists with respect to ground water. Noh v. Stoner, 53 Idaho 651, 26 P.2d 112 (1933).

¹¹¹The right to convey water rights apart from the land to which it was originally appurtenant is a recognized right in Idaho. In In re Robinson, 61 Idaho 462, @ 469, 103 P.2d 693 (1940), the Idaho Supreme Court said: a water right is real property and may be sold or transferred separate and apart from the land on which it is used and may be made appurtenant to other lands so long as such transfer does not injure other appropriators.

Some other western states do not permit such bifurcation of rights. See Water Saved or Water Lost, 11 Land and Water Law Review 435 (1976).

again have to be met. However, since the sale involves a permanent grant, the dollar amount might well justify the cumbersome and probably expensive procedure required. If A can find a buyer willing to pay a substantial price, this option could be a desirable choice under present Idaho law. However, actual experience indicates that farmers will seldom voluntarily part with even a portion of their water rights.

Alternative 4: Rent the Water to Another User for One Season

Again, the constraint of no-injury to other users will have to be met. This option appears less attractive, because all of the difficulty and expense involved in obtaining Department approval will accrue to only one irrigation season. Perhaps in a drought year a one season rental might bring a high enough price to justify the effort and expense, but in an ordinary year this is less likely. In any event, the high transaction costs involved will certainly discourage A from trying to rent out his saved 500 acre feet on any short-term basis.

Alternative 5: Use the Water for Other than Agricultural Use

A might consider, for example, building a Pepsi-Cola bottling plant on his land, or some other business which requires large amounts of water to operate. Legally, this is an interesting option. Idaho law requires Department approval for a change in point of diversion or place of use of water. A would not be changing his point of diversion; he would not be changing his place of use. Idaho law is unclear as to whether a change in purpose of use is legally permissible.¹¹² Downstream users could not

¹¹²There is no specific statutory authority either authorizing a change in the purpose of use of water, or forbidding such a change. The statutes controlling changes in the use of water are Idaho Code Section 42-108 and 42-222. These sections deal with changes in the point of diversion and place of use of water. They are silent regarding changes in the purpose of use of water.

complain of the loss of their return flow because A would still be applying his 1000 acre feet to beneficial use. Industrial use is a recognized beneficial use,¹¹³ and A had not changed his point of diversion or place of use. The chief drawback to this option is the uncertainty involved, and whatever practical problems may exist in installing an appropriate non-agricultural use on the premises.

Alternative 6: Switch to a More Water-Intensive Crop

Of course, the only incentive to switch is if the more water-intensive crop is also a more profitable crop. If it is, then little stands in A's way. The Idaho Supreme Court has made it clear that a farmer may change the character of crops grown at will.¹¹⁴ The court said:

Users of water may change the character of crops grown at will from those that require much water to those that require little water and vice versa, and the extent of a user's permanent right may not be limited by the character of crops raised unless the soil is adapted only to one or to a limited kind of crop.¹¹⁵

If A elects this option, downstream users would lose return flow but they could not prevent A from growing his water intensive crop, and they would not be entitled to compensation for their loss. In view of the difficulties present with options 1 - 5, this last option has several attractions. No Department approval or permit is required; no loss of water rights through forfeiture threatens; no transaction costs accrue;

¹¹³Idaho Constitution, Article XV sec. 3.

¹¹⁴Muir v. Allison, 33 Idaho 146, 191 Pac. 206 (1920); In re Robinson, supra.

¹¹⁵Muir v. Allison, supra, @ 159.

no large investment in a non-agricultural business is necessary. The constraint, of course, is the availability of a higher profit, more water-intensive crop.

Alternative 7: Store the Saved Water

Both Idaho statutory ¹¹⁶ and case law ¹¹⁷ recognize storage as a beneficial use of water. However, the amount of stored water must bear a reasonable relation to the user's needs, ¹¹⁸ and may be limited to a maximum of 5 acre feet of stored water per acre of land to be irrigated, ¹¹⁹ where flood or winter flow waters are involved. Several problems arise with this option. A will have to obtain a water storage right from the Department of Water Resources. This will not be granted unless it appears that the stored water will be used beneficially. Even if A obtains the storage permit, he will have to secure the available space in a storage reservoir. A storage reservoir may not be available, or, if it is available, it might already be fully utilized. The "no-injury" test will have to be met so if downstream users suffer loss of return flow, they could prevent A from storing his saved water.

In spite of these difficulties, storage of saved water is an attractive option in areas which are faced with repeated shortages.

The above seven options represent A's pre-waterbank alternative uses for his saved water and the legal constraints facing each. It should be

¹¹⁶Idaho Code Sec. 42-1737, 42-202, 42-801, 42-802

¹¹⁷Payette Lakes Protective Ass'n v. Lake Reservoir Co., 68 Idaho 111, 189 P.2d 1009 (1948), Anderson v. Dewey, 82 Idaho 173, 350 P.2d 734 (1960).

¹¹⁸Idaho Code Sec. 42-1737.

¹¹⁹Idaho Code Sec. 42-202.

noted that several of these options could be combined. For example, combining options 4 and 7, A could rent 300 acre feet and store 200.

Reviewing the above seven options, we see that none is entirely satisfactory. Making no use of the water saved could result in a loss of water rights through statutory forfeiture. Irrigating more acres is likely to be viewed as an enlargement of the water right and prohibited by the Department. A permanent sale involves substantial transaction costs and could leave A without water that he might need at a future time. Renting the saved water might not be economically practical in view of the high transaction costs and the relatively smaller amounts of income produced. Using the saved water for a non-agricultural use might be legally prohibited and impractical. Switching to a more water-intensive crop might not be feasible or more profitable. Storing the saved water might be impossible if no storage space is available, and this option is limited by other constraints as well.

The unavailability of an efficient, cheap and quick method for A to profitably dispose of his saved water might very well deter him from investing in the expensive equipment that he must buy in order to create the water saving. This is one reason why Idaho has recently adopted the new institution of a water bank.

Alternative 8: Deposit the Saved Water in a Water Bank

This is a new and even radical departure from traditional water law. As we have seen the foregoing seven options are all less than entirely satisfactory. In order to facilitate the efficient transfer of surplus water to those who need it, the State of Idaho has pioneered the institution of a water bank. No other state has institutionalized this concept, although it has been flirted with on a temporary basis. The State of California once

employed a water bank during a drought year.¹²⁰

The Idaho Water Bank was first proposed in the State Water Plan, adopted by the Idaho Water Resource Board on December 29, 1976.¹²¹ Policy 11 of the Plan states:¹²²

A water supply bank should be established for the purpose of acquiring water rights or water entitlements from willing sellers for reallocation by sale or lease to other new or existing uses. Legislation authorizing the water supply bank should also provide for the bank to be self-financing in the long run with initial funding to be provided by creation of a Water Management Fund as provided for in Policy 31.

The plan goes on to state that "The state is approaching a situation where all water supplies capable of being developed have been utilized. Presently, there is difficulty in finding buyers for blocks of water when such water becomes available, primarily because the water rights for sale are either too small to be made into an economical block or too large to a single buyer to acquire. This proposal would create a self-financing program for the acquisition and sale of water entitlements and would act as a mechanism to acquire and hold water for future users. Water rights would be purchased from willing sellers and then resold to new users at a cost sufficient to cover expenses associated with the original purchase. Water rights held in the bank for future uses could be "leased" or "rented" for interim uses to cover costs of administering the bank until resold. Public benefits derived would be considerable."

¹²⁰Angelides, S., and E. Bardach. 1978. Water Banking: How to Stop Wasting Agricultural Water. 52 pp. San Francisco, California.

¹²¹Idaho Water Resource Board, Boise, Idaho 83720.

¹²²See page 100 of the Plan.

From this embryonic beginning has emerged enabling legislation enacted by the Idaho legislature in 1979 to establish a permanent "Water Supply Bank" for the state.¹²³ The Bank may accept deposits¹²⁴ and may act as a broker¹²⁵ between buyer and seller. It is significant that a new constraint to water transfers has been introduced by this section, that of "no conflict with the 'local public interest.'" As discussed above, one of the dangers inherent in water transfers is

¹²³42-1761. WATER SUPPLY BANK CREATED. The water resource board shall have the duty of operating a water supply bank. The water supply bank shall make use of and obtain the highest duty for beneficial use from water, provide a source of adequate water supplies to benefit new and supplemental water uses and provide a source of funding for improving water user facilities and efficiencies.

¹²⁴42-1762. RULES AND REGULATIONS - ACQUISITION OF WATER RIGHTS. The water resource board shall adopt rules and regulations in governing the management, control, delivery and use and distribution of water to and from the water supply bank in compliance with chapter 52, title 67, Idaho Code. The board may contract with lessors and lessees and act as an intermediary in facilitating leasing or rental of water. The board may purchase, lease, rent or otherwise obtain water rights to be credited to the water supply bank. The water rights may be retained in the water supply bank for a period as determined by the board.

¹²⁵42-1763. LEASE OF WATER RIGHTS - APPROVAL BY DIRECTOR. Decreed, licensed or permitted water rights may be leased or rented. The use to which the owner is entitled under his water right shall be reduced by the quantity of the leased or rented water right. The terms and conditions of any such lease or rental must be approved by the director of the department of water resources. The director of the department of water resources may reject and refuse approval for or may partially approve for less quantity of water or may approve upon conditions any proposed leases or rentals where the proposed use is such that it will reduce the quantity of water available under other existing water rights, the water supply involved in the lease is insufficient for the purpose for which it is sought, the lease would cause the use of water to be expended beyond that authorized under the water right to be leased, or it will conflict with the local public interest where the local public interest is defined as the affairs of the people in the area directly affected by the proposed use. Such leases or rentals shall be approved only for uses within the state of Idaho. The approval of a lease or rental may be a substitute for the requirements of section 42-222, Idaho Code.

loss through statutory forfeiture. It was therefore essential that the new water banking law provide that such forfeiture would not occur as a result of participation in the Bank. Idaho's enabling legislation contains a provision that eliminates this problem.¹²⁶

The Idaho Department of Water Resources has proposed rules and regulations for the operation of the Water Supply Bank. However, the critical issue of price is not resolved; proposed Rule 4 simply states that "price shall be the market price as determined by the board or other method of setting a price..." The "no injury" rule, which allows a downstream user who holds water rights and who will be adversely affected by the transfer (sale) of water to block the transfer, has been retained in Proposed Rule 3. A substantial fee, 10% of the sale price of the water, is to be retained by the bank to cover expenses and also to fund future water projects. (Proposed Rule 5)

In examining the new enabling legislation and the rules proposed thereunder, we see a mixed bag of benefits and detriments. Statutory forfeiture is avoided, a wider market of sellers and buyers is created, and more efficient information dissemination should result. However, transaction costs are boosted 10% to cover the Bank's fee; a new constraint of not offending the "local public interest" has been created

¹²⁶42-1764. SUBSTITUTION - LEASES NOT SUBJECT TO FORFEITURE - DEDICATION. The approval of a lease or rental may be a substitute for the requirements of section 42-222, Idaho Code. Leases or rental of water rights acquired pursuant to section 42-1763, Idaho Code, shall not be subject to forfeiture under section 42-222(2), Idaho Code, provided that the rental agreements have been approved. The lease or rental of such water rights shall not constitute a dedication to the lands of any lessee or renter since the rental, sale, or distribution of water by the water bank is only incidental to its primary purposes listed in section 42-1761, Idaho Code.

(which can be criticized on grounds of vagueness) and the "no injury" rule can still block an otherwise desirable transfer of water. Moreover, a new bureaucracy has been created at the state level which has taken over functions that were previously handled at the local level.

CHAPTER VI

ECONOMIC EFFICIENCY AND WATER TRANSFERS

This chapter attempts to clarify the distinction between physical efficiency and economic efficiency in water use and allocation. The discussion also explores the complexities which arise in water use because of "externalities" or "third party effects," and the nature of the transaction costs associated with water transfers. Finally, the Water Supply Bank is evaluated as an intermediary institution which could help reduce these transaction costs.

Economic Versus Physical Efficiency

The studies of irrigation efficiency in southern Idaho summarized in Chapter II indicated there was significant potential for improving irrigation efficiency. These studies suggested that some irrigators or organizations could save up to one-half of their diverted water supply through technical improvements: lining canals and ditches, better water scheduling, installing sprinkler systems, etc. The emphasis of these studies was on physical rather than economic criteria. Economic criteria involve consideration of the costs and benefits of such improvements in physical efficiency. Economic considerations require evaluation of the cost of inputs, not just their physical quantity. While a productive process is a function of technical relationships between inputs (resources) and outputs, the choice of production technique depends upon the cost of inputs or resources. Profit-maximizing behavior encourages the technique which is least costly for a given level of output or value of output. If water is perceived as nearly costless, it will tend to be substituted for other resources such as labor or capital which have higher relative prices.

The cost of water to most irrigators in southern Idaho is generally limited to the operating and maintenance cost of water delivery to the irrigator or farm. Storage water maintenance and operating costs provided by the Bureau of Reclamation vary between \$0.50 and \$0.75 per acre foot. Assessments may also be made on the capital construction costs or for the bonded indebtedness of the irrigation district. These are usually based on the land in irrigation districts. For Bureau of Reclamation (now the Water and Power Resources Services) assisted projects, the pay-off period for the construction costs was usually set at forty years with no interest requirements.¹²⁷

The evidence from Allen and Brockway¹²⁸ indicated the cost per acre foot of water from a sample of representative irrigation projects in Idaho for the year 1977 averaged \$3.39 per acre foot of water. The lowest cost among the projects was \$0.148 per acre foot of water with the highest being \$23.41 per acre foot of water. Not surprisingly, the irrigation efficiency of the project with the highest cost per acre foot of water was 55 percent. The irrigation efficiency of water for the project with the lowest cost per acre foot of water delivered was only 12 percent.

¹²⁷The level of Bureau of Reclamation activity in Idaho has been substantial. Federal assistance has been utilized for development of water supplies for approximately 37 percent of the irrigated lands in the state. The nearly 5.5 million acre feet of reservoir storage constructed by the Bureau by the early 1970's represented nearly 16 percent of the total water supply. Total costs of public investment in irrigation projects in Idaho were \$208.9 million, with \$157.8 million required to be reimbursed by the irrigation districts or beneficiaries. (Source: Summary Report of the Commissioner, Bureau of Reclamation). What part of this latter figure remains has not been documented; it would depend upon each project - the date of the completion of the projects and the contract specification of each contract between the Bureau and the district or project.

¹²⁸op. cit.; appendix B.

This sparse evidence indicated economic behavior motivated by economic calculus, cost in this case.

As indicated in the previous chapter, an individual irrigator or organization has a number of options when contemplating water conservation to increase water use efficiency. Many of these options are risky because of the legal constraints or uncertainties. Without access to a market for the conserved water, it is difficult to appraise the private benefit of improved efficiency. Without a market to rent or sell conserved water, benefits can not be captured by the individual or organization. The cost of improving water use efficiency, however, would be incurred by the individual or organization. Given such a situation, there is little incentive to improve water use efficiency. The social benefits may indeed be sufficient to justify the additional costs of increased water use efficiency, but lacking a market to transfer water and its guidance system, there will be little incentive.

Economic Efficiency Criteria

In discussions on the allocation of water supplies such terms as "beneficial use," "fair share," and "reasonable requirements" are often suggested as criteria. These terms are essentially concerned with equity or distributional issues. The difficulty is determining what is "fair," "beneficial," or "reasonable." Economics as a discipline can address distributional questions, but its primary responsibility is the application of efficiency criteria. Economics alone cannot give answers to distributional policy issues; it can indicate the costs of inefficiency and how to attain efficiency. Economic analysis can then address what

the distributional consequences of attaining efficiency in alternative ways may be.

Economic analysis asserts one universal principle which characterizes an efficient allocation - the "equal-marginal value in use" principle. The value in use of any unit of water purchased by an ultimate user is measured by the maximum amount of resources (money) which the user would be willing to pay for that unit. Marginal value in use is the value in use of the last unit consumed and, for any given consumer, marginal value in use will ordinarily diminish as the quantity of water consumed in any period increases. The equal-marginal principle is that all consumers or users derive equal value in use from the marginal unit consumed or used.

As far as efficient allocation of water is concerned, the ideal solution is that the value of the marginal product from the resource be equal in all uses. When we take transfer costs into consideration, transfers should take place so long as the disparity in marginal values in use exceeds the transfer costs. If perfect markets for water existed, this result would be brought about automatically, since the higher valued uses could always buy out the lower valued uses at some mutually advantageous price. If resources are to be put to their most efficient use, there should be no uncertainty of tenure or insecurity of the property right and no restrictions upon the use. Insecurity of right interferes because individuals will be unwilling to pay for property or its use if a secure right cannot be conveyed. Existing holders of a property will be unwilling to bear the costs in development or conservation of the resources if there is a risk of seizure without compensation. Restrictions upon voluntary

choice of use - whether upon place, purpose, or transfer - interferes with the market process.

In water use the measurement may be considered either a stock unit such as an acre-foot of a flow such as cubic foot per second. Value per unit of water resources is usually considered on an annual basis, although the exchange of rights would also involve capital values. The relevant measurement of water use in a productive process is termed consumptive use. In assessing the value of the marginal product of water, determining allocative efficiency consumptive use is an important factor since the availability of return flow or water re-use potential becomes a part of the issue of efficiency. Upstream use of water has frequently been favored over downstream use because of the re-use potential or return flow. Where water is transferred some distance in unlined canals or ditches, losses occur through evaporation and seepage; thus the consumptive use and diversion of water may be quite different. An ideal method for valuing water would take account of both gross diversion and consumptive use. The two characteristics of these resources are: consumptive use and return flow (in the case of streams) and recharge water (in the case of ground water). Valuation procedures would involve a payment for the first use, and credit or compensation for the second. Practical difficulties are inherent in measuring the water returned, especially in the case of ground water return or recharge. Hydrological knowledge and information may be the limiting factor.

Third Party Effects and Efficiency Criteria

As previously mentioned, present water law recognizes the interrelatedness of water supplies by providing procedures to protect users' rights

when a transfer that changes the point of dimension or type of use is proposed. However, these procedures have not been developed to permit a change or transfer of water that is consistent with economic efficiency. In situations where there are a number of diversions from a flowing river, stream, ditch or canal, some fraction of the water may be returned to the stream as "return flow," which represents a potential quantity of usable water. In these situations exchanges between upstream and downstream users affect uses at intermediate locations or sequential use. In such cases the users are partially complementary in the nonconsumptive use. Optimal allocation within these situations would be determined by equating marginal products per unit of consumptive use. Allocation among groups of users would require equating joint marginal products.¹²⁹

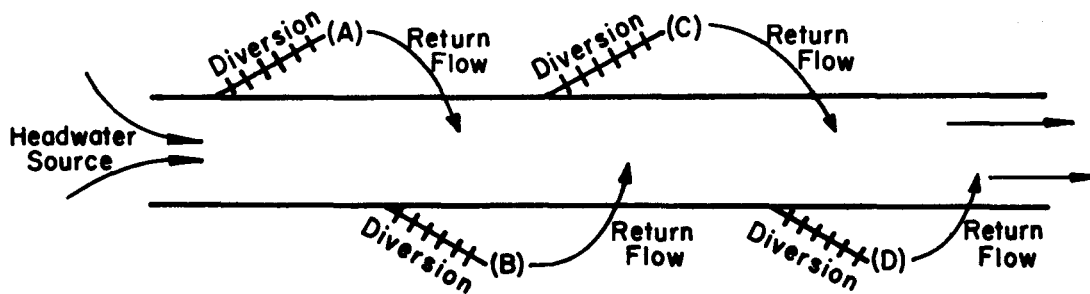
In general, a test of allocative efficiency between any two points is whether the value of the marginal product in the first use plus the value of the marginal product from each succeeding return flow is equal between all points of use. As market conditions for products change, the value of the marginal product of water will change, which will require reallocation of water to achieve efficiency. Because of externalities or third-party effects the water transfer may not occur, thus economic efficiency will not be achieved. Suppose two parties motivated by profit incentives begin negotiations for a purchase or rental transaction of water that would require changing the point of diversion of water. The greater the difference in the value of the marginal product of water between the two, the greater the incentive for the transaction.

¹²⁹A rigorous discussion of these complexities is provided by Jack Hirshleifer, J. DeHaven, J. Milliman: Water Supply, Rand Corporation, University of Chicago (1960), especially Chapter III, "Economics of Utilization of Existing Water Supplies," pp. 32-73.

An issue arises concerning the matter of the water right; a change in point of diversion will often change the return flow pattern and affect other users - the externalities or third party effects. Transfers in such cases are generally restricted to the habitual consumptive use. An efficient transfer would occur if the value of the marginal product in the preferred use plus the value of the marginal product of the return flows in this use was greater than the potential suppliers' value of the marginal products for return flows from his use. Since the two negotiating parties only consider their respective values of the marginal product of water, and not the values of sequential users, the private interests of the two parties above do not result in an economically efficient transfer.

A simplified diagram is provided to more clearly illustrate and examine the transfer problem. The diagram shows a simplified river or canal system. To illustrate the previous discussion, consider a situation where there is an incentive to transfer water rights held at diversion (A) to the diversion at (C). Diversion (B) in the schematic diagram represents intermediate water uses between (A) and (C) that are partly dependent upon return flows from (A), except during reduced stream flows when they may be totally dependent upon the return flows from (A). Users at (D) are likewise partially dependent on return flows from (C). If the water right at (A) is transferred permanently (sale) or temporarily (rented) to (C), then the users at (B) lose the return flows from (A). These flows, if not totally consumed by (C), are redistributed to the users below (C) shown in the diagram by diversions at (D). Present procedures may well prohibit the transfer, or restrict the transfer to the consumptive use at (A) in order to protect the (B) rights that rely on the return flows from (A).

SCHEMATIC DIAGRAM OF A SIMPLIFIED RIVER OR STREAM



Procedures Facilitating Efficient Transfers

A procedure permitting efficient transfer would make the (C) user free to sell the return flow to downstream users, i.e. to (D). The (C) user could buy the return flow of (A) from the (B) users and transfer the full amount of the (A) right or forego the return flow, transferring only the consumptive use of (A). The achievement of an efficient transfer, however, depends on sale of return flow from (C) to downstream users. The buying and selling of return flows considers both the full sequence of uses of water in its present allocation and the anticipated allocation of the full sequential uses at the new diversion. This procedure would involve internalizing the external costs and benefits of reallocating water into the market's valuation process. Internalization of these externalities would enable potential buyers and sellers to weigh the full productive use of a given quantity of water in present and anticipated use, so that there would be a possibility for the market to bring about an efficient transfer.

This efficient transfer process or procedure would be facilitated by an intermediary agency which could provide information on the externalities

and thus reduce the transaction costs to potential buyers and sellers. In the situation described above, for example, this intermediary agency could inform the downstream users (D), that new return flow from (C) is available for use. This availability would be contingent upon the (D) users compensating (C). The water bank concept could introduce such an intermediary agency facilitating and encouraging the market process to achieve economically efficient water transfers.

Transaction Costs and Water Transfers

Economists use the term "market" to refer to the complex of activities through which potential buyers and sellers of goods or services or resources, are brought into contact with one another to engage in voluntary purchase, sale, or rental. Markets can be as sophisticated as the structured institutions like the New York Stock Exchange or as informal as a flea market. Common to all markets, however, is the contact of potential buyers and sellers making bids and offers in the process of determining the terms of the voluntary exchanges. Buying and selling are voluntary activities that would not be undertaken unless the gains from these activities outweighed the costs incurred by the market participants, and markets facilitate such activities.

The process of engaging in exchange entails costs for sellers and buyers. Such costs are referred to as transaction costs. There are costs involved in locating potential buyers and sellers; economists refer to these as search costs.¹³⁰ These are the costs in time and effort involved in obtaining information on potential buyers and sellers. There

¹³⁰George Stigler; "The Economics of Information;" Journal of Political Economy, Vol. LXIX, No. 3 (June 1961).

are also costs of verifying title to the goods or resources, i.e. securing the property right to enable owners to make decisions as to their use. Costs may also be incurred in assuring the right to exchange or trade these rights with others. Enforcing legal performance of a transaction or exchange are possible additional costs.

When transaction costs are large relative to the perceived benefits of exchange, other alternatives than the market will be used for allocation of resources. For most resources institutional mechanisms have evolved to reduce transaction costs to allow market exchanges or transfers. Specialized brokers or traders have developed, their chief service being the provision of a medium for potential buyers and sellers to negotiate mutually agreeable exchanges. The broker or specialist facilitates exchanges by providing centralized information on potential buyers and sellers of resources, assets, or services, verifying titles to ownership, and insuring enforcement of contracts or transactions. Examples are real estate brokers, stock brokers, and commodity brokers.

Prior to the concept of water banking, water delivery organizations, watermasters, the State Department of Water Resources, and the courts administered water allocation according to water law. While there were administrative procedures to allow water transfers, these procedures were only incidentally concerned with means to lower or reduce the transaction costs associated with transfers. Procedures were primarily designed to protect water rights than to provide the flexibility to transfer or rent these rights. The protection of these rights is important, especially because of possible third party rights which might be adversely affected by transfers. A more efficient solution would encourage negotiation to assure compensation to third parties adversely affected, rather than denying the transfers.

Water Banking - Reducing Transaction Costs

Water banking has the potential of reducing the transaction costs associated with water transfers via the market as discussed above. The water bank will act as a brokerage service - it will provide a centralization of information for potential buyers and sellers of water use (rentals), or water rights. The centralization of information will tend to reduce the "search costs" for potential participants in a voluntary water market.

In Idaho the Water Supply Bank operation will be the responsibility of the Water Resources Board, which establishes the policy direction for the Department of Water Resources, which is supervised by its Director. The Department provides staff assistance to the Board of Water Resources. The Department also administers permits and licensing of water rights, supervises the distribution of water through watermasters, conducts adjudication of water rights under court authority, administers the Carey Act, and coordinates selected federal water resource programs.¹³¹ The specialized personnel and staff (i.e. hydrologists, lawyers, engineers, etc.) of the Department possess a large information base which could be utilized in a cost effective way to maintain the information required to complete a water transfer or transaction.

As explained above, verification of title can be one cost of transactions. Since the Department of Water Resources administers the permits and licensing of water rights, verification can be expedited by these records. The Water Plan which was adopted also mandates that all existing unrecorded water rights within the State of Idaho should be defined and recorded by June 10, 1982.¹³² This procedure will ultimately result in adjudication

¹³¹Idaho Water Resource Board; The State Water Plan - Part II (1977), p. 68.

¹³²Ibid., p.93.

of all rights in all streams in Idaho. Once this process is completed, the verification of rights and claims will be simplified by the records at the Department of Water Resources. The cost of verification of the water right will tend to be reduced by these legal requirements.

The rules and regulations of the Water Supply Bank are presented and discussed in Chapter VIII. One of the regulations, however, requires approval of a water irrigation district or company for water transfers originating within the organization but using the facilities of the Water Supply Bank. This regulation, while a possible constraint, protects the legal trust and contract obligations of members to their water delivery organization. Thus, the Water Supply Bank is not usurping legal authority from the water delivery organizations.

Another transaction cost associated with water market transfers may be enforcement costs. In the sense that the water banking system is functioning under the existing water distribution system supervised by the Department of Water Resources, there should not be additional costs to enforce the water transfers facilitated by the Water Supply Bank.

Most significant under the water supply banking concept would be the reduction of possible transaction costs associated with uncertainty about legal security of water rights with water transfers. Since transactions utilizing the water supply bank would constitute "beneficial use," there would be no forfeiture threat to transferring water through the water banking institution. This indeed would remove the risk and the associated costs to protest forfeiture for transactions of the water bank.

Therefore, by consolidating or eliminating the present time-consuming legal and administrative procedures needed to transfer rights, the water bank could reduce these transaction costs. Other economies of transaction

costs will likely result by standardizing contracts and centralizing the recording of transactions. These devices should reduce the cost of enforcing contracts and assuring performance.

The most difficult transaction cost to reduce will be the one associated with externalities or "third party" effects. Procedures usually provide for barring water transfer if there are adverse effects on parties not voluntarily participating in the transfer. Determining third party effects requires expert advice and evidence; sometimes the state of knowledge is lacking in this degree of certainty. However, in cases where third party effects can be determined, payment of compensation would be more efficient than outright prohibition.

In reducing transaction costs, the water bank would permit greater development of the market process in allocating water usage, yet assure the security of ownership of water rights. Flexibility of water usage and economic efficiency should result as the value of the marginal products and the marginal costs of water change to reflect changing preference, productivities, and availabilities through the calculus of prices. Holders of water rights will transfer or rent their property right to the most productive uses as owners of property, motivated by self-interest (i.e. profit motive) and guided through the price system. In order to achieve these results, property rights require clear definition; water rights will require definition in terms of the full conditions of diversion, so the right becomes certain. While all "externalities" will be difficult to determine and assess, damages to third-parties can be alleviated through the payment of compensation to injured or harmed parties, if property rights are clearly defined. As an intermediary the bank can expedite the determination and assessment of these externalities by providing specialized

knowledge and information on hydrology and law when a change in point of diversion or change in method or place of use of water is considered. The coordination of the market process by some institution is necessitated by these externalities.

Pricing Considerations Under Water Banking

Under water banking, prices of water will be determined primarily by voluntary deposits and withdrawals of water and will reflect the underlying forces determining demand and supply within any discrete time period. Since the water bank acts as an intermediary to facilitate market exchange, it will be providing a service which should be included in the prices paid by buyers of water. The charge for these services will be in addition to the price paid by water buyers to water depositors, and will compensate the bank for costs incurred in facilitating transactions. These costs represent transaction costs, but as has been suggested, they should be lower than under current institutional arrangements.

In the banking or brokerage system deposits and withdrawals will be a function of the anticipated price of water. Individuals or organizations will deposit water in a bank if the monetary return or price received is worth more to them than the value of the marginal productivity of water in their uses. Essentially, this water will be surplus to these individuals at some reservation price. Similarly, individuals or organizations will decide to withdraw water if the value of the marginal productivity of additional water is greater than the additional cost or price to be paid for it. The reservation price or minimum asking price of suppliers (depositors of water) may well be determined largely by the assessments which many irrigation districts or companies have levied on

water right holders to cover capital improvements embodied in irrigation works of a district.

Economic variables other than the price of water will also determine the quantities deposited or withdrawn. Potential values of the marginal productivities of water actually in use influence the quantities demanded and supplied. Suppliers will offer water for transfer if the price to be paid for its use is greater than the values to be derived from utilizing it themselves; greater than the value of the marginal productivity of water in their uses. In the case of agricultural uses, the expected prices of various agricultural commodities will induce changes in the desired quantities of water to be utilized in producing these commodities because these prices reflect the value of the marginal productivity of water. The optimal level of utilization (or conservation) of water will be guided by the price of water as decision makers choose those quantities of water which equate the value of the marginal productivity of water to its marginal cost.

Innovations in management, capital, hardware, or techniques will also influence decisions on water utilization by altering productivities and thus the marginal values. Prices of these inputs (capital and labor) also affect the optimum quantities of water to apply; as the relative prices of these change, substitutions will occur. While primarily a function of price, supplies of water will also be determined by factors affecting their physical availability. Natural factors such as precipitation are obviously significant. In years of drought the market prices will tend to be high as supplies are generally reduced, while in years of abundant precipitation, flows will be greater; consequently, prices will tend to be low. Actual prices received and paid will also differ because of

transportation cost. Since surface distribution of agricultural waters requires conveyance to individual farmers, transportation, conveyance, and distribution costs will have to be incurred and paid by withdrawers. A practical consideration is that because of different locations and use patterns, the marginal costs of delivery will vary. The solution is to have prices equal marginal costs to account for the difference in transportation and distribution costs; prices may differ because of the difference in marginal costs. Experience in California during the recent drought tends to confirm these expectations. Some Bureau of Reclamation customers paid \$150 per acre foot for water when normal Bureau rates averaged three dollars per acre foot; in this particular case, transportation costs represented nearly half of the price paid.¹³³ These startling prices were paid because the value of the marginal productivity of water to these users was worth at least the \$150 per acre foot.

Prices will also differ between water suppliers and buyers to provide compensation for third parties damaged by water transfer transactions. Insofar as the water bank could facilitate negotiations to compensate third parties harmed by water transfers, these costs will be added to the price charged for withdrawals. Compensation could take the form of decreased assessments or charges for water or could be direct monetary payment. For instance, if the deposit of water by an individual into the bank resulted in the loss of return flows to others (third parties), the bank could compensate the damage by increasing the price charged for withdrawing that water and distribute the compensation to the damaged parties. If third party effects are extensive, the compensation charges would be large. If withdrawers are willing to pay the price, the transaction will

¹³³Reported by Neil Schild at the Water Transfer Workshop; Graduate School of Public Policy, University of California, Berkeley, California (May 20, 1977).

be voluntary and mutually beneficial. If the price is too high, then the third-party effects (costs in this case) will exceed the benefits of the transfer, and the transaction will not occur. Just as third-party costs are incorporated in the market process, the water bank should try to account for third-party benefits that occur as a result of bank transactions. In this instance, third-party benefits would be deducted from withdrawal prices; ideally, third-party beneficiaries should be assessed for the benefits they receive as a result of water banking transactions, to prevent windfall gains from occurring.

Models of Pricing

A formal pricing model could be developed to incorporate the variables and determinants suggested as affecting incentives to deposit or withdraw water from the water bank. The relationship's complexity requires careful specification of the functional and structural forms. Models formulating part of the process have been developed using fixed programming models and the technique of linear programming.¹³⁴ However, few of these models try to formally incorporate "externalities" or third-party effects. A formal pricing model incorporating all variables and their functional forms has not been developed. However, the relationships identified in the previous discussion suggest the following identity should hold in water pricing transactions:

¹³⁴Micael Greenberg and Robert Harden; Water Supply Planning; a Case Study and System Analysis (Rutgers, the State University of New Jersey, New Brunswick, N.J., 1976), and Mark H. Anderson; "An Economic Analysis of Supply and Demand for Irrigation Water in Utah: A Linear Programming Approach," M.S. Thesis (Utah State University, Logan, Utah, 1973). Also John MacIntosh Callaway, Jr.; "The Optimal Use of Surface Water with Return Flows Present: A Theoretical Model for Deriving Alternative Allocation Rules;" M.S. Thesis (University of Minnesota, unpublished; August 1979).

$$P_{wb} = P_d + T_c + S_{wb} + C_e - B_e$$

where: P_{wb} : the transaction price for water bank withdrawals

P_d : the price paid to water bank depositors

T_c : the transportation and delivery cost of water

S_{wb} : the administrative charge or transactions costs incurred by the water banking process

C_e : the compensation to third-parties injured by banking transactions (i.e. external costs)

B_e : an assessment to third-parties benefiting from water bank transactions (i.e. external benefits)

The specific values or prices of transactions will vary with time, locations and the quantities of water voluntarily supplied and demanded. The value for temporary transfers or rentals, of course, will differ from those representing permanent transfers which involve the valuation of an income earning asset (the water right). If the water right is permanently transferred, the value of the income earning asset will be equal to the discounted value of the expected future income stream of the asset. In this case the expected rental value of the "right to use water" will be capitalized in the price of the asset (i.e. the water right). If transfers are on a temporary basis, the price would represent the rental value for use with a time limit to the use right.

CHAPTER VII
WATER USERS AND WATER DELIVERY ORGANIZATIONS
ATTITUDES TOWARD WATER BANKING

The feasibility of water banking depends upon the services of the institution being perceived as acceptable and useful by potential clients who would use them. In Idaho the potential clients are primarily agricultural water users (i.e. individual irrigators) and water delivery organizations (i.e. irrigation districts, canal companies, and/or mutual irrigation companies). There are over 76,000 individual agricultural water users and 365 water delivery organizations in Idaho.¹³⁵

Thus, within the agricultural sector alone there appears to be a significant number of potential clients for the services of a water bank. Personal interviews were initially conducted among several managers of water delivery organizations and watermasters - these were helpful in understanding the general mechanics of the existing water allocation and delivery system. However, the number of organizations and individuals precluded extensive personal interviews because of time and resource constraints, so surveys based on mail questionnaires were utilized to reach a greater number of potential clients of the water bank.

Purpose of Survey

In the fall of 1979, mail surveys were conducted among agricultural water users and water delivery organizations in Idaho. The main purpose of

¹³⁵S. Koehler Kennedy and J.C. Wrigley, An Economic Market as an Alternative to Reduce Return Flow from Irrigation, Idaho Department of Water Resources in cooperation with Idaho Department of Health and Welfare, February 1979, p. 29.

the surveys was to explore views of and attitudes toward the concept of water banking among its potential users.

Questions were designed to gain data from these groups about the existence of water transfers, and attitudes regarding the advantages of water transfer by market transactions. Information was sought regarding the mechanics facilitating and/or constraining transfers within the existing institutional framework. The survey questions attempted to elicit attitudes about the need for and durability of water banking services. Questions also addressed preferences for the pricing mechanic for water transactions facilitated by water banking. Respondents were given an opportunity to express their views on the incentive guidance function of pricing information for water. The respondents were also encouraged to express and rank their preferences for the various functions of the water supply bank. Copies of the two surveys - one to water users and one to water organizations - are presented in Appendix A.

Technical Characteristics of Survey

The survey was conducted during the period September through November of 1979. A sample of agricultural water users was randomly drawn from the membership roles of the Idaho Water Users Association, and one thousand questionnaires sent to them. Assuming the most conservative estimates of the population parameters, this sample would provide a probability of 90 percent that the sample size would fall within the 0.10 of the population characteristics. From this sample a response rate of 14 percent was experienced. The geographical distribution frequency of the survey area, which is a reasonable representation of the irrigated agricultural area in Idaho, is shown in Figure 3.

The survey of agricultural water delivery organizations represented more of a census of these organizations operating in the state of Idaho. Three hundred and sixty-five survey questionnaires were sent to water delivery organizations encompassing water irrigation districts, canal companies, and mutual irrigation companies. The response rate of 16.7 percent was experienced from this group with a probability of 99.7 percent that the sample response will fall within 0.005 of the true population.

A summary of these surveys revealed some insights into the attitudes toward water banking and water transfers by users and water delivery organizations. Some striking agreements and contrasts are shown in the attitudes of these two groups revealed by the survey results.

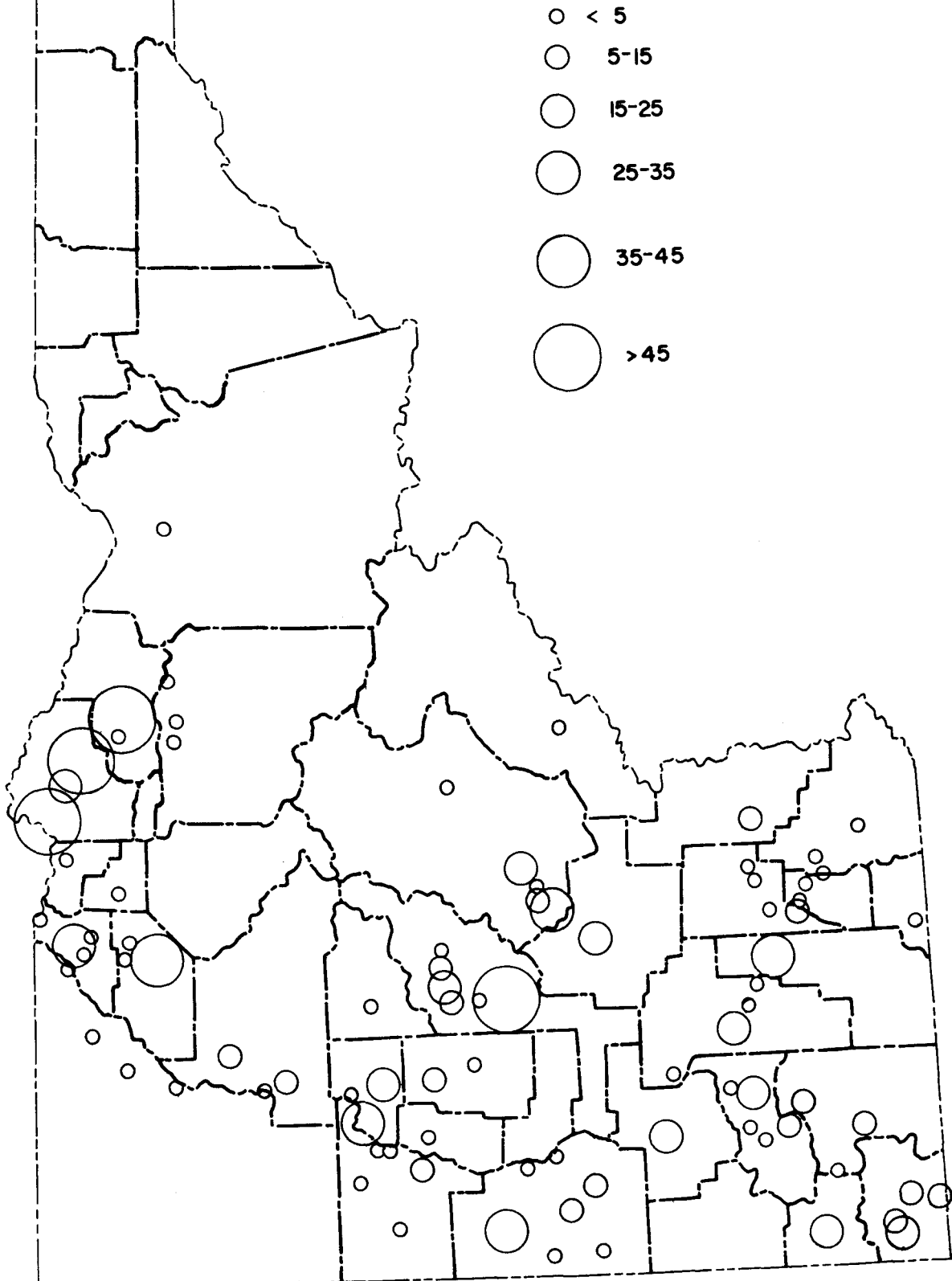
Survey Results

Water Users

Water Delivery Organizations Among respondents to the agricultural water users survey a majority, 57.5 percent, received their water through an irrigation district and 23.3 percent received their water through a canal company. Only sixteen percent of the responding water users relied on their own individual system to receive water.

Attitudes Toward Water Market Transfer Over eighty percent (84.7%) of the respondents were in favor of allowing temporary water transfers via market transactions where the price was perceived as "fair." Although over sixty-eight percent (68.4%) have not previously transferred water either as a buyer or seller, nearly seventy-eight percent (77.3%) of these water users who have been unable to transfer water would be interested in being able to do so. Among those water users who have tried to transfer water temporarily, a large response, 64.1 percent, claimed

Figure 3. Geographical Frequency
Distribution of Survey of Water Users



no difficulties. Those water users who have had difficulties in transferring water expressed the main reason (78.4%) as the prohibition of transfers by their delivery organization. Twenty-one percent of the users responded that their delivery organization did not allow water transfers.

Incentive of Price and Scope of Market When asked if information on market prices or water would aid in making decisions on the use of water, seventy-five percent of those responding expressed that such information would aid decisions on water use. In response to the question concerning scope of water transfers, over seventy percent (71.5%) of the water users responding preferred limiting transfer of water to users in the same district or organization.

Attitude Towards Water Supply Bank When asked directly if the users would favor a water supply bank, over seventy-five percent (77.9%) of those responding favored such an organization. This response is in sharp contrast to a similar question on the delivery organization questionnaire in which 87.8 percent of the organizations responding did not favor another method, such as the water banks, to facilitate water transfer.

Attitudes to Functions of Water Supply Bank When asked to respond to a choice of responsibilities for the Water Supply Bank, 59.8 percent wanted it to act only as an intermediary between voluntary sellers and buyers, 51.9 percent to facilitate transfers by providing information on prices of water rentals. A write-in response was experienced, with 11.8 percent writing in that no Water Bank was needed. A question to elicit response toward the form of the Water Supply Bank brought a

response of 75.6 percent favoring a commodity exchange form in which the Water Bank assisted voluntary buyers and sellers who deal directly with one another. The favored pricing mechanism was demand and supply (75.6%), with 14.6 percent favoring that the price be set by a state agency and 10.8 percent writing in that "no supply bank was needed." Over fifty percent (52.2%) of the water users were of the opinion that the water delivery organization should be the local rental water storage representative, with 36.3 percent of the users preferring that the representative should be a water user. Responding to an attempt to determine attitudes toward functions of the Water Supply Bank, the water users provided the following responses:

1. 57.6 percent favored the Bank being able to transfer stored water.
2. 43.2 percent favored transferring water between agricultural users within the State of Idaho.
3. 38.4 percent favored transferring natural flow water.
4. 27.2 percent favored transferring water among the various districts and basins within the State of Idaho.

Again, a write-in response was experienced with 15.2 percent writing "No water bank is needed."

Water Delivery Organization

Type of Water Delivery Organizations Among respondents to the water delivery organization survey, the most prevalent type of organization was the canal company, representing over fifty percent (51.1%) of the respondents. The irrigation district represented nearly thirty percent (27.6%) of the returns, and mutual irrigation companies represented over ten percent (10.6%).

Attitudes Toward Water Market Transfers Of the organizations responding, almost seventy-five percent (74.5%) allowed temporary water transfers within their boundaries; one quarter (25.5%) of the responding organizations did not permit water transfers. This latter percentage is slightly more than the percentage on the water users survey, but still relatively consistent.

In response to a question about who initiates the decision to transfer within the organization, over fifty percent (54.8%) of the respondents allow individual farmers or shareholders this decision, while over a third (33.3%) allow the organizations' cooperative polling as enforced by the organizations' management.

Requests for water transfers are handled on an informal basis among members (i.e. through personal contact on telephone) in only one-third (33.3%) of the organizations responding. Nearly fifty percent (46.1%) of the water delivery organizations have a more formal application process with the water master or management personnel acting as an intermediary.

In the cases where transfers were allowed, the prices of such water transfers were predominantly (79.5%) determined by the buyer and seller. District organization policy established the price in only five percent of the organizations responding. Other methods of establishing prices for transfers accounted for fifteen percent of the respondents choice. While not clear, their "other methods" may refer to Bureau of Reclamation policies on contracts for transfers of storage water.¹³⁶ Unfortunately, the explanations (space was provided in the question) were not completed or unclear on the other methods used to determine price.

¹³⁶As suggested earlier in the study, the Bureau of Reclamation (now the Water Power Resource Service) often has contracts which specify the price for storage operation and maintenance (i.e. \$0.75 per acre foot) and could prohibit any subleasing at another price.

Although the organizations allowed transfers, they are not without restrictions. The majority (60.9%) of respondents did not allow transfers of surface waters (natural flow and storage) to users who have ground water rights. There apparently is no difference between the treatment of temporary transfers of natural flow and temporary transfers of storage water: nearly ninety percent (88.8%) of the responding organizations claimed they did not treat them differently. It appears that although most of the organizations permitted temporary transfers, they only permitted the transfer of surface waters from one member to another having basically the same source and water rights (i.e. from surface water user to surface water user).

In regards to "third party" effects, most of the responding organizations (61.5%) prohibited temporary water transfers if such a transfer would have the effect of reducing someone else's water flow. Surprisingly, a "no action taken if water transfer reduced someone else's water flow." Response was chosen by nearly eighteen percent (17.9%). of the respondents.

Attitudes Toward Water Supply Bank Attitudinal questions concerning the need for an easier procedure to bring about temporary water transfers, and the concept of a Water Supply Banking elicited some organization responses. In response to a question asking feelings toward a need for an easier procedure to bring about water transfers, 87.8 percent expressed the opinion that no need existed for a more efficient transfer procedure. When asked, "What should the Water Supply Bank's responsibilities be?" the most prominent choices were:

1. Facilitate transfers by providing information to users. (45.2%).
2. Act as an intermediary between voluntary sellers and buyers. (35.7%).

3. Maintain records of transfers. (38.1%).
4. Provide to users prompt information on prices of transfers. (28.6%).
5. Mediate protests arising from a reduction in downstream water flow. (21.4%).

Although the "No Water Bank" option was not specifically expressed in the questionnaire, 23.8 percent felt strongly enough to write in "No Water Bank is needed." Similarly, in the question concerning the scope of the Water Bank concept, 48.7 percent favored that the Water Supply Bank's being able to transfer stored water, 43.6 percent favored transferring water between agricultural users within the State of Idaho; 30.7 percent, transferring natural flow water, and 25.6 percent, transferring water among the various districts and basins within the State of Idaho. Again, a large write-in response was elicited, with 25.6 percent expressing that there was no need for a Water Supply Bank. When polled about their opinion as to who should be designated as the local rental storage committee, 60 percent felt that the water delivery organization should be designated, with the remainder being fractionalized between the other responses.

Comparisons of Attitudes of Surveys

There are a few areas in which the water users' and water delivery organizations' attitudes and opinions are similar. They both generally favor the local water delivery organization as being a designated representative for the committees to facilitate rentals of storage waters. Both organizations and users generally favor water transfers only within a district and only transfers between agricultural users. There also was general agreement that the water supply bank's main function should be to facilitate water transfers.

Beyond these general areas of agreement expressed in the results of the surveys, there are some sharp differences. The water users favor the Water Supply Banking concept while the water delivery organizations do not want any changes in the present method of transfer. This aspect was also reflected in the comments and opinions expressed on the questionnaires. Many comments on the questionnaires received from the water delivery organizations were vehement in their opposition to the Water Supply Bank or any government intervention in the water process, while the water users comments are much more positive towards a government organization to facilitate an operating water market.

APPENDIX A

COPIES OF SURVEYS SENT TO
AGRICULTURAL WATER USERS
AND
WATER DELIVERY ORGANIZATIONS

Survey of Agricultural Water
Delivery Organizations

PLEASE CHECK ANSWERS IN THE SPACES PROVIDED:

1. Which form of water delivery organization best describes your organization?

_____ Irrigation district

_____ Mutual irrigation company

_____ Commercial irrigation company

_____ Canal company

_____ Cooperative

_____ Other - Explain: _____

2. Do you allow temporary transfer* of water within your boundaries?

Yes _____ No _____

3. Who decides whether a temporary transfer* of water between members of your organization can take place?

_____ Individual farm operators or shareholders

_____ District, company, or cooperative policy as enforced by management

_____ Other - Explain: _____

4. If farmers wish to voluntarily transfer* water as a buyer or seller, how are such requests handled?

_____ Informally (i.e. word of mouth, telephone, etc.) among the organization members

_____ A formal application process with the watermaster or ditch rider acting as an intermediary

*Transferring for a fee, compensation to be paid to original holder of water right.

_____ Informally, with the organization members contacting the watermaster or ditch rider

_____ Other - Explain: _____

5. If temporary water transfers* are allowed, prices of such transfers* are established by;

_____ Buyer and seller

_____ District or organization policy

_____ Other - Explain: _____

6. Do you feel that there is a need for an easier procedure to bring about temporary water transfers*?

Yes _____ No _____

7. Does the existing 1902 Bureau of Reclamation Act acreage restriction create a constraint on temporary water transfers* in your organization?

Yes _____ No _____

8. Does your organization allow the temporary transfer* of surface waters (natural flow and storage) to users who have groundwater rights?

Yes _____ No _____

9. Does your organization allow the temporary transfer* of groundwater to users having surface (natural flow and storage) water rights?

10. Does your organization treat natural flow temporary water transfers* differently than storage temporary water transfers*?

Yes _____ No _____

If yes: then check the following:

_____ Less natural flow water allowed to be temporarily transferred than storage

_____ Can temporarily transfer natural flow but not storage water

_____ Other - Explain: _____

* Transferring for a fee, compensation to be paid to original holder of water right.

11. If temporary water transfer will have the effect of reducing someone else's flow, how does your organization protect this party?

- No action taken
- Prohibit those temporary transfers which harm others
- Determine the fair market value of the water difference and compensate the affected party in money
- Determine the fair market value of the water difference and compensate the affected party with water
- Other - Explain: _____

12. What should be the Water Supply Bank's responsibilities? (check as many as appropriate)

- Act as an intermediary between voluntary sellers and buyers
- Facilitate transfers by providing information to users
- Provide to users prompt information on prices of transfers
- Maintain records of transfers
- Decide price of transfer water
- Mediate protests arising from a reduction in downstream water flow
- Compensate parties affected by a reduction in downstream water flow
- Other - Explain: _____

13. Should the Water Supply Bank be able to : (check as many as appropriate)

- Transfer water among the various districts and basins within the State of Idaho
- Transfer natural flow water
- Transfer stored water
- Transfer water between agricultural users within the State of Idaho

_____ Transfer water between both agricultural users and non-agricultural users

_____ Decide who to transfer water to when the demand for supplemental water is greater than the available supply

_____ Other - Explain: _____

14. Under the new Water Supply Bank legislation, stored water may be rented through local rental committees. Who should be designated as the local rental committee for your area?

_____ The water delivery organization

_____ A water user

_____ The Idaho Water Resource Board

_____ Other - Explain: _____

15. Does your organization allow rentals of water to non-members outside the organization?

Yes _____ No _____

SURVEY OF AGRICULTURAL WATER USERS

PLEASE CHECK YOUR ANSWERS IN THE SPACES PROVIDED.

1. From what type of water organization do you get your water?

- | | |
|--|--|
| <input type="checkbox"/> Irrigation district | <input type="checkbox"/> Canal company |
| <input type="checkbox"/> Individual system | <input type="checkbox"/> Cooperative |
| <input type="checkbox"/> Mutual irrigation company | <input type="checkbox"/> Commercial irrigation company |
| <input type="checkbox"/> Other - Explain: _____ | |

2. Do you feel that water users with surplus water should be allowed to transfer* on a temporary basis their water at a fair price to another user who needs water?

Yes No

3. In the past, have you temporarily transferred* water either as a buyer or seller?

Yes No

4. If you have been unable to temporarily transfer* water, would you be interested in being able to do so, if the price is fair?

Yes No

5. If you have tried to temporarily transfer* water to another user, have you experienced difficulties when trying to transfer water?

Yes No

If Yes:

My water delivery organization does not allow me to temporarily transfer* water

* Transferring for a fee, compensation to be paid to original holder of water right.

- I can only transfer within district boundaries.
- Transfer process is delayed with too much state or local red tape.
- Difficult to get immediate information on willing buyers and/or sellers.
- Other - Explain: _____

6. Do you prefer a system which would allow transferring* water to users in other irrigation districts, or would you prefer to limit transfers* to users in the same district?

- Prefer allowing transferring* of water to users outside the district
- Prefer limiting transfers* of water to users in same district.

7. Would prompt information on prices of water resulting from a voluntary water market aid you in making decisions on your use of water?

Yes _____ No _____

8. If a Water Supply Bank provided information on quantities and prices of water, and facilitated fair market transactions for voluntary water exchanges without endangering your water rights, would you favor such an organization?

Yes _____ No _____

9. What should be the Water Supply Bank's responsibility (check as many as you want):

- Act only as an intermediary between voluntary sellers and buyers
- Facilitate transfers by providing information and maintaining records
- Provide prompt information on prices of water rentals

* Transferring for a fee, compensation to be paid to original holder of water right.

10. Would you prefer a Water Supply Bank to buy, hold and sell water, or would you prefer a Water Supply Bank that acted more like a commodity exchange, assisting voluntary buyers and sellers who deal directly with one another?

Buy, hold, and sell _____

Commodity exchange form _____

11. Would you prefer the price of water that is exchanged to be set by a state agency, or would you prefer the price to be determined by supply and demand?

Price set by State agency _____.

Price determined by demand and supply _____.

12. Under the new Water Supply Bank legislation, stored water may be rented through local rental committees. Who should be designated as the local rental committee for your area?

_____ The Water delivery organization

_____ A water user

_____ The Idaho Water Resource Board

_____ Other - Explain: _____

13. Should the Water Supply Bank be able to (check as many as appropriate):

_____ Transfer water among the various districts and basins within the State of Idaho.

_____ Transfer natural flow water.

_____ Transfer stored water.

_____ Transfer water between agricultural users within the State of Idaho

_____ Transfer water between both agricultural users and non-agricultural users.

_____ Decide who to transfer water to when the demand for supplemental water is greater than the available supply.

_____ Other - Explain: _____

CHAPTER VIII

WATER SUPPLY BANK: A SUPPLEMENTARY AND EVOLUTIONARY WATER ALLOCATION INSTITUTION - ADMINISTRATIVE AND OPERATIONAL CHARACTERISTICS

Idaho's legislature has provided by statute¹³⁷ for the creation of a Water Supply Bank, and rules and regulations¹³⁸ have been adopted by the Idaho Water Resources Board effective in May 1980. The purposes of the Water Supply Bank, as defined by statute, are to encourage the highest duty for beneficial use from water, provide a source of adequate water supplies to benefit new and supplemental water uses, and provide a source of funding for improving water user facilities and efficiencies.

While the Water Supply Bank is a supplementary institution in facilitating market water transfers, it does not replace the existing water management institutions in their functions in water allocation. Existing legal water rights, water use, and transfer procedures are not endangered by the Water Supply Bank's administration or operation procedures. The bank will have interactions with existing local water management and delivery organizations and individual water right holders and users. These interactions should be mutually beneficial as the utilization of banking services is voluntary and most of the administrative and operating functions are in the form of appendages to existing responsibilities of the Board of Water Resources and the State Department of Water Resources.

Administrative and Operating Characteristics

The Water Resource Board has the duty of operating the Water Supply

¹³⁷ Sections 42-1761 to 42-1766, Idaho Code.

¹³⁸ The rules and regulations as adopted by the Board are reproduced in Appendix A at the end of this chapter.

Bank in Idaho and adopting rules and regulations governing the management, control, delivery, and distribution of water to and from the Water Supply Bank. The board may contract with lessor and lessees and act as an intermediary in facilitating leasing or rental of water. Further, the board may purchase, lease, or rent water rights to be credited to the Water Supply Bank. Thus, the Water Resource Board has the administrative responsibility for operating the Water Supply Bank.

The Water Resource Board in Idaho was created in 1965 by the legislature¹³⁹ with the power and duties:

To progressively formulate an integrated, coordinated program for conservation development, and use of all unappropriated water resources of this state....

The Water Resource Board consists of eight members, four appointed at-large and four appointed from each of the four districts in Idaho. The Department of Water Resources was established in 1974 with the merger of the Idaho Water Resources Board and the Department of Water Administration. The latter's history can be traced back to 1895 when the Office of the State Engineer was created by an act of the legislature.

The Director of the Department of Water Resources performs administrative duties and other functions as the Board may assign to enable the Board to carry out its duties.¹⁴⁰

The primary activity of the Water Bank would be in providing information for buyers and sellers of water rights or parties seeking water rentals. The operation of the bank as a brokerage service would focus on transfer process with the intention of making transactions as efficient as

¹³⁹Section 42-1734, Idaho Code.

¹⁴⁰Section 42-1805, Idaho Code.

possible. The banks might be a useful device in "packaging" water rights or rentals in ways to coordinate the use of surface and ground water rights and/or integrate the use of storage rights and direct natural flow rights.

As a brokerage service the Water Bank could be effective in facilitating water transfers which involve complex ownership and/or physical characteristics. The legislation and the rules and regulations also enable the Water Bank to acquire water rights which it could hold in trust, or reallocate through auction or lottery.

Since the legislation creating the Water Bank specifies that leases or water rights approved by the Director of Water Resources shall not be subject to forfeiture nor dedication to the lands of any lessee or renter, all water transfers using the banks' services would constitute "beneficial use."

It appears one of the most significant roles of the water bank will be as a market facilitator in providing a mechanism for listing of water rights available for sale or lease to potential buyers or lessees.

Administrative Advantages

The Water Resource Board appears to be the obvious entity to operate the Water Supply Bank because of its legislative responsibilities in managing water resources for the state. It also has statewide representation which provides a means for public accountability.

The Department of Water Resources, as the administrative agency responsible to the Water Resource Board, possesses the technical qualifications and expertise for assisting the Water Resource Board in operating the Water Supply Bank. They have the means for verifying titles or rights to water, which is critical in facilitating water transfers. The watermasters who enforce water rights and decrees in the distribution of water are

bonded and supervised by the Department of Water Resources. These existing water management functions are accepted and operating, and the water banking operations appear to be extensions of many such existing functions.

Under Idaho law, the Director of the Department of Water Resources must approve all water transfers which are "change in use" or "change in diversions." The Director examines the nature of the transfer with particular concern for adverse impacts that may result to "third party" water users. The procedural requirements for making water transfers are explicit and require formal application with provisions for protest hearings. These statutory requirements¹⁴¹ are maintained in the Water Banking administration and rules and regulations (see Rule 3). Before the Water Banking concept, the procedures in protest hearings focused on the technical legal requirements, and if a water transfer adversely affected a "third party," it was prohibited. From an economic efficiency and equity perspective, negotiations to determine compensation would appear more fruitful than outright prohibition.

The interaction of the Water Bank with local water management and delivery organizations will depend upon voluntary utilization of the banks' services. Nothing in the enabling legislation nor the rules and regulations force irrigation districts or companies to accept the transfer services of the bank. The rules and regulations of the Water Supply Bank (see Rule 1) specify "these rules shall not affect the right to directly sell or lease water where such transactions are provided for by statutes." Thus, transfer procedures and policies within the boundaries of a district or company would not be directly affected by the Water Supply Bank. Further, the rules and regulations (Rule 3.2) adopted by the Board require written

¹⁴¹Section 42-1766, Idaho Code.

consent from a company, corporation or irrigation district to a proposed sale or lease when an application affects these water management and delivery organizations. This rule maintains the legal and contractual authority of the local water management and delivery organizations; their interaction with the Water Bank will be purely voluntary on their part. The hostility towards the Water Supply Bank on the part of some water delivery organizations reflected in the survey reported in the preceding chapter may have been based on an erroneous fear of the loss of their authority and revenue base if the Water Supply Bank usurped their function.

The enabling legislation¹⁴² and rules and regulations (Rule 6) also recognize existing procedures for leasing or rental of stored water. The Board can consider appointing an entity to serve as a local committee to facilitate the lease and rental of stored water. While the Board has formalized the procedures and the lease forms for the local storage rental committees, there was an existing precedent for local committees to facilitate the rental of stored water between owners and voluntary renters. The storage pool in the Upper Snake River Basin has a history which involves these functions.

Upper Snake River Storage Pool Committee A storage pool committee has been in existence in Water District 01 since 1919. Its function was to assist and advise the watermaster on the renting of surplus stored water to companies or individuals in need of additional water. The Storage Pool Committee was appointed by the Committee of Nine which helps regulate the Upper Snake River Basin and resolve problems of water management. The Storage

¹⁴²Section 42-1765, Idaho Code.

Pool Committee usually consisted of the Chairman of the Committee of Nine, the watermaster of District 01, the Minidoka Project Superintendent, and the U.S. Bureau of Reclamation Regional Supervisor of Irrigation. The watermaster, acting under the approval of the Committee and procedures established before the irrigation season, makes the rentals and collects and disburses the rental fees.¹⁴³

If an individual or canal company anticipates before the irrigation season that part of the water allotted to them will not be needed, they notify the watermaster. In this way water is pooled with other offers, providing an available supply of water for rental. The watermaster acts as the broker between consenting parties. In the case of District 01, the rental price of water was set to prevent "profiteering" or undue speculation. Between 1961 and 1976 the price per acre foot for rental water was set at \$0.50; the fee was increased to \$0.75 per acre foot for part of the 1977 season which was a drought year.¹⁴⁴ The committee had attempted to increase the rental price of water, but the request was denied by the U.S. Bureau of Reclamation.

The Committee of Nine requested to be appointed the local committee for storage in the Upper Snake River Basin; and on August 1, 1979, the Idaho Water Resource Board appointed the Committee of Nine as the local committee for the Water Supply Bank.¹⁴⁵ The appointed committees must provide procedures and a copy of the leases to the Director to be used by the committee which provides for priority procedures, reimbursement

¹⁴³Lynn Crandall; "Irrigation Development on the Upper Snake" (June 1964, Presented at Columbia Basin Inter-Agency Commission).

¹⁴⁴District No. 01, Water Distributions and Hydromatic Work.

¹⁴⁵Certification record, Water Resources Board (August 1, 1979).

schedules, leasing price, and administrative charges to be assessed. (See Rule 6 of Rules and Regulations of the Water Supply Bank, in Appendix A of this chapter.) While the latest administrative rules and regulations tend to standardize procedures and assure a reasonable access to the rental water market, the reliance on local committees for water storage recognized existing administrative and operational procedures in the water management area; again, the Water Supply Bank has not replaced but supplemented existing local institutional arrangements.

The approval of the procedures and lease form by the Director could help assure that access to the rental market is open and available. Whether the U.S. Bureau of Reclamation (now the Water and Power Resource Service) will allow removing the fixed price for rentals of storage water in reservoirs they manage will be critical in the operation of a true water market.

If the estimated 16 percent of the total water supply in Idaho which was federally financed and/or managed is fixed in price by U.S. Bureau contractual arrangements, then this would be a critical constraint on the water rental market. Prices would be prevented from responding to market forces and denied their guidance function in allocation. There are, however, precedents which indicate adjustments are possible under drought conditions. The U.S. Bureau of Reclamation has purchased and resold at least 43,000 acre feet of water (in California) under the temporary water banking program authorized by Congress.¹⁴⁶

¹⁴⁶Water Banking Bill S. 929, passed April 1977. The figure reported in Sotiros Angelides and Eugene Barduch; Water Banking: How to Stop Wasting Agricultural Water, Institute for Contemporary Studies (1978), p. 17.

Administrative and Operational Disadvantages

Ideally, one could argue that a water broker and banker should be independent and merely a facilitator of the water market process. The organization should have no vested interest to protect, and not participate in the water supply or allocation. The Water Resources Board has been given the constitutional authority¹⁴⁷ ... "to construct and operate water projects;..., to appropriate public waters ..." and authority for the preparation of a State Water Plan. Thus, in essence the Water Resource Board remains the water policy making body for the state.

Since its constitutional and legislative authority make it possible for the Board to become a water user and holder in its own right, some might suggest it may have difficulty maintaining impartiality in facilitating a water market process. However, public accountability provisions for the Board and the Department of Water Resources appear to provide adequate pressures to prevent the Water Supply Bank from regulating or manipulating water markets to suit its own ends as a possible water entrepreneur. The Water Bank, however, would be less vulnerable to criticism about possible manipulation of water markets if it served solely as a broker or facilitator in water transfers between negotiating entities and not as a participant in the water market itself.

Procurement, Sale, or Lease of Water or Water Rights and Pricing Procedures

While the potential participants in the Water Supply Bank are basically voluntary, they must file applications for sale or lease with the Director of the Department of Water Resources. Any person proposing to sell or lease water to the Bank must verify ownership of the water right, present evidence

¹⁴⁷ Article 15, Section 7, Idaho Constitution.

of the availability of the water, and written consent from company or irrigation district to the sale or lease. The Board approves the application upon several requirements: (1) verification of right; (2) consents; (3) the "reasonable value" of water for water right; (4) that the acquisition will have present and future beneficial effect not contrary to the State Water Plan; (5) application is in the local public interest; (6) there are sufficient funds on hand to acquire water or water right in the Water Supply Bank, however, if not, the water may be acquired on a contingency basis with payment to be made after water is subsequently sold or leased from Water Supply Bank. (See Rule 3-3.6).

In regard to the sale or lease of water or water rights, the director can announce the availability of water from the Water Supply Bank, establishing a time and date for receiving applications. The director will evaluate applications in terms of: (1) whether there will be injury to other water rights, (2) whether the application would constitute an enlargement of the water right, (3) whether beneficial use will be made of the water right, and (4) whether the proposal is in the local public interest. (See Rule 4.) The minimum lease or sale price shall be determined by the Board and may be different from the value in acquiring the water right. (See Rule 4.1).

The most advantageous interpretation of this language is that the pricing mechanism is intended to take account of "external costs" to third parties and compensation for the transmission costs or conveyance costs of transferring water from seller or leaser point of diversion to buyers or lessee point of diversion. The rules are vague on why the prices of acquisition and sale or lease may differ.

The Director is authorized to lease water offered by the Board from the Water Supply Bank for periods up to two years. Applications for

purchase or lease for periods longer than two years require action by the Board.

Most significantly, sales or leases shall only be approved for use of water within the State of Idaho (Rule 4.3). This rule was the result of a mandate from the legislature when the Water Supply Bank enabling legislation was being considered in 1978. The rules specify the requirements regarding considerations of the timing of applications to assure "fairness" of access to the water market. (See Rule 4.4). The Board or Director may conduct a lottery or auction for sale or lease of water if applications exceed the available supply (Rule 4.4).

The most efficient mechanism would be the auction, as only those who had a high value for the marginal product of water would receive the water. The lottery may appear more fair or equitable, but it is unlikely to assure economic efficiency (unless a later auction outside the confines of the Water Supply Bank takes place).

Administrative Charge

The rules and regulations specify that ten percent of the funds obtained through the leases or sales of the Water Supply Bank are for the water administration of the Bank. (See Rule 5). This 10 percent fee apparently represents an administrative charge for water bank transactions. Transactions handled by the local storage committees are not subject to this administrative charge of the Board, but these committees may establish their own administrative charges. (See Rule 5).

Since the enabling legislation required that the Water Supply Bank be self-financing, it is understandable that an administrative charge or fee is needed to cover the transaction costs absorbed by the Water Supply Bank in carrying out its purpose of facilitating a water transfer market. There

are high transaction costs associated with effecting water transfers - information costs, verification of ownership, compensation for externalities, and enforcement of transactions - which have often prevented a market mechanism from developing. These costs were enumerated and discussed in Chapter VI. Quantifying these costs creates difficulties because time and effort as well as direct monetary costs are required in effecting water transfers.

The cost of a water banking service depends primarily on the extent of the service provided. A bank offering only the information service - listing of offers and bids - would have lower cost than a bank offering verification of title services and enforcement services, as well as investigation of externalities (which would require the services of a professional staff with lawyers and hydrologists).

Initially, the information service appears to be essential to a functioning water brokerage service, but the other requirements to effect a legal water transfer via the market are also being assured through the Water Supply Bank. It seems the Director of the Department of Water Resources and his staff will be assigned functions to assure the water transfer applications are verified and enforced according to the rules and regulations adopted by the Board to govern the management, control, delivery and use and distribution of water to and from the Water Supply Bank.

Administrative charges and fees are common in intermediaries which facilitate markets for other assets and commodities. Realtors often charge six or seven percent, in the case of real estate transactions, a much more established and accepted marketing system than a water market. Whether the ten percent administrative fee is excessive will ultimately depend on the operating cost of the Water Supply Bank and the benefits perceived by potential clients of the Water Supply Bank.

Rather than assessing a fee based on the percentage of the selling price or lease price of water, the banks could have used alternative criteria - volume of water transferred or the cost of investigating and facilitating a transfer. The latter would be more in line with economic accountability, but have created some uncertainty for potential users of the service.

The Board has apparently determined that the buyer will pay the necessary fee. However, in a freely negotiated arrangement the allocation of the cost would be left to the buyers and sellers as part of the price negotiation process.

In summary, the Water Supply Bank appears as a supplementary institution to the existing organizations managing, allocating, and distributing water in Idaho. Basically, water market transfers would only be facilitated between existing districts or organizations, i.e. the transfers are interdistrict rather than intradistrict. The latter are still the responsibility of the irrigation districts and companies.

APPENDIX A

WATER SUPPLY BANK
RULES AND REGULATIONS

WATER SUPPLY BANK
RULES AND REGULATIONS

Adopted
April 23, 1980

Effective
May 20, 1980

State of Idaho
Idaho Water Resource Board
Statehouse
Boise, Idaho 83720

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WATER SUPPLY BANK
RULES AND REGULATIONS

Rule 1. Purpose

These rules and regulations are adopted by the Water Resources Board as mandated by Section 42-1762, Idaho Code (1979). The rules and regulations govern the Board's operation and management of a WATER Supply Bank provided for in Sections 42-1761 to 42-1766, Idaho Code. The purposes of the Water Supply Bank, as defined by statute, are to encourage the highest duty for beneficial use from water; provide a source of adequate water supplies to benefit new and supplemental water uses; and provide a source of funding for improving water user facilities and efficiencies. These rules and regulations are to be used by the Water Resource Board in considering the purchase, sale, or lease of natural flow of stored water, the use of any funds generated therefrom, and the appointment of local committees to facilitate the lease of stored water.

The adoption of these rules shall not affect the right to directly sell, or lease water where such transactions are provided for by statutes.

Rule 2. Definitions

- 2.1 Board means the Idaho Water Resource Board.
- 2.2 Director means the Director of the Idaho Department of Water Resources.
- 2.3 Department means the Idaho Department of Water Resources.

- 2.4 Local committee means the advisory committee of a water district, the board of directors of an irrigation district or canal company, or board of county commissioners, which has been designated by action of the Board to serve as a local committee to facilitate lease of stored water pursuant to Section 42-1765, Idaho Code.
 - 2.5 Natural flow means water or the right to use water that exists in a spring, stream, river, or aquifer at a certain time and which is not the result of the storage of water flowing at a previous time.
 - 2.6 Stored water means water made available by detention in surface reservoirs and/or water stored in an underground aquifer in recharge districts only.
 - 2.7. Water Supply Bank means the water exchange market operated by the Water Resource Board pursuant to Section 42-1761 through 42-1766, Idaho Code and these rules and regulations.
 - 2.8 Water year is defined as the period from October 1 to September 30.
- Rule 3. Procurement of Water and Water Rights by the Water Supply Bank.
- 3.1 The Board may purchase, lease, accept as a gift or otherwise obtain rights to natural flow or stored water and credit them to the Water Supply Bank. These rights may then be divided or combined into more marketable blocks provided that there is no injury to other right holders, or enlargement of use of the water rights, and the change is in the local public interest. Any person proposing to sell or lease water to the Water Supply Bank shall file a completed application with the Director on forms provided by the Department and provide such additional information as the Board or Director may require in evaluating

the proposed transaction.

- 3.2 Submitted with the completed application shall be (1) evidence that the water right has been recorded through court decree, permit or license issued by the Department, (2) proof of ownership of the right by the applicant, (3) evidence that the right has not been lost through abandonment, or forfeiture as defined by Section 42-222(2), Idaho Code, (4) evidence to demonstrate the relative availability of water in the source to fill the right, and (5) the written consent of such company, corporation or irrigation district to the proposed sale or lease must accompany the application if the right to the use of the water, or the use of the diversion works or irrigation system is represented by shares of stock in a company or corporation, or if such works or system is owned or managed by an irrigation district.
- 3.3 Upon receipt of the completed application the Director will review it for completeness and make such further review as he deems necessary to adequately brief the Board on the merits of the proposed transaction.
- 3.4 The Board may consider an application at any regular or special meeting.
- 3.5 An application may be approved by the Board upon making the following findings:
 - 3.5.1 That the applicant is the owner of the water or water right proposed to be transferred to the water bank;
 - 3.5.2 That all necessary consents have been filed with the Board;
 - 3.5.3 That the evidence submitted does not show that the water or

water right has been lost by abandonment, or by forfeiture as provided in Section 42-222(2), Idaho Code;

3.5.4 The reasonable value of the water or water right to be acquired;

3.5.5 That the acquisition of the water or water right will have present or future beneficial effect and will not be contrary to the State Water Plan;

3.5.6 That the application is in the local public interest as defined in Section 42-1763, Idaho Code;

3.5.7 The dates upon which applications equal in all other respects, were filed;

3.5.8 That there are sufficient funds on hand to acquire such water or water rights for the water supply bank; provided that, if there are insufficient funds, or if in the opinion of the Board, existing funds should not immediately be expended for such acquisition, the Board may find that the water or water right should be acquired on a contingency basis, with payment to be made to seller or lessor only after water is subsequently sold or leased from the Water Supply Bank; and

3.5.9 Such other factors as determined to be appropriate by the Board.

3.6 The Board may accept water into the Water Supply Bank on a contingency basis with payment to be made to the seller or lessor only if the water is subsequently sold or leased from the Water Supply Bank.

Rule 4. Sale, or Lease of Water Rights from the Water Supply Bank

4.1 The Board may in its discretion initiate the process to sell or lease water from the Water Supply Bank to achieve the

purposes of the Act. The Board may from time to time, as water is available, authorize the Director to announce the availability of water from the Water Supply Bank establishing a time and date for receiving applications in the office of the Director to purchase or lease the water. The applications shall be on forms provided by the Director. The minimum lease or sale price shall be the price as determined by the Board, which price may be different from the value found by the Board in acquiring the water right under Rule 3.5. The Director will evaluate the applications with respect to the purposes of the Act, whether there will be injury to other water rights, whether the proposal would constitute an enlargement of the water right, whether the same beneficial use will be made of the water right, whether the water supply in the Water Supply Bank is sufficient for the use intended, whether the proposal is in the local public interest and would result in application to beneficial use.

- 4.2 The Director may give notice of an intended lease as he deems necessary, provided that prior to approving any application for purchase, or for lease for a period encompassing portions of two or more water years, he shall give notice as required in Section 42-222(1), Idaho Code. The Director is authorized to lease water offered by the Board from the Water Supply Bank for periods encompassing up to two (2) water years or any portions thereof, but shall submit applications for purchase, or lease for longer periods to the Board for action. The Director will advise the Board on applications for which he is authorized to act whether he can approve the application in

whole or in part or with conditions to comply with Section 42-222, Idaho Code.

- 4.3 Sale or lease shall be approved only for use of water within the State of Idaho.
- 4.4 The Board and the Director shall consider all applications received on or prior to the announced date for receiving applications as having been received at the same time. Applications received after the close of the application date may be considered only if sufficient available water remains in the Water Supply Bank after all acceptable, timely applications have been filled. The Director may consider applications received after the close of the application date at his discretion or he may reannounce the availability of water. The Board or Director may conduct a lottery or auction for sale or lease of water if applications therefore exceed the amount of water available.

Rule 5. Use of Funds in the Water Supply Bank

Ten percent of the funds obtained through the lease or sale of water from the Water Supply Bank shall be credited to the Water Administration Account provided by Section 42-238a, Idaho Code. Other funds obtained through operation of the Water Supply Bank shall be credited to the Water Management Account provided by Section 42-1760, Idaho Code, for use only in acquiring water rights or for other purposes of the Water Supply Bank Act. Transactions handled by an appointed local committee shall not be subject to the administrative charge of the Board, but are subject to such administrative charges as provided in the approved procedures or bylaws of the local committee.

Rule 6. Appointment of Local Committees

- 6.1 The Board may at any regular or special meeting consider appointing an entity to serve as a local committee to facilitate lease of stored water. At least 10 days prior to the meeting, the entity seeking appointment shall provide to the Director a copy of proposed local committee procedures, pursuant to which the local committee would facilitate the rental of stored water, together with a copy of each general lease form proposed to be used by the committee. The local committee procedures or bylaws must comply with these rules and regulations and must include provisions for the following:
 - 6.1.1 Determining priority among competing applicants to provide stored water to the bank and to make withdrawals from the bank;
 - 6.1.2 Determining the reimbursement schedule for those putting water into the bank;
 - 6.1.3 Determining the lease price to those taking water from the bank;
 - 6.1.4 Determining the administrative charge to be assessed by the committee;
 - 6.1.5 Allocating water not leased;
 - 6.1.6 Notifying the Department and the watermaster of any leases where water will be moved from within the boundaries of an irrigation district organized under Idaho statutes; and
 - 6.1.7 Leasing of water with a termination of lease to expire within the period of appointment of the local committee.

- 6.2 The local committee may voluntarily at their discretion, provide that part of any excess funds produced from the lease of stored water be credited to the Water Management Account for use by the Board for purposes of the Water Supply Bank Act.
- 6.3 The Director will review the local committee procedures and submit them along with his recommendation to the Board. The lease form must receive the Director's approval in accordance with Section 42-1765, Idaho Code. The Board may designate the applying entity as the local committee for a period not to exceed five (5) water years. A Certificate of Appointment will be issued by the Board. The Board may extend the appointment for additional periods up to five (5) years. The Board may revoke a designation upon request of the appointed entity, or after a hearing pursuant to the promulgated Rules of Practice and Procedure of the Idaho Water Resource Board, if the Board determines that the local committee is not abiding by its own approved procedures, these rules and regulations or applicable statutes.

CHAPTER IX

CONCLUSIONS AND RECOMMENDATIONS

A Water Supply Bank has been authorized and created in Idaho by the legislature; rules and regulations have been adopted by the State Water Resources Board which was given the operational responsibility for the Bank by the enabling legislation. Our study analyzed the feasibility of water banking in Idaho given the legal, institutional, and economic considerations and conditions of the water allocation system in the state. The focus was on water allocation in irrigated agriculture because consumptive water use in Idaho is dominated by irrigation use. Empirical evidence on the water supply bank operation has been scant as the operating experience has yet to evolve - the rules and regulations were not operational until the end of June 1980. Conclusions and recommendations were not operational until the end of June 1980. Conclusions and recommendations consequently are based on an appraisal of the legal appropriation system, water transfer procedures, and on interpretation of the new water bank enabling legislation, the apparent need for an incentive mechanism (price of water) to guide the efficient use of water, attitudes toward water banking (as revealed through surveys), and the administrative and operational form of the water supply bank within the existing water management and delivery organization structure.

Conclusions

The water supply bank could potentially lower the transaction costs associated with water transfers through a market which allows the forces of supply and demand to price water as a resource. By providing a centralized source of information about water availability and needs, the

Water Supply Bank can also potentially lower the "search" or information costs for potential water market participants. The Director of the State Department of Water Resources, who will process the applications for market deposits and withdrawals, has a staff in the Department of Water Resources with technical knowledge of the legal requirements, hydrologic relationships, and economic externalities that often accompany changes in water use or diversion. This knowledge constitutes a specialized source of information which can potentially be utilized in processing water deposits and withdrawal applications to facilitate cost-effective and resource-efficient exchanges between buyers and sellers of water. Since the Department of Water Resources already has responsibility for issuing water licenses, permits, and adjudicating water rights, the verification of water rights for water banking transactions will constitute an extension of the basic title registration or certification process. Potential water banking participants should realize a reduction of transaction costs from the previous water transfer process because of the centralization of the verification of legal rights process combined with the application process.

Economic and Social Benefits

The benefits of the Water Supply Bank would accrue to participants in water banking transactions and to society as a whole. Participants would benefit since water suppliers prefer the monetary benefit and buyers prefer the value of the water to the monetary payment required for withdrawal of water. Since participation is voluntary, the exchanges would be mutually beneficial. In addition to the private benefits there are also potential social benefits. The actual extent to which society benefits will depend on the degree of participation by individuals, and

water management and delivery organizations. Once the explicit opportunity cost of water is known and reflected in water market prices, individuals and organizations will have a guidance mechanism to aid in their decisions on water use.

More participation could be expected in the long run as irrigators have the opportunity to make adjustments in production techniques and crop production. Water delivery organizations would also reassess their delivery and control systems as they perceive the potential benefits of systems which conserve water. The water bank would then allow them to capture the benefits of their conservation efforts.

One of the major advantages of the Water Supply Bank will be an explicit value or price of water as a resource. An explicit price will reflect the opportunity cost of water to users and help them in making decisions on its use. The studies on water efficiency in irrigated agriculture in Idaho indicated substantial inefficiency in delivery and use in many irrigation districts and companies. The appropriation doctrine and "beneficial use" interpretation are legal principles which provided security of the water right as long as the allotted water is used in its original use, time, and place of diversion but with limits on transferability, they also encourage economic inefficiency. The "use it or lose it" fear discouraged development of new incentives for water conservation.

Under water banking, the benefits of water conservation can be realized (or captured) by selling conserved water to the water banks. Water banking will provide financial incentives to water conservation. With financial rewards available for conserving water use, irrigators and water districts will have incentives to invest in improvements to prevent seepage, evaporation in canals, and better control of

water delivery. Water banking, in facilitating a water market or water transfers, should result in more rational prices of water. These prices should also cause a shift of water from less productive to more productive land and crops. Economic efficiency will result as water is reallocated from uses where the value of the marginal product of water is low to higher valued uses.

As the water market improves the economic efficiency of water use, existing water supply could be extended to satisfy supplemental needs. Further, existing supplies could be exploited before new sources are considered. Rational water prices would help put resource development on a more economically rational basis. Widespread participation in water banking should extend the water availability (at a price) to most agricultural users. In decisions considering financing new water projects, the issue is whether project benefits outweigh the costs, but without an explicit value for water it is difficult to assess the benefits. In considering whether to develop a new water project, the cost of water from the Water Supply Bank could be compared to the expected cost of water from the new project, making the opportunity cost explicit.

Legal

As we have seen legal constraints upon the free transferability of water are substantial and have led to the establishment of a water supply bank in Idaho. Legal problems still face water transfers, even transfers made through the water bank. The problem of undetermined federal claims to water still exists; the Irrigation Districts ultra vires problem still exists; the problem of Bureau of Reclamation nontransferable storage water still exists, and, of course, the constitutional limitations of due process and eminent domain affect water bank operations. The basic technical

problem of determining impacts to third parties' return flows has not been eased, and current legislation still permits an adversely affected third party to block an otherwise economically desirable water transfer.

While the Water Supply Bank has not solved all legal and other problems, it probably has increased the free transferability of water in Idaho. Depositors in the Water Supply Bank need no longer fear losing their water through statutory forfeiture. An improved information network is available to potential participants. The Water Supply Bank will likely be more successful than individual irrigators in obtaining Bureau of Reclamation consent to transfer water from its storage facilities. In the spirit of federal-state cooperation the water Supply Bank may even be able to resolve the thorny problem of unrecorded and undetermined federal claims to water. A Water Supply Bank in Idaho has potential for improving the efficient use of water and benefiting all concerned. Like any other well-intended governmental agency, however, its success will depend largely on the attitudes and competencies of its personnel.

Attitudes Toward Water Supply Bank

Surveys among water users and water delivery organizations in Idaho in the fall of 1979 reflected potential participants' attitudes toward water banking. Water users in general (nearly eighty-five percent of those responding) favored allowing market-determined temporary water transfers. Water users also favored (seventy-seven percent of respondents) a Water Supply Bank which would provide information on water markets and facilitate fair market transactions for voluntary exchanges without endangering water rights. Agricultural water users (seventy-five percent) indicated information on water prices would aid them in making decisions on water use. The responding water users predominantly (over seventy-five

percent) preferred a demand-and-supply pricing mechanism with substantially less (fourteen percent) preferring that the price be set by the state agency.

Respondents from the water delivery organizations (irrigation districts, mutual companies, canal companies, etc.) survey strongly indicated (nearly eighty-eight percent) that there was no need for an easier procedure to facilitate water transfers. Nearly twenty-five percent of the water delivery organizations responding expressed the attitude that "no Water Supply Bank was needed."

Both groups indicated the Water Supply Bank responsibilities should be to facilitate transfers by providing information to users and act as an intermediary between voluntary water sellers and buyers. Compared to the delivery organizations, the water users responded more favorably to these Water Supply Bank functions. Only eleven percent of the water users indicated "no Water Supply Bank needed;" compared to twenty-five percent of the water delivery organizations.

Thus the attitude survey results tend to indicate that the water users were more inclined to favor water banking than water delivery organizations. The surveys were taken in the fall of 1979 before the rules and regulations were adopted by the Water Resources Board. Those rules and regulations (especially Rule 3) require consent from any irrigation water delivery organization for applications to sell or lease water by members of such organizations. The negative response to the State Water Supply Bank indicated by the water delivery organizations survey probably reflected concern by these organizations that their water management control and revenue base could be threatened by the State Water Supply Bank. However, in essence, the rules and regulations adopted by the Board allow the water delivery organizations "veto" power over interdistrict water transfers.

Administrative-Operational

The administrative and operational responsibility for the Idaho Water Supply Bank has been assigned by statute to the Idaho Water Resources Board. The Board, having the constitutional authority for determining water policy, is aided in administering and implementing that policy by the State Department of Water Resources. In this capacity the Department of Water Resources administers permits and licensing of water rights, supervises the distribution of water through watermasters, investigates water quantity and quality, and conducts adjudication of water rights under court authority. Legal procedures to effect water transfers involving water rights, changes of use, and points or diversions have been administered by the Director of the Department of Water Resources. Under the Water Supply Bank rules and regulations adopted by the Water Resources Board in May 1980 the director has responsibility for processing applications for water deposits and withdrawals from the Water Supply Bank.

State water banking appears an obvious operational adjunct to the existing state water resource management authorities because of their familiarity with the mechanics with water transfers, legal requirements of water allocation and distribution, and ready access to information on water rights. In practice the State Water Supply Bank will not replace water brokerage by other existing water institutions and organizations. Water delivery organizations (irrigation districts, mutual companies, etc.) which have been engaging in de facto water exchanges and transfers within their legal geographical boundaries will maintain their rights to adopt rules and procedures for water transfers within their jurisdiction. The Boise Board of Control, which consist of five irrigation districts and already has procedures to effect water transfers (described in Chapter II) will still

have responsibility for transfers within these districts. State water banking affords a supplementary means to facilitate water transfers and market exchanges between a large number of participants, i.e. interdistrict and intercompany transfers. Providing a procedure to facilitate interorganizational water transfers will expand the potential market area. Further, by improving the information on water availabilities and prices, the Water Supply Bank can improve the range of options for individuals and organizations. Choice among these options are voluntary; the water delivery organization's consent is required on applications for deposits in the State Water Supply Bank originating from members of such organizations. Since over seventy percent of irrigation water users belong to some form of water delivery organizations, the organizations retain significant authority in the water allocation process. Likewise, the legislation enabling the Water Supply Bank gives local storage rental committees responsibility for facilitating rental or lease of stored water. While the Water Resources Board has authority to appoint members of these local committees and approve their water rental procedures, the local rental committees are recognized as de facto water brokerage services for stored water.

The State Water Supply Bank does not replace existing water organizational structure - it supplements the existing structure. By aiding the standardization of procedures and improving information on water availabilities and prices, the Water Supply Bank can widen access to water market options and water users and right owners.

The rules and regulations adopted by the Water Resources Board require applications by depositors of water in the bank which assure ownership of the water right and availability of water by consent of water delivery organizations. Likewise, procedures for buying and leasing water from

the bank have time requirements to accommodate irrigation season planning. Beneficial use of the water will be considered by the bank, as well as potential third party effects of water transfers.

Water pricing rules and regulations by the bank are less clear. The prices paid to water depositors will not be the same as prices paid by renters who withdraw water. The most advantageous interpretation of these rules is that the prices for water withdrawals will be greater than deposits to account for transportation and conveyance costs and possible compensation to third parties adversely affected by such transfers.

Administrative Charge

The Water Supply Bank as specified in the rules and regulations will charge a ten percent fee of the sale or rental price of water to cover the apparent transaction cost of the water banking and brokerage services it provides. Since the enabling legislation requires the Water Supply Bank to be self financing in its services, it is understandable that benefits it provides in facilitating water transfers should be compensated. From an economic viewpoint these fees should be associated with the actual cost of facilitating transfers, rather than a mandated fixed percentage of the sales or lease price of water sold or rented. Of course, without an actual history of such transaction costs it may be difficult to ascertain these costs, so the fixed percentage was adopted as an initial approximation of the average cost of facilitating transactions.

As experience of the actual costs associated with facilitating water transfers accumulates, the administrative or service charge should be adjusted to reflect the actual transaction costs incurred.

Recommendations

1. This study revealed that one of the main advantages of water banking would be lowering the transactions cost associated with "search cost" or information costs for potential water market participants. The Water Supply Bank should assure that information on water supplies, demands, and prices asked or offered, are available to water users and holders of water rights or equities. Price information guides decision makers in the market process by registering and reflecting the opportunity cost of a resource as well as the value of its marginal productivity. In order to guide the efficient allocation of water, water prices must be readily available to decision makers.
2. In confronting the "externalities" which frequently occur in transfers of water, the State Water Resources Board should consider the principle of economic compensation as a negotiable possibility, rather than just the legal principle of prohibition of transfers with adverse third party effects.
3. In approving procedures adopted by the local storage rental committees, the Water Resources Board should encourage the establishment of pricing which reflects demand and supply forces. Where the water is in storage facilities managed by the Water and Power Resources Service (formerly the U.S. Bureau of Reclamation), existing contractual arrangements may constrain rational pricing but future contracts could remove this constraint.
4. A cost-benefit analysis of the water bank's services was difficult to perform because the Idaho Water Supply Bank is just evolving. The impact of the Water Supply Bank will be reflected in the increased hydrological and economic efficiency resulting from actual experience. An evaluation of the pre- and post-banking evidence could be made in

several years: transfers, volumes, prices, cost of service, and water use efficiency could be evaluated. Several years are suggested because of the time adjustment required by water users and organizations to perceive the benefits and cost of a water market process.

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