Institutional History of the Snake River 1850-2004

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Abstract

Western water allocation has long been based on the legal principal of prior appropriation, under which the first user to put water to a beneficial use establishes a claim on the use of that water so long as the beneficial use continues. It has historically been difficult, for legal, political, and hydrologic reasons, to subsequently provide for changes in place or nature of the use of water once appropriated. At the same time, the impacts on junior rights-holders and new uses have been compounded by climate variability and growth in demand for the resource.

This article traces the interaction of public policy objectives with the hydrology and ecosystem of the Snake River Basin, the success and growth of irrigated agriculture in the Basin, and, after 1950, with institutional reflections of changing preferences for use of the water.

Introduction

The water resource implications of climate change raise the question of how well water institutions in the Western United States might be expected to adapt to changed volume or timing of water flows. Particularly in basins where snowpack provides substantial storage, flows will be significantly reduced and underground recharge from slowly melting snow will also be reduced.[1] Within that context, it would helpful to develop an understanding of what institutional structures are conducive to adaptation, and to what extent new or changed institutions might be required or expected to emerge. This study examines these questions in the context of the Snake River in southern Idaho. The Snake provides a useful case study for several reasons: It lies almost entirely within a single state, Idaho, and thus within a single water law jurisdiction; it is coupled with an extensive aquifer, providing complexities of hydrologic and legal interaction which make it a complete case; and the water law underlying Snake river water allocation is based in the prior appropriation doctrine, providing a test of whether that doctrine continues to be useful.

A Snake River study has another value as well. The Snake history encompasses a major shift of public policy preference from development of the West (19th century) to protecting environmental values from development pressure (late 20th century). During the period of development priority, public policy explored several public and private models to provide the scale economies required for irrigation and hydropower. Simultaneously, institutions matrix were required to deal with climate variability, primarily in the form of drought. Finally, as the river became over-appropriated and public preferences began to change in the late 20th century, institutions have had to deal with changes in use and resource scarcity in the context of a growing population and changing economy.

Prior Appropriation and Water Allocation

At the core of debate over water allocation in the West is the doctrine of Prior Appropriation. The doctrine developed to meet the needs of mining, and then irrigation

communities for a water allocation technique that would be predictable over time and enforceable. In brief, the doctrine holds that he who first appropriates (diverts) water for a beneficial use on appurtenant land – or, in the case of a municipal or industrial right, for use as specified – continues to hold that diversionary right so long as the water is beneficially used, and in an amount (duty) appropriate for its purpose, as determined by the technology in existence at the time of the diversion. In times of drought, earlier (senior) rights holders have their place in the queue, for their full right, ahead of junior rights holders. It is a usufructory right and not a right to the water itself, ownership of which remains with the State.

Many have questioned the continued utility of prior appropriation in times of changing uses and needs. In the absence of markets and due to the unique nature of water, allocation is frequently made to low value uses ahead of those with a higher economic or social value. These criticisms range from the historical analysis of Donald Pisani that highlights early monopolistic effects,[2] to recent criticisms that prior appropriation obstructs re-allocation to higher social uses. For the most part, these criticisms object to the obstacles that prior appropriation poses for re-allocation of water. But some basis for allocation must exist. If prior appropriation is to be scrapped, and the historic rights assigned thereunder re-allocated, then there must be another specific legal institution to accomplish that purpose.

Any allocation scheme, if it is not to be inherently political, must be based in some system whereby rights are owned and alienable. While such a system might theoretically provide for public ownership of the usufructory right, it is difficult to conceive of a public system that can support substantial, continuous private investment and non-politicized transfers. If the system is not to be continuously dependent on the political access of various claimants, then rights, once assigned, must be transferable over time through a consistent, known mechanism.

As a case study, the Snake provides yet another wrinkle, not unique to the Snake, but frequently not considered by critics of either prior appropriation or irrigated farming. The Eastern Snake River Plain in Idaho incorporates an aquifer hydraulically linked to the river, the Eastern Snake Plain Aquifer (ESPA). The linkage is such that diversions in excess of consumptive use recharge the aquifer, and the aquifer discharges into the channel, downstream from the diversions. Additionally, pumping from the aquifer both serves as a buffer against dry years and as a water source to expand irrigated acreage. These linkages are such that the third party effects[*] of conservation measures can be severe.[3]

The River and Irrigation

In the beginning, there was the river, rising in southwestern Wyoming, and flowing westward across southern Idaho, north along the Idaho/Oregon and Idaho/Washington borders, and then swinging westward again to meet the Columbia.

[*] Third parties are stakeholders not party to the transaction. In a river system, movement of the diversion point may affect return flows, which in turn may be the source for another (third) water user. For surface water irrigators, return flows can amount to as much as 2/3 of diversions.

Although it flows across some of the most arid land in the western United States, it contributes to the Columbia over 40% of the flow of that mighty river, as measured at The Dalles, on the Oregon-Washington border 60 miles upstream from Portland. It was traditionally home to several species of salmon and steelhead, some migrating over 1,000 miles upstream from the Pacific to spawn in the central Rockies.

Today, the Snake irrigates some 3.4 million acres of cropland, of which over 3.0 million are in Idaho. It produces over 25 million megawatt hours of electricity in an average year, and serves the municipal needs of some 2 million people before reaching the Columbia. No salmon spawn above Hells Canyon, where three hydroelectric dams block the river. At Milner Dam, near Twin Falls in southern Idaho, the river is totally diverted during part of most summers, to provide water to 1,000 miles of canals that reach 600,000 productive acres in the most successful Carey Act project in the United States. The Snake, like many rivers in the West, is over-appropriated.

Snake and Columbia comparison

Attribute	**Snake River**	**Columbia River**	**Snake % of total Columbia**
Length	1,040 miles	1,240 miles	
Acres Irrigated	3.5 million in Idaho	7.1 million total in 3 state region (all rivers, all water sources)	49%
Avg. Annual Flow	< 2.0 mAF (million Acre Feet) (Milner), 6.5 MAF (King Hill), 12 MAF (Weiser, below the Boise River), 27.5 mAF at Hells Canyon, 36.0 mAF (Lewiston)	134 mAF at the Dalles (includes Snake)	26%
Basin Drained	109,000 sq. miles	248,500 sq. miles (includes Snake)	44%

Source: Length, flow, basin (Snake): National Park Service: nps.gov/rivers/waterfacts.html#lengths, Bureau of Reclamation Flow Augmentation Study; Columbia: Bonneville Power Administration (BPA), *Columbia River Inside Story*. Irrigated acreage: 1997 Census of Agriculture. Columbia: length, acres: encyclopedia.com; flow: Northwest River Forecast Center, National Oceanic and Atmospheric Administration (NOAA).

The Institutional History

The first irrigation in Idaho occurred in 1837, at the Whitman Mission on the Clearwater River above its junction with the Snake. The first Boise Valley irrigation had evidently occurred by 1843.[4] The Boise River is a tributary of the Snake, downstream from the Eastern Snake Plain Aquifer (ESPA). Irrigation by early Mormon settlers in the Upper Snake valley in eastern Idaho began shortly thereafter. The development of interest, however, is that which occurred under Federal land policy, beginning in 1862.

Public Policy: Generating Private Capital to Develop the West

Beginning in 1862, Congress undertook to promote private development of arid lands in the West. The policy instruments began with constrained grants of land, and progressed to greater government involvement and support as it became clear that the required scale economies could not be achieved without capital investment beyond the capacity of the individual farmer and private risk capital. The mining-based canal systems in California, which proved so unpopular with later critics,[5] were somewhat more successful than early private irrigation systems in Idaho and Utah. Many of the latter failed because they depended on natural flow and had insufficient storage to serve farmers' needs in dry years. Where significant private investment made large canal systems possible, it proved insufficient to provide the storage required for successful long-term farming.[*] That need was finally met through dams constructed under the Newlands Reclamation Act of 1902.

The 1862 Homestead Act, one of the earliest Federal efforts to encourage settlement in the West, anticipated dry farming and did not work well in the West prior to enactment of the Reclamation Act in 1902. The earliest Homestead Act settlements in southern Idaho were quickly abandoned, as individual farms, absent irrigation structures and modern pumping, were no match for a dry climate. Many of the parcels deeded in Idaho, as in much of the West, were filed on only for the purpose of transferring title to a development company, in contravention of the Congressional purpose.[6]

The early policy emphasis was on private capital and small-scale private development. The 1877 Desert Land Act envisaged individual farmers capitalizing their own irrigation works. This proved an impossible task on the desert above the river, the capital required to bring water to any but riparian lands being well beyond the capability of individual farmers.[7] Ironically, by the 1960s the same act proved very successful in southern Idaho, when advances in pump technology made it possible for a family of four to claim a full section of desert, providing water by means of a high-lift pump, no canal, dam, or diversion required.[8] Groundwater irrigation rose from 100,000 acres in 1950 to 700,000 acres by 1965 and 1.1 million acres by 1980.[9]

By 1889, some 217,000 acres were irrigated, in the Boise Valley and the Upper Snake Valley (eastern Idaho), all from natural flow, most using coffer dams that were rebuilt each year. By that same year some 40 canals had been built, at a cost of over $1 million, but were frequently dry because none originated in a secure reservoir or permanent waterworks.[10]

In 1894 Congress tried again, expanding public involvement in search of scale economies to make irrigation viable. The instrument was the Carey Act, which provided for large land grants to individual states. The States administered the land grants, which could be done in conjunction with an organized canal company that would finance water delivery. This arrangement enabled somewhat larger scale private development, making possible the construction of a water source sufficiently large and dependable that

[*] Except in significant cases such as the Twin Falls Tract, where large-scale storage was not necessary.

droughts could be survived. The Carey Act led to the first major state-level involvement, inasmuch as grants were made through the states and not directly to individuals. In Idaho, the Office of the State Engineer, the forerunner of today's Water Resources Department, handled State responsibilities for Carey Act projects.[11]

The Carey Act is also partially responsible for a quasi-governmental element of water resource institutions, the irrigation district. By enabling large-scale development, the Act encouraged creation of financing and management entities that handled water provision. Canal companies had existed before, but many had failed due to insufficient water rights. In 1917 the Idaho Legislature provided for legal organization and taxation authority for irrigation districts.[12]

With the Carey Act some of the projects proved out, as it was possible for private capital to earn a return on water provision to farmers. On the Twin Falls project in particular (1904 – 1909), farmers found a water source that was sufficiently reliable to assure crops each year, while the canal company was able to earn a return on invested capital. The original Twin Falls Project, on the south side of the Snake, irrigated some 260,000 acres of land, using over 1,000 miles of canals.[13] The promoters of the Twin Falls project were able to file on most of the un-appropriated flow of the Snake River at Milner, a site east of Twin Falls, Idaho, where the river begins a descent from the level of the plain to a canyon over 400 feet deep.

The Storage Problem and the Federal Solution

The Carey Act solved the problem of development scale, but did not address the issue of a reliable water source. Public attitudes still favored private development, with little or no Federal involvement. With the exception of the Twin Falls project, however, few Carey Act projects had sufficiently reliable water to survive.

For the next step it became necessary to not only create a bundle of legal rights sufficient to support canal construction and that of a small dam, but to build a dam large enough to provide long term storage. This, at the time, was beyond the capacity of private finance, given especially the nature of the Carey Act. In short, further expansion required not only a sufficient water right and the ability to divert the required water, but also sufficient storage to ensure water during dry years. This is a new, and expensive requirement, which provides returns on investment only in those years when the storage is needed.

The solution came through the Newlands Reclamation Act (NRA) of 1902, which after many years of debate put the Federal Government into the dam building business in support of private agricultural development. Not only could a Federal project realize greater scale economies, but the Federal Government did not require immediate, positive returns on its investment. Thus, what was not possible privately became possible publicly. Federal financing made possible social returns – settlement of the West – that could not, given current technology, be realized privately with the existing institutional structure.

While the NRA solved the storage issue, it did so at the expense of private development. The NRA provided funding for dam construction from a revolving pool of funds created by sale of development rights. Because this fund required no positive return on investment, it solved the risk problem for project finance, but in such a way as to undercut returns on privately funded projects.

Further, the NRA changed the nature of water rights on the Snake. Bureau of Reclamation projects created storage for downstream irrigation to supplement natural flow rights. One early reservoir, Wyoming's Jackson Lake (1911-16), was upstream of the earliest natural flow irrigation in eastern Idaho. Jackson Lake storage produced the irony of natural flow rights holders having their water shut off while there was substantial flow in the river, the flow belonging to storage rights holders downstream in the Minidoka Project.* [14] This situation, in the context of the measurement and modeling technology of the day, led to the first collaborative institutional innovation on the river, the Committee of Nine. The Committee's task was, and still is, to negotiate annually an allocation of water between natural rights and stored rights holders in the upper Snake (above American Falls) and the middle Snake (above Hells Canyon).[15]

Milner Dam, completed in 1905 with private funds, made possible the successful Twin Falls south side project under the Carey Act. But expansions of that project, particularly on the north side of the Snake River, were not as successful because Milner is a run-of-the-river dam, with inadequate storage for dry years. The north side project had the junior water right. The problem was solved in 1926 with construction of the publicly funded American Falls Dam. American Falls provided storage sufficient to guarantee delivery over several water years, and made the projects north and east of Twin Falls successful. On the Boise, a Snake tributary, storage problems were solved with construction of Arrowrock Dam in 1915, at the time the highest dam in the world. The Boise Project was approved in 1906, just two years after passage of the Reclamation Act.[16]

There are two trends of significance in this history. The first is that once the original natural flow projects had been completed after 1890, irrigation expansion required ever larger-scale economies from centralized canal construction and large storage dams. Technology change, in the form of high-efficiency pumps, negated much of that requirement after 1950. The second significant trend is that risk associated with large project construction, together with the public nature of the resource involved, led inexorably to state and federal government involvement.

The context for these developments was set by two external variables: public policy preference, and climate variability. Public policy from 1850 to at least 1950 favored irrigation to promote settlement at the expense of other values, many of which were not contemporaneously recognized. Climate variability required that physical infrastructure and social institutions be developed to deal with the effects of water

* The contract between the developers of the Minidoka project and the Bureau of Reclamation provided for joint management of Bureau reservoirs on the upper and middle Snake, so that obligations from Lake Walcott (Minidoka Project) could be met with storage in Jackson Lake, and vice-versa. Thus, water could literally "flow uphill."

insufficiency. Ironically, the greater the system's capacity to deal with climate variability, the greater expansion it could support in normal years, leading to a continuing need for institutional innovation. The limits to this growth did not become clear until the 1970s.

The Problem: To Allocate a Scarce Public Resource

In 1850, the river was immense and man's needs few. Early diversions were of natural flow by means of extending an obstruction into the channel to provide water for a small acreage. Later, as demand and technology increased pressure on the river there grew to be competition for water, between natural flow and storage rights (irrigation), and between irrigation and hydroelectric production, recreation, fish, and finally navigation. While there was substantial dredge mining on the Boise River and other basins elsewhere in the state, there was never much mining demand for water from the Snake itself. Even on the Boise, mining did not divert water from the basin, but returned it to the channel; the problem posed by dredge mining was sediment, not diversion.[17] For that reason, many of the conflicts evident in California were avoided in southern Idaho.

Nonetheless, the fact that mining brought the first diversions, together with the fact that many of the early miners had experience in California, led to an early preference for prior appropriation. That early preference resulted in prior appropriation being written into the Idaho Constitution, a fact that may be highly relevant for the relative success of market development in Idaho.[18]

When a resource is abundant relative to demand, few institutional constraints are required. When, however, the demand grows to claim most or all of the resource, the institutions matter. At base, there are two, and only two, ways to allocate a scarce resource: by price and by queue. Allocation by price is the normal function of a market, where ownership and use can be allocated, in full or in part, through exchanges between willing buyers and sellers. Allocation by queue occurs when a market does not evolve or is superseded by political considerations. In that case, those in the front of the line are fully satisfied and those at the end may receive, or buy, nothing.

There is seemingly a third option — public regulation, wherein wise regulators have the responsibility and authority to allocate and re-allocate among claimants in the public interest, however that is defined. This third option, however, is only a variant on allocation by queue. The public authority defines the rules of the queue, and may re-arrange the queue, providing preference to a different set of claimants. If the authority engages in determining outcomes instead of just interpreting and enforcing the rules, the entire process may be politicized, where the currencies are different, efficiency is not a criterion, and the "public interest" subject to re-definition over time. One effect is to diminish investment, because political risk adds to the required return.

The Idaho Constitution adopted prior appropriation as the legal basis for water use allocation. Under the Constitutional method, a diversion right could be established by a continuing diversion of water. Today, rights are established through registration of the claim with the Department of Water Resources, successor to the state water engineer.

Prior appropriation establishes the queue. While many commentators prefer riparian rights, or community rights,[19] prior appropriation is probably the preferable means of accomplishing an initial allocation, from the perspective of 21st century needs: the movement of water from one use to another. By establishing a reasonably well defined right, prior appropriation – as interpreted and reformed over the years -–- has accomplished a fundamental market requirement: ownership of a right that can be bought and sold. Riparian systems have difficulty with use of water at some distance from the river itself, a situation common in the West. Community systems have difficulty accommodating growth beyond the initial community. Neither establishes the legal basis necessary for an efficient movement of water from one use to another, while accommodating growth.

Still, while prior appropriation establishes the initial queue and to some degree a bundle of legal rights, it is still a queue. Junior rights holders may receive no water during a dry year. While some institutional development of market-like instruments has occurred, the exchange of water between senior and junior users, not to mention between different uses, until recently was a sometime, and usually *ad hoc,* event.

Institutional Innovation

Institutional innovation on the Snake has occurred in three phases, not totally distinct chronologically: first, new instruments were created and new responsibilities adopted at the Federal and State levels, to enable successful irrigation in furtherance of over-arching national policy. For the most part, these innovations recognized the need for expanded scale economies as a requirement for realization of sufficient private returns from economic activity that individuals would commit their capital and careers to the desired social purpose. Frequently, a failed mechanism would be followed by a new initiative that recognized more fully the need for larger scale development.

Second, institutions evolved to enable the established irrigation community to cope with periodic drought. While some innovations required further Federal intervention to realize scale economies, most were initially informal means of sharing or allocating water during drought. Some involved legal changes to help the Prior Appropriation doctrine fit with current need. Ironically, stretching the resource during drought frequently provided expanded water during normal flows, thus underwriting a larger demand – resulting, during the next drought, in an even greater difficulty.

Finally, there have been innovations to accommodate new demands and new public preferences. Those new uses stemming from purely economic origins have, for the most part, been successfully accommodated. New demands stemming from changes in public preference have proved more difficult. In this latter case, preferences have tended to find expression in the political arena, and the initial instruments used have been political. In several instances, however, even here there have been institutional changes that have at least partially accommodated each new demand.

Innovations to Provide Scale Economies

Carey Act

The Carey Act provided a state-level institutional mechanism for the organization of irrigation districts. These districts combined many settlers' irrigation needs in order to fund diversion and canals.

Twin Falls Land and Water Company (1900*)*

The Twin Falls Land and Water Company was one of the first irrigation companies to take advantage of the Carey Act in Idaho. A private organization, the Company financed and built irrigation works for farmers holding 260,000 acres of southern Idaho land under the Carey Act. The Company also financed and built the Milner dam to divert nearly the entire flow of the Snake River for irrigation. The Company is still in business today.

Reclamation Act of 1902 (Newlands Act, or NRA)

The NRA created the Bureau of Reclamation and put the Federal government into the dam building and irrigation business.

NRA dams: Arrowrock, American Falls, Minidoka, Jackson Lake, Palisades

Several dams have been built by the Bureau under NRA authorization on the Boise and Snake Rivers. While not themselves innovations, the dams are a consequence of the Reclamation Act. The dams include Arrowrock, at the time of construction the tallest dam in the world, on the Boise, and Minidoka, Jackson Lake, American Falls, and Palisades on the upper and middle Snake. Some of the dams made possible dependable irrigation on projects already in existence, and also provided for growth. Arrowrock (1915) made the New York Canal successful, Minidoka (1904-06) and Jackson Lake (1911-16) provided water for the Minidoka Project, and American Falls (1926) provided, in addition to new irrigation, storage for the existing, private, development on the north side of the Snake River that had suffered from an undependable supply. These dams are an example of the ability of the Federal Government to capture the scale economies necessary for storage, as well as the willingness of the Government to provide either patient capital, or subsidy, depending on one's calculations and perspective, in pursuit of national social goals.

Warren Act (1911)

The Warren Act provided that storage in Federal reservoirs could be contracted to private interests. In this way, the Federal government not only overcame problems of scale economies, but also provided that water could be stored for interests not in Federal reclamation projects. Today, water in federal storage, controlled by private owners, can be rented or sold for other uses without the blessing of Bureau officials.

Innovations to Cope with Climate-Induced Stress

Committee of Nine

The Committee of Nine was created following the drought of 1919 and the raising of the elevation of Jackson Lake in 1916. The new storage at Jackson lake belonged to the Minidoka Project, a Bureau project in the middle Snake, just above Milner Dam. During the drought years of 1919, 1924, and 1926, Upper Valley farmers would find their head gates turned off while there was still strong flow in the river. The flow was from the Minidoka Project storage at Jackson Lake. The State Engineer and several consultants determined that it was technically impossible to separate stored flow from natural flow, because existing means of measuring flow as well as interaction with the aquifer were not adequate to the task. The solution was to create a committee, composed of three representatives each from the Henry's Fork the South (main) Fork, and the Minidoka Project. The Committee of Nine then negotiated an annual determination, on best available evidence, of the proper allocation of stored and natural flow. The Committee was never sanctioned in law, but was effectively institutionalized by its 1924 water distribution agreement.[20] It still exists, to negotiate water appropriation and serves as the operating committee for the District 1 Rental Pool, setting prices and conditions under which water can be rented from the pool. District 1 constitutes all of the Snake River irrigated acreage above Milner Dam.

Groundwater Development

About 1950 pumping technology reached the point that it became economic to draw ground water for irrigation above the ESPA. Groundwater had the advantage of being dependable, inasmuch as surface irrigation had been seeping into the aquifer and raising its level for over fifty years.

The new technology led to two developments of significance. First, lands that had not been irrigated, because they lay above the river or for some other reason, were now opened under the 1877 Desert Land Act. Second, in some areas there was a large-scale conversion from surface to groundwater irrigation. Between them the aquifer, whose level had been rising for fifty years due to surface irrigation, began to fall. Today, it is still above the 1911 level, but has fallen far enough that in some places there are springs, on which claims were made in the 19th century, that no longer flow.

In 1951, the State of Idaho enacted legislation to provide a statutory means of acquiring groundwater rights, inasmuch as groundwater was not covered by the constitutionally based prior appropriation provisions. This legislation, together with follow-on statues through 1994, makes Idaho distinct from states following groundwater "capture" rights (Glennon).[21] Idaho has gradually extended state jurisdiction over groundwater to requiring a permit for groundwater (1963), authorizing IDWR to shut down unauthorized wells (1986), and requiring all groundwater users to install meters to measure withdrawals (1994).[22]

1980s Swan Falls Suit and Agreement

The hydropower rights of Idaho Power Co. at Swan Falls, an early hydro development on the Snake just south of Boise, are the only hydro rights on the river not subordinated to irrigation. The Company, however, had been effectively subordinating their rights in practice. In 1978 a shareholder group, fearful of losing their water rights as well as irritated at the loss of revenue, sued the Company to enforce the Company's water rights. In 1980 an agreement was reached under which the Company's water rights were affirmed, but the dam would continue to be operated in such a way as to not interfere with upstream irrigation.

1990 Water Supply Committee

The Idaho Drought Plan formulated in 1990 provided for a Water Supply Committee to coordinate drought-related activities whenever a drought is likely. The Committee is formed on an *ad hoc* basis from a pre-determined membership, to monitor conditions, provide information and recommendations, and if necessary develop a formal contingency plan. A Committee was formed during the 1987-94 drought period, implementing steps short of a demand reduction program.[23]

1992 Moratorium on New Consumptive Appropriations from ESPA

In 1992 IDWR placed a prohibition on new consumption appropriations. By shutting off new appropriations, this action made transfers the only available method by which to acquire water. As a result, transfer applications increased by 100 – 200 percent between 1991-92 and 1993-94.[24]

2001 Energy Buybacks: IPCo, PcP

In 2001, in the context of both drought and spiking wholesale energy prices resulting from California deregulation, the Idaho Public Utilities Commission authorized programs by Idaho Power Company (IPCo) and PacifiCorp (PcP) to purchase from irrigators the irrigators' rights to energy for irrigation pumping during the 2001 season. The companies paid irrigators $150/MWH for that energy, 15 cents per KWH. Participation in the Idaho Power program was quite extensive. While not purchase of water specifically, the result was that water remained in the channel while aquifer recharge was reduced (IPUC 2001).[25]

Innovations to Cope with Changing Policy Preference

1979 Idaho Water bank (Snake and Boise River Rental Pools)

Informal rental arrangements have operated in eastern Idaho since at least 1932, when 14,700 acre-feet of water were rented for 17 cents per acre-foot. A formal program was authorized by the Legislature in 1979, for transfer of water from willing sellers to willing buyers, for either new or existing uses. The Committee of Nine was appointed by the Water Board in 1979 to be the local committee for water bank administration in Water District 1, which runs from Wyoming to the Milner diversion. A second bank was

created for the Boise River in 1988, and a third in 1990 for the Payette drainage. The Shoshone-Bannock tribes in eastern Idaho also operate a water bank.[26] In more specific usage, the term "bank" generally refers to natural flow water, whereas the rental pools consist of storage rights in various Federal reservoirs that are contracted by farmers and irrigation districts that assisted in the financing of the dams.

The rental pools have added to the value of stored water, and in so doing have changed the incentive structure. Unused stored water can now be sold for hydroelectric production, fish, or downstream irrigation. That being the case, there is pressure on BOR management to implicitly change the operating rules curve bias from flood control toward refill.

Revision of state law on beneficial use

As part of the law authorizing water banks, the Legislature changed the definition of beneficial use to include the banking of water. As a result, the "use it or lose it" feature of the prior appropriation doctrine may be stayed indefinitely, enabling water to be moved temporarily to higher valued uses without loss of ownership.

Changes Resulting from The Endangered Species Act (ESA)

ESA has not yet had the devastating impact on the Snake that it has had in other basins, but its effects have not been absent. In particular, ESA has changed the operating style of the Bureau of Reclamation.

1995 Biological Opinion (BIOP) and Reclamation Water Purchases

The National Marine Fisheries Service (NMFS) issued a multi-year biological opinion in March 1995, following two years of development and legal skirmishes. The 1995 Opinion found that several Snake River species, including salmon, the peregrine falcon, and others, were endangered, and that others were threatened. It recommended a program to augment Snake River flows during the early and mid-summer period to help move young salmon past the dams (Corps 1999). The BIOP has precipitated an evident change in Bureau focus and operations, wherein the Bureau appears to be less concerned with irrigation *per se* and more with restoring streamflow. The Bureau has in recent years engaged in several purchases of water rights for the purpose of returning water to the channel (Day and McGrane, 2003).[27] As of this writing, a Federal court has invalidated the mitigation plans incorporated in the BIOP, bringing the fundamental public policy issue (navigation vs. fish) back to the fore.

"427" Program

The BIOP recommended augmentation of Snake flows by 1,427 thousand acre feet (KAF) during the summer period. An augmentation of 427 KAF was put into place in 1993, and has been maintained, excepting for recent drought

years, since then.[28] Suit has been filed by conservation groups to force the 427 KAF flow augmentation in all years.

Brownlee Operations adjustment

In 1998 the Idaho Power Company voluntarily altered operation at Brownlee and its affiliated reservoirs, Oxbow and Hells Canyon, to improve, or "reshape," flows at critical times for fish migration. This adjustment reduces the hydropower potential of the reservoirs, and thus incurs an expense for Idaho Power shareholders and ratepayers. It has been undertaken as a necessary part of the "427" augmentation program to effect those flows.[29]

Conjunctive Management

Idaho has moved toward conjunctive management of ground and surface water over the past fifty years. In 1951 the state exerted jurisdiction over groundwater, and in 1963 required a permit for new wells. It was not until 1986, however, that IDWR was authorized to shut down unauthorized wells, and 1994 before metering was required. The legislature also placed a moratorium on all new diversions in 1994.

IDWR Flow Measurement

In the 1920s the State Engineer was unable to ascertain with confidence the extent to which middle Snake flows at any given time were from natural flow or from storage at Jackson Lake, in Wyoming. This inability prompted creation of the Committee of Nine. Today, the Department (IDWR) is able to electronically measure flows at a large number of head gates and other flow points, through which that determination can be made. These measurements also contribute significantly to modeling of the river and the aquifer (IDWR 1989).[30]

UI, IDWR Groundwater Flow Model

University of Idaho hydrologists have developed a spreadsheet model of flows from any one point in the ESPA to any other, based on current knowledge of the ESPA's flow characteristics. This model describes the effects of increased or reduced draws from any point in the aquifer at any other point, in annual steps, for up to 100 years. IDWR uses this model to effect its transfer policy, under which transfers of water rights from any one point to any other point may only be approved if there is no impact on third parties, or if those effects are fully mitigated.[31]

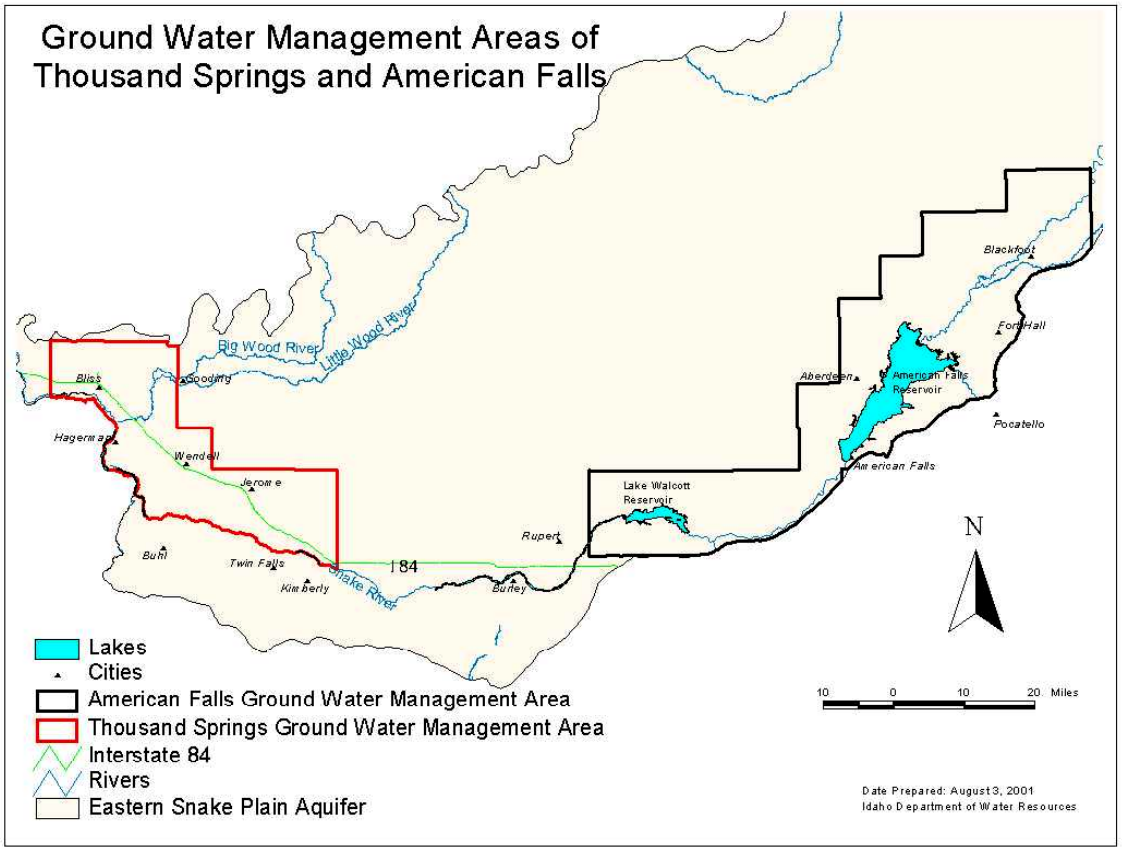
IDWR Transfer Policy, effected through flow model

In 2002, IDWR published revisions to its policy on water transfers. This policy applies to transfers between points of use for irrigation, or between uses; e.g., sale of water rights from agriculture on one reach of the river to improve flow for fish or hydro on the same or another reach.

The spreadsheet-based flow model links the standard hydrological model on which it is based with the policy requirement. In standardizing policy application, it both specifies and reduces transactions costs associated with water transfers, making possible transfers that otherwise would not occur.

Voluntary reversion to surface irrigation, purchase of water from water bank, to protect flows for older rights.

Beginning in 1950 many owners of surface water rights in the Milner-King Hill reach of the Snake River converted from surface to groundwater irrigation. Many of these surface rights were then transferred to other users, and other uses. As a result, the outflow from the ESPA at Thousand Springs fell from 4.5 MAF to about 3.5 MAF, a level still somewhat above the 1911 outflow, prior to irrigation from the Milner diversion.



In 1993 irrigators in the Hagerman Valley, below the aquifer outlet, filed the first of several "calls" for water, formal requests of the IDWR Director to curtail withdrawals by junior users. Following several years of legal action, a 2001 curtailment order by IDWR was averted at the last minute by an agreement providing for voluntary conversions from groundwater back to surface irrigation in the district just above the Thousand Springs. That agreement was renewed and

expanded, with legislative participation and funding, in March 2004, only weeks before another curtailment was to go into effect.[32]

To avoid curtailment, irrigators have undertaken to convert pumping from groundwater back to surface, provide rental pool water directly to the surface users, and recharge the aquifer. Because they no longer own surface rights, the conversion must be accomplished in part with water from the rental pool.[33]

A curtailment would impact several industrial concerns that operate with purchased water rights, large dairy operations, and municipal water expansions, as well as the irrigators. The case has forced the issue of hydrologic interconnections between the ESPA and surface flows.[34]

Conclusions

Snake River institutions have demonstrated a remarkable adaptive capacity over the past 150 years. Driven by public policy, economic reality, and individual desire to succeed, water users in southern Idaho have found ways to accommodate drought, expanding use, and changing public preferences. To the extent that the initiators of change have had an economic basis (drought, problems of scale), innovation has been largely successful. To the extent that more recent change is due to shifting social priorities, innovation is proving more difficult. Since 1960 national policy preferences have changed, and the river has been fully appropriated. Still, emerging water markets, conjunctive management, flow management, and the purchase of water rights for in-stream use have largely kept up with water demands from industrial, municipal, and environmental uses.

At the same time, expansion for irrigation has been halted through an ongoing moratorium on new rights applications, and some irrigated land has been withdrawn to accommodate industrial and environmental use. This should be seen as a normal development, particularly as about 98% of all water diversions in Idaho are for agriculture. The state's economic base has moved from mining to timber to agriculture to manufacturing and services over the past century and a half, and that shift will continue. A 1989 study identified movement of the state's economic base from resource industries (mining, timber, agriculture) to manufacturing (primarily electronics) and services during the latter half of the 20th century. While agriculture remains the dominant industry, accounting for perhaps 35% of all economic activity, excepting for the dairy industry economic growth since about 1970 has been non-agricultural.[35]

The institutional history can be seen in three phases:

First, adaptation enabled the private sector to successfully develop western land. This adaptation allowed realization of greater scale economies, first through legal expansion of private efforts (Carey Act), and then through public assumption of development risk for storage (Reclamation Act) and private ownership of part of that storage (Warren Act).

Subsequently, climate variability (drought) brought forth informal collaborative innovation (Committee of Nine), state oversight (State Engineer, IDWR), and extension of Reclamation's role in building storage. Together with technological development, climate variability also introduced extensive groundwater use, leading to conjunctive management.

Finally, changing public use preferences are proving more difficult, but have also brought forth a continuing series of innovations. It should be noted, however, that excepting for Idaho Power's flow management at Hells Canyon, and Reclamation buyouts of water for fish, the fundamental conflict over uses has not been resolved. That conflict remains in the public/political arena, which may help explain why it is so resistant to resolution.

While prior appropriation can be criticized for monopoly abuses prior to reforms in the late 19th century, and shortcomings relative to moving water from lower to higher valued uses, it is not clear either that the doctrine is inherently responsible for those failures, nor that any other legal basis would provide a superior means to re-allocation. Legislated adjustments to the definition of beneficial use, together with emerging Water Resource Department rules on transfer procedures and mitigation have enabled mechanisms within the doctrine – water banks, rental pools, buyouts, minimum streamflow appropriations, conjunctive management, flow management – to address the requirements of changing public preferences as well as stress created by drought and growth.

Collaboration among water users has also been part of the solution, particularly to drought-induced stress. Users have voluntarily shared water on many drought occasions, though they have not engaged in the kind of collaborative planning frequently proposed as a solution to resource conflict. Instead, they have developed new institutional forms to deal with stresses as they occur.

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