Technical Memorandum
Wind/Big Horn Basin Plan
BRS Engineering
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Institutional Considerations

Introduction

This memorandum explores the current status and some consequences and implications of institutional factors for water and associated resource management and development. Among the institutional factors discussed are land ownership and control, environmental laws, water law and river basin compacts, and future water development. Water management and development is considered within a cultural, economic and political context.

This memorandum contains the following sections:

Section 1 - Introduction

Wyoming's culture and economy are largely shaped by the state's natural setting. All three of the state's major industries, mineral production, tourism, and agriculture, are natural-resource reliant. Much of the state's quality of life is founded on a tradition of easy access to open country rich in wildlife and relatively un-crowded natural vistas. Outdoor activities from skiing to hunting and fishing to off-road four-wheeling are integral to both the culture and economy of the state. Environmental and economic consideration can collide in this situation. This context is highly relevant to water resource management. Relevant environmental legislation is discussed below.

Management of land, water, wildlife and associated resources occurs within a multifaceted context of institutional constraints. Perhaps the most relevant of these constraints is fragmented ownership and control of land and natural resources. In Wyoming in general, about half the land is owned and managed by federal agencies, and management and ownership of the other half is divided among state, county, local, and private entities. Given that the headwaters of most Wyoming streams are located on Federal lands, federal oversight of water development and management is inevitable. These constraints apply to the Wind/Big Horn Basin (WBHB) also, where public lands constitute about 70% of the Basin's territory.

Those regions of Yellowstone National Park east of the Continental Divide also lie within the WBHB watershed. Management of the waters within the Park falls within the purview of the National Park Service, although it remains the position of the State of Wyoming that National Parks in the State need permits from the Wyoming State Engineer's Office to use water.

The Clarks Fork River leaves Yellowstone within Wyoming, and provides water for northern sections of Park County before going north into Montana. Yellowstone draws around three million visitors per year, and three to four hundred thousand of these enter the Park through the East Entrance, west of Cody. Another eight hundred thousand or so enter through the south entrance, and thus traverse the Wind River Basin.

Another important institutional factor in the Basin's water management is the two-million acre Wind River Indian Reservation, located in Fremont and Hot Springs Counties. The Wind River and many of its tributaries are on or run through the Reservation.

Natural resources on the reservation are, in general, jointly owned by the two tribes, although some tribal members hold water rights individually. Tribal surface water rights date to 1868 – the oldest in the Basin. Legal proceedings between the State of Wyoming and the Shoshone and Arapaho Tribes awarded the right to 500,000 acre feet of water from the Wind system to the Tribes. Half of this was designated to be used for new irrigation projects. At the present time the Tribes cannot beneficially utilize this much water.

Downstream users, whose rights are junior to those of the Tribes, are accustomed to having this water available. Working out a management regime that will satisfy all parties is a formidable task. The Reservation not only incorporates within its boundaries private lands, but must operate within a governmental context of tribal, federal, state and local authority and activity.

In regard to Indian reservations, a further potential factor is the Reserved Water Rights Compact in Montana, which allocates a half-million acre-feet of water per year from the Bighorn River to the Crow Tribe, on their Montana Reservation. The U. S. Bureau of Reclamation is to allocate 300,000 acre-feet per year of storage for this purpose. The State of Wyoming is carefully watching the development of this Compact, which has not yet been approved by Congress or by the Crow Tribe.

Interstate water compacts are another significant institutional constraint. The flow of the Wind/Bighorn River is subject to a compact between Wyoming and Montana whereby the water is apportioned 80% to Wyoming and 20% to Montana. The Clarks Fork River is also apportioned, 60% to Wyoming and 40% to Montana. At this point in time Wyoming is not using all its apportionment of Bighorn River water – on average some 500,000 acre-feet that Wyoming could use flows into Montana each year. Neither is Wyoming using much of its Clarks Fork apportionment. Water from the Clarks Fork is only available for Wyoming use in a portion of Park County, before the river flows into Montana.

Section 2 - Land Ownership

In the WBHB, the Wyoming pattern of diverse land ownership applies in spades – some 70% of the Basin's 15.2 million acres is publicly owned – 61% by the federal government. Privately owned land totals nearly three million acres, but the Bureau of Land Management alone controls about 5.2 million acres in the Basin, while the Forest Service owns more than 3.1 million acres. Other federal agencies controlling large areas include the National Park Service and the Bureau of Reclamation. Much of Yellowstone National Park is in the WBHB, and there are wilderness areas in the national forests (Bighorn and Shoshone) in the mountains. Bighorn Canyon, where the Bighorn River leaves Wyoming for Montana, is a National Recreation Area. Federal agencies play a major role in the why, when, where, how and why of water management and development. The necessity of dealing with diverse land ownership can complicate water development planning.

Table 1: Land Ownership in WBHB (acres)

County	Bureau of Indian Affairs	Federal	Private	State	Water	Total
Hot Springs County	220,948	542,728	433,262	84,736	3,056	1,284,730
Natrona County	0	136,301	152,828	38,217	0	327,346
Park County	0	3,548,712	746,760	159,546	0	4,455,018
Washakie County	0	941,213	351,300	98,044	1,324	1,391,881
Fremont County	1,323,871	2,083,832	977,048	159,732	42,161	4,586,644
Bighorn County	0	1,616,215	328,184	72,879	2,551	2,019,829
WBHB	**1,544,819**	**8,869,001**	**2,989,382**	**613,154**	**49,092**	**14,065,448**

(All County/Landownership area calculations based on data projected to UTM, Zone 12, NAD27. The Landownership file was acquired from the BLM, its scale is 1:24,000.)

Table 2: Percent Land Ownership in the WBHB

County	Bureau of Indian Affairs	Federal	Private	State	Water
Hot Springs County	17.2%	42.2%	33.7%	6.6%	0.3%
Natrona County	0.0%	41.6%	46.7%	11.7%	0.0%
Park County	0.0%	79.6%	16.8%	3.6%	0.0%
Washakie County	0.0%	67.6%	25.2%	7.0%	0.2%
Fremont County	28.9%	45.4%	21.3%	3.5%	0.9%
Bighorn County	0.0%	80.0%	16.2%	3.6%	0.2%
WBHB	**11.0%**	**63.0%**	**21.3%**	**4.4%**	**0.3%**

(Percentages based on Table 1: Land ownership in the WBHB)

Section 3 - Wyoming Water Law

The fundamental principle of Wyoming Water Law is the prior use, or "first in time, first in right" doctrine. The salient aspect of this doctrine is that the priority of senior water rights

means that they must be satisfied before junior rights get any water. This implies that considering worst-case scenarios in terms of water supply is fundamental to establishing new projects. In any proposed project, whether it be a completely new one or an expansion of an existing one, consideration must be given to not only water supply, but also state and federal environmental laws and economic feasibility.

The Wyoming Water Development Program was established in 1975, with a mandate to foster, promote, and encourage the optimal development of the State's human, industrial, mineral, agricultural, water and recreation resources. . . . The program shall encourage development of water facilities for irrigation, for reduction of flood damage, for abatement of pollution, for preservation and development of fish and wildlife resources, for protection and improvement of public lands and shall help make available the water of this state for all beneficial uses, including but not limited to municipal, domestic, agricultural, industrial, instream flows, hydroelectric power and recreational purposes, conservation of land resources and protection of the health, safety and general welfare of the people of the State of Wyoming. The Wyoming Water Development Commission, established in 1979 to implement the water development program, sets goals, provides technical support, and to provide grants and loans to public entities for construction projects directly related to water needs.

Wyoming statutes do not require that publicly funded water development projects include provision for instream flows. However, the WWDC (established in 1979 to implement the Program) through its founding legislation, is able to consider instream flows, though it is not mandatory in every case. If a project receives federal funding, instream flows must be considered. Under Wyoming law, only the State can hold Instream Water Rights.

The presence of threatened or endangered wildlife species is a trigger for instream flow consideration or action by the state. Examples of fish species that seem to be under pressure are the Yellowstone cutthroat trout in the western drainages of the Basin, and sauger and sturgeon chubs in the Bighorn River. State action initiatives can simplify remedial actions that might be made more complex by federal intervention. However, 90% of the more than 10.7 million acres of public land in the Basin is Federal, so Federal involvement or participation is likely in most water projects of any size.

Other State agencies involved in water management include the State Engineer's Office, the Department of Environmental Quality, the Wyoming Game and Fish Department and the Wyoming State Parks and Cultural Resources Department. Water rights are administered by the State Engineer's Office.

Section 4 - Impact of Environmental and Cultural Concern on Regulation and Legislation

During the last four decades concern over the condition of the natural environment has increased steadily. A fundamental change has been the rise of the view that the "environment is not just a storehouse of resources for economic growth and sustenance. Rising concern about

the physical environment (ever more broadly defined) has sparked many regulatory initiatives in response.

A much broader spectrum of value is now applied to natural entities. Included are concepts such as "existence" or "passive" uses of environmental amenities. Attempts to place monetary values on these uses is often done by "contingent evaluation."[1]

Numerous activist groups now exist, seeking a voice in policy-making, and using these econometric methods to enable comparisons of intangible benefits attached to natural phenomena. The rise of these advocacy groups has moved other types of interest groups to be more active in areas of environmental and development policy also.

There also developed a more sensitive and active concern about historic and archaeological, or cultural, sites and artifacts. As a consequence surveys to determine effects of development projects on "cultural" values are necessary. The Cultural Resources Division of the Department of State Parks and Cultural Resources provides surveys of areas to ascertain whether or not cultural resources might be put at risk.

These factors have played a role in producing more activist participation in public land, water and wildlife policy-making and management than was earlier the rule. In response to this political evolution, since the late 1960s governments at all levels have proliferated studies, laws, regulations and policies aimed at environmental protection. Water development is no longer (if it ever was) focused purely on economic considerations. While agricultural, industrial, municipal, domestic and recreational water needs remain fundamental to water managers, the relevance of ecological values in policy-making has greatly expanded.

One consequence of increased and widespread public concern, beyond whatever ecological or cultural benefits may be produced, is an increase in the complexity, cost, and time required to evaluate, plan, fund, carry out and maintain projects. Perhaps the most obvious consequence of this trend is the increasing range, number and complexity of laws, regulations, agencies and policies governing water use and development. This evolution is highly relevant to water management in the WBHB, as it is everywhere else.

Section 5 - Environmental Legislation

Prior to 1948 the federal government's role in water pollution regulation was nil, but in 1956 the federal government began to assume primary responsibility for water quality.[2] Since then, federal and state legislation and regulation have created many constraints for water and water-related development efforts. A much broader spectrum of issues exists than was the case in earlier periods: water development projects are not necessarily driven primarily by consumptive needs any more. A change of emphasis from "wise use" to "conservation" and then toward "preservation" has occurred, carrying many implications for water planning and development. A major consequence is higher levels of costs and longer time periods for planning and construction.[3]

Major national environmental legislation pertinent to water management and development includes the National Environmental Policy Act (NEPA), the Clean Water Act (CWA), and the Endangered Species Act (ESA). These three laws (first enacted in 1969, 1972, and 1973, respectively) are the source of most federal authority for regulating water and, as well, ecosystems relevant to water supply and quality. Agency rules, regulations and policies are derived from these legal roots.

Federal environmental protection laws are very inclusive in their reach. The Endangered Species Act (1973), for instance, covers both animal and plant species, and requires that the Department of Interior, often through the U.S. Fish and Wildlife service, determine whether or not an action may affect some species. No federal agency can take any action deemed threatening to any endangered or threatened species. There is also concern for "sensitive" species such as raptors.

These laws mandate that project planners avoid or minimize impacts viewed as ecologically negative. Most judgments are vested in lead agencies: the US Fish and Wildlife Service for the ESA and the US Corps of Engineers for the CWA. NEPA is an extremely broad piece of legislation, demanding the submission of environmental impact statements (EIS) to all federal agencies involved in proposed projects.

Almost all water development actions fall under the purview of federal environmental laws and the agencies that administer them. As Purcell has noted, the "only water development activity not subject to federal environmental laws is drilling a well with non-federal funds on non-federal lands outside the banks of rivers, streams, and wetlands. However, piping the water from such wells across federal lands or rivers, streams and wetlands could initiate a federal environmental review."[4] Any project involving public lands will be subject to special use and right-of-way permitting, and ecological reviews will be required in most cases. In cases where an Environmental Assessment finds that there are no serious issues involved, a full-blown Environmental Impact Statement may not be necessary, expediting the process.

This national legal and institutional framework means that any Basin water project will receive close scrutiny from multiple agencies unless the proposal is a very clear cut, unmistakably beneficial one. Given the large areas of ecologically sensitive areas, particularly in the mountains surrounding the Basin, such scrutiny is politically and scientifically inevitable. Considerations such as water quality, instream flows, riparian habitat, threatened or endangered species and human access are particularly pertinent.

In Shoshone National Forest (in Park County) a 20-mile reach of the Clarks Fork River running through a deep canyon is Wyoming's only federally designated Wild and Scenic river. The terrain of the Wild and Scenic reach is not conducive to development anyway, but Wild and Scenic status severely limits development possibilities. Other WBHB waters, outside of Yellowstone National Park, that have been mentioned as deserving protected status include the Porcupine drainage in Big Horn County, the Shoshone River within the Big Horn Canyon National Recreation Area, the Middle Fork of Powder River in Washakie County, and the Wiggins Fork in Fremont County.[5] These streams could be considered for inclusion under several categories: wild, scenic, or recreational. None of them, however, have reached candidate status as yet.

The headwaters of most WBHB streams are with the boundaries of US Forest Service or Park Service lands. Most reservoirs are managed by the US Bureau of Reclamation. Other federal agencies such as the US Department of Agriculture's Natural Resource Conservation Service are concerned with riparian areas, crop and pasture land. Outside the National Parks, wildlife management, including fisheries, is within the domain of the Wyoming Game and Fish Department, although the US Fish and Wildlife Service plays a major role in issues involving threatened, endangered, migratory species, or threatened habitat.

In practical terms, one of the significant impacts of the environmental revolution and the expanded federal role is that proposed projects must be far more carefully planned. The purpose of and need for the project must be clear, the means acceptable, and the alternatives thoroughly explored.

Section 6 - Water Development Projects and Proposals

Because Wyoming has more water apportioned than it currently uses, and because water demand in down-stream states is increasing, the State continues to seek beneficial uses for that unused water. Estimates of the amount of unused water leaving the WBHB in the Clarks Fork and Bighorn Rivers are in the range of a million acre-feet annually.

In arid Wyoming, water tends to be somewhat scarce and therefore a valuable and controversial commodity. Proposed projects must receive broad support if they are to be funded and implemented. Since the foundation of Wyoming water law is the doctrine of prior appropriation, junior rights have no right until senior rights are satisfied. This means that the first water management issue to be resolved is whether or not there is adequate water available

for junior uses under a worst case scenario. If it is thought likely that in dry years the water supply could be inadequate, then consideration needs to be given to the possibility of building storage facilities. As a project study proceeds, legal, institutional and economic issues are identified. An important factor may be whether or not additional benefits, such as environmental or recreational opportunities, are there to strengthen the project. The evaluation completed, the overall economic feasibility of a proposed project can be assessed.

Endnotes

[1] These terms, drawn originally from welfare economics, are used to assign economic valuation to intangible goods. A person may derive personal satisfaction (an intangible good) from the awareness that an endangered species is being protected, for example. Contingent valuation is an attempt to quantify such intangibles by using surveys asking people how much it is worth to them to know, for example, that wolves run free, or sturgeon still exist, or forests are not being logged. The only "use" most individuals can make of phenomena such as these examples is passive.

[2] Freeman, A. Myrick, "Water Pollution Policy," in *Public Policies for Environmental Protection*, Paul R. Portney, Ed. (Resources for the Future, Washington, D.C., 1991, p. 104.

[3] For example, the WWDC has reported ". . . the federal permitting processing is more costly, time consuming and restrictive than it was in 1982. For example, in 1985 the federal 404 permit for the Sulphur Creek Dam was obtained in nine months at a cost of approximately $50,000. In 1996, after three and one-half years, we received [sic] the 404 Permit for the Buffalo Municipal Dam, a smaller and less complex project than the Sulphur Creek Dam. The actual costs related to permit acquisition were approximately $650,000. New federal requirements for wetlands mitigation, criteria involving purpose and need, and alternative analyses are the major reasons for the increased costs." Wyoming Water Development Commission, "2002 Legislative Report, Situation Analysis": http://wwdc.state.wy.us/legreport/2002/situation.html

[4]Purcell, Mike, "Institutional Constraints," page 1: Technical Memorandum, Green River Basin Plan, Wyoming Water Development Commission, 2001.

[5] US National Park Service, Nationwide Rivers Inventory: http://www.ncrc.nps.gov/programs/rtca/nri/STATES/wy2.html