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**Task 5 Future Water Use Opportunities: Screening Criteria**

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This memorandum defines the screening criteria utilized to evaluate potential future water use opportunities. The criteria was then applied to the long list of future water use opportunities as provided in Chapter 5, Tab 25, “Future Water use Opportunities – Project Summaries”

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**Section 1 – Introduction**

The purpose of this task is to identify future water use opportunities that can be implemented to satisfy present and projected water demands in the Wind and Bighorn River Basins in Wyoming. The list of opportunities compiled under this task is intended to be used by individuals and organizations that need to develop a water supply to satisfy their specific needs. First and foremost is ascertaining the project category: Agriculture, Municipal, Environmental and Religious/Cultural. One must always recognize that any screening criteria which is applied between categories may unfairly treat the project within the adjudged “less important” category. For example a municipal water supply that provides new water to 10,000 persons may be judged more important than the agricultural water supply development for 5000 acres of alfalfa. With population benefits as a heavily weighted criterion, the municipal projects will always rank higher than the agricultural projects. For this reason, the Wind/Big Horn Basin Planning Team developed screening criteria, which could be applied independent of category as well as within the individual category.

A long list of future water use opportunities was presented to the BAG. To assist the users of this list to identify potential opportunities to satisfy their demands, a methodology is documented in this memorandum, which can be employed to evaluate a specific opportunity on the list relative to similar and related opportunities. The suggested methodology evaluates opportunities according to

the likelihood that they are desirable, functional, and capable of receiving the support required for development. By using the list of future water use opportunities and employing the evaluation methodology, individuals and organizations will have “a place to start” in their investigation to develop a water supply to satisfy their specific needs.

The procedure used to complete this evaluation consists of the following five steps:

1. Establish project groupings into category and sub-category
2. Develop screening criteria to evaluate future water use opportunities:
3. Develop a long-list of future water use opportunities
4. Develop a short-list of opportunities; and,
5. Evaluate the opportunities on the short-list.

These steps are described in the remainder of this technical memorandum.

## **Section 2 – Project Categories**

Specific to the Wind/Big Horn Basin planning process, four initial categories were identified. These were Municipal, Agriculture, Environmental and Religious/Cultural.

### **Category 1: Municipal.**

This category includes the development, augmentation and improvement of public water supplies throughout the basin. Several regulatory and non-regulatory issues have focused attention on this issue within the 30 year planning period. Prior to the 1990’s many of the municipal water systems were surface-water based. In 1986 the Safe Drinking Water Act was passed and many of its requirements were promulgated during the 1990’s. These requirements including watershed protection plans, extensive water treatment and disinfection requirements. In response to these new requirements, water system operation and maintenance costs became increasingly prohibitive and several municipalities moved to a deep ground water option. In conjunction with the development of new water supply sources and the increased costs of water supply, treatment and distribution, a regionalization of water systems began to occur. Finally the susceptibility of surface water based systems to drought was realized in the late 1990’s through 2002 and an alternate supply became a realistic goal.

### **Category 2: Agriculture**

This category includes the development, augmentation and improvement of agricultural storage, conveyance and distribution throughout the basin. Several administrative and planning issues have focused attention on this issue within the 30 year planning period. Agriculture has always been a significant player within the economy of the Wind/Big Horn Basin. Economic incentives are an essential element in maintaining agricultural production at current, let alone future levels. Such incentives include inexpensive and available water supply, storage and distribution. 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. Tribal surface water rights date to 1868 and are 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 River system to the Tribes. Half of this allotment was designated for new irrigation projects. Downstream users, whose rights are junior to those of the Tribes, are accustomed to having this water available. Working out a future planning scheme that will allow new uses and adequately distribute the existing water resources is a formidable task. Future planning projects must address this.

### **Category 3: Environmental and Recreation**

This category includes development and preservation of water supplies for environmental and recreation purposes. Within the 30 year planning period, environmental and recreation uses are anticipated to become increasingly more important. Preservation of wetlands, riparian buffers, maintenance of minimum stream flows and minimum reservoir pools are addressed as regulatory as well as conservation goals. Tourism and recreation are increasingly important to the Wind/Big Horn Basin economy. With nearly 71% of the Basin under public ownership, including several national forests and Yellowstone National Park, recreation interests are a major player. Water for fish hatcheries, campgrounds and golf courses are new demands. The impact of drought conditions and an administrative water rights call on junior appropriators has made the issue of minimum flows controversial.

### **Category 4: Religious and Cultural**

This category includes the preservation and maintenance of existing springs, lakes and water sources for religious and cultural purposes. No assessment of the Basin's future is complete without consideration of the 2.2 million acre Wind River Indian Reservation. Home of the Eastern Shoshone and Northern Arapaho Tribes, the Reservation is located mostly in Fremont County, with a relatively small area in Hot Springs County also within the Reservation. Much of the Reservation is mountainous, and its eight watersheds incorporate around 365 lakes and reservoirs, collectively containing more than 100,000 acre feet of water, and about 1,100 miles of streams and waterways. Many of these waters provide good fishing. As active BAG member, the Tribe has identified preservation for religious and cultural purposes as an important category.

## **Section 3 – Project Sub-Categories**

To assist in further project groupings eight sub-categories were developed as part of the Wind/BigHorn Basin planning process. These sub-categories were intended to allow comparison of projects based on the type of project and were as follows:

- **Development of New Sources**- includes the development of a new, previously undeveloped water source e.g. deep ground water.
- **Distribution of Existing Sources**- includes the construction of new canals, ditches and pipelines to improve agricultural or municipal conveyance. Regionalization of municipal

systems is included in this sub-category.

- **Storage of Existing Sources**- includes the development of new storage opportunities for both agricultural and municipal purposes.
- **Water Conservation**- includes both structural and non-structural conservation measures to include municipal metering programs, use and reuse of grey water for parks and cemeteries, lining of agricultural ditches and more efficient sprinkler systems.
- **Water Management**- includes management of existing uses through water rights or storage facility administration. This sub category includes a review of existing water rights and uses, potential abandonment of unused water rights, development of new accounting procedures such as augmentation plans and coordinated releases and reservoir schedules by the USBR to meet specific basin needs.
- **Conjunctive Use Options**- includes the combination of several types of uses to address a water planning goal. This sub category includes use of excess surface water to help recharge depleted ground water reserves as well as using existing flood plain gravel pits for storage and later reuse of river flood flows.
- **Basin Transfers**-includes transfer of river flows from a basin or sub basin with excess or underappropriated water to a basin where additional water is needed.
- **Environmental and Recreation**- includes the development and preservation of water supplies for environmental and recreation purposes. This subcategory includes water development for recreation purposes such as fish hatcheries, golf courses as well as maintenance of existing flows for environmental purposes. Finally this category may include fencing, land purchase for preservation of riparian ecology.
- **Development of New Uses**- includes the development of new water uses within the Basin. This subcategory includes the use of water in a fossil fuel power plant, bottled water plants, new lands to irrigation and water for dust abatement.

## **Section 4 – Screening Criteria**

A significant task of the river basin planning process is the development of screening criteria and methods for evaluating future water use opportunities identified and listed for the study basins. The Wind/Bighorn Basin project team adopted the screening criteria and evaluation method, which was originally developed for the Green River Basin Plan. These criteria were presented to the Basin Advisory Group (BAG) for consideration and comment.

### **Criterion 1: Need**

This criterion reflects the ability of the project to meet existing and future water needs in the Basin. A score of 1 is assigned if the project falls in area of water surplus. A score of 10 reflects that the project will potentially benefit areas with existing shortages even during wet years.

### **Criterion 2: Water Availability**

This criterion reflects the general ability of a project to function, given likely bypasses for

environmental uses and prior rights. It is not a reflection of the relative size of the project. With respect to ground water availability, this criterion is reflective of an aquifer's likelihood to yield the anticipated project demand. A score of one (1) indicates no dependable supply, whereas a score of 10 reflects that water is available even during dry years.

### **Criterion 3: Financial Feasibility**

This criterion reflects the effects of the combination of technical feasibility (high or low construction cost) and economic use to which the water would be put (e.g. irrigation of native meadows vs. cultivation of alfalfa or row crops). The intent of this criterion is to indicate the sponsor's ability to afford the project or meet Wyoming Water Development Commission (or other) funding source criteria. A low number (1) represents a project, which is ineligible for WWDC funding or where costs significantly exceed benefits. A high number represents a project that would more easily meet funding and repayment requirements.

### **Criterion 4: Public Acceptance**

This criterion reflects the extent to which a project will encounter or create public controversy (low number) versus a project that would likely engender broad public support (high number). For example, on-stream storage in environmentally sensitive areas would be very controversial, while off-channel storage in less sensitive areas would more likely be supported.

### **Criterion 5: Number of sponsors/beneficiaries/participants**

This criterion reflects the desirability, all other things being equal, that a project serving a larger segment of the population should be evaluated higher (higher number) than one serving only a few (lower number). This criterion is problematical, when one applies it to many of the conservation or institutional/administrative options, or to projects where there is no clearly defined sponsor. Such projects could be ranked higher, since they truly benefit a large number of people, yet no single entity is identified as a lead or direct sponsor. As sponsors adopt these type of projects (e.g. leak detection/pipeline replacement), such projects will rise to the top of the short list.

### **Criterion 6: Legal/Institutional concerns**

This criterion reflects the perceived relative ease (high number) or difficulty (low number) with which a project could be authorized and permitted under existing state and federal law. In several cases, certain long list projects received lower rankings because there was known opposition and the threat of litigation. A number one (1) reflects a project with known fatal flaws, whereas a number ten (10) reflects a project which is easily permissible, no mitigation required and has strong support from the environmental or neighborhood groups.

### **Criterion 7: Environmental/Recreation benefits**

This criterion reflects the positive (high number) environmental and recreational aspects of a project versus those projects, which have a potential negative (low number) impact on recreation and/or the environment. If this project would result in no net gain or loss, a number 5 was assigned. For example a ground water development project for a small town would rate a 5, since it has neither a positive or negative environmental benefit.

**Section 5 -Weighting of Screening Criteria**

Each screening criterion was assigned a weight depending on its relative importance to assuring a successful project. Weights were assigned values between 1 and 10 by the consulting team based on its understanding of the values and preferences expressed by BAG members during the project development. Weights are listed in the following table.

<b>Screening Criteria</b>	<b>Relative Weight</b>
Need	8
Water Availability	7
Financial Feasibility	7
Public Acceptance	6
Number of Sponsors / Beneficiaries	6
Legal / Institutional Concerns	5
Environmental / Recreational Benefits	7

After the long list was developed, each long list project was evaluated for the individual criterion on the basis of 1 to 10. After applying the criterion weights to each number, a total “value” of the long list project was established.

**Section 6 - LONG-LIST OF FUTURE WATER USE OPPORTUNITIES**

Compiling the long-list of future water use opportunities began with a review of published reports available for the study basins, knowledge of the basin and recommendations received at the October 2002 BAG meeting. The level of information and data available for the projects identified through the literature review varied from very sketchy to completed conceptual designs.

Both surface and ground water development projects were identified and included on the long-list. Municipal projects have and will continue to include replacement of surface water sources with deep ground water supplies. Regionalization of municipalities and rural areas are and will continue to be included in these types of projects. Water conservation projects were included on the long list and reflect a growing attitude of both the funding agencies and the people of the Basin. Environmental, religious and cultural projects reflect the ethnic diversity of the users in the basin, which includes ranchers, tourists, city dwellers and members of the Eastern Shoshone and Northern Arapahoe Tribe. Although hot geothermal water is present and serves as a major tourist attraction in portions of the

Basin (primarily, Yellowstone and Hot Springs County), it was not included in this study. Similarly, ground water produced in the development of coalbed methane was not included on the long-list and is not considered a major player in the Wind/BigHorn Basin.

Water right permit applications have been submitted to the State Engineer for several of the projects included on the long-list. Some of the applications have been approved and the State Engineer has granted permits authorizing project development. The majority of the projects, however, have not been elevated to permit status and the applications remain in the pending status. Several of the projects are in various stages of study and feasibility determination within the WWDC process. These were addressed in the long list and in some cases were elevated to the short list.

Water right information was not compiled for the projects nor was water right status considered in the subsequent evaluations of the projects. Each of the projects on the long-list were evaluated under the assumption a water right for the project could be perfected and conflicts with competing water rights could be resolved. Consideration was given to simply compiling the water right status for information only and not for the purpose of evaluation. However, this task proved to be beyond the scope of this river basin planning study and, more important, the information derived from this effort promised to be more confusing than useful.

Another future water use opportunity in the Wind/Bighorn River Basins is the establishment of in stream flow water rights and minimum reservoir pools. These water rights are developed through a specified procedure that begins when the Wyoming Game and Fish Department proposes a stream segment for an instream flow water right. Once submitted, the Water Development Commission reviews the data and the stream hydrology to determine if adequate water is available to meet the proposed new water rights. The State Engineer then either grants or rejects the water right. In-stream flow opportunities are included on the long-list since not only have several reaches been granted, but a large number remain in queue. As new segments are nominated they will be advanced through the process. Minimum reservoir pools have been proposed to sustain both recreation and fisheries. They have been included on the long list, yet specific locations (sponsors) have not been identified. This type of project will need to be reviewed and approved by the owner of the reservoir, which in many cases is the US Bureau of Reclamation.

An initial long list, which included over 200 water storage projects was presented to the BAG in August of 2002. Following discussions and further input from the BAG a supplemental long-list was presented to the BAG at the October meeting. These two lists were combined and amended in time for the December 2002 BAG meeting in Powell. This latter long list was broken into categories and sub-categories, which defined the type of project or project grouping. The individual long list projects were scored individually and as a category/sub-category group.

Although scoring and weighting of the individual projects did occur, the use of these multiple categories allowed projects of similar nature to be compared to each other directly. In this manner an environmental project (no direct benefit to people) wasn't directly compared to a municipal project, which might benefit 8,000 people.

## **Section 7 - SHORT-LIST OF FUTURE WATER USE OPPORTUNITIES**

Projects and opportunities on the long-list were reviewed to determine if they should be included on the short-list or if they should be eliminated from consideration during the 30-year planning period. Reasons to eliminate projects included:

- 1) the project had already been constructed;
- 2) the location of the project facilities (i.e. within an environmentally sensitive or Wilderness Area), presented major legal, institutional, and permitting constraints;
- 3) the original demand for the project no longer exists and is not expected to appear within the planning period;
- 4) the project had no immediate or near term sponsor; or
- 5) the project feasibility was questionable or did not fall within the upper percentile of screening criteria.

Given the size, breadth and distribution of project needs within the Wind/BigHorn Planning area, an attempt was made to develop short list projects that might benefit different interests throughout the Basin. This included an attempted geographical distribution of projects throughout the Planning Area.

## **Section 8 - SUMMARY OF PROJECT EVALUATION METHODOLOGY**

The methodology described in this section is intended to assist the user of the long/short-list of future water use opportunities. The process described can be employed to establish “a place to start” in the quest to match specific water demands to future water use opportunities. There should be no question that many of the long list projects may migrate to the short-list and ultimately to project status over the 30-year planning horizon.

The process begins after a project need is defined. This project need could be served from the existing long list or short-list of future water use opportunities or may require a new entry. The project need should be defined by its category and/or sub-category. The screening criteria, developed under this basin planning process should be applied or, in the case where things may have changed since the creation of the original long list, be reapplied to the project. The result of the screening process will be an evaluation of opportunities in accordance with the relative likelihood that they are desirable, functional, and capable of receiving enough public support to be implemented. In general, the results should present an overall favorable future water use opportunity or project.

Finally once a project is defined and screened, the process of implementation takes place. In many cases, this will include:

- 1) The development of a sponsor, which might include the formation of regional joint powers board, local watershed council or agricultural district.

- 2) Establishment of board members responsibilities and establishing a method to service members, collect fees and institute operating agreements;
- 3) Prepare project funding package, which might include project need, project sponsor and time table for implementation of the project;
- 4) Apply for grant or grant/loan package which allows technical analysis of feasibility, project parameters and conceptual level costs;
- 5) Apply for grant or grant/loan which allows for final design, plans and specifications for final project implementation.
- 6) Apply for project funding to construct project.