4B - SNAKE RIVER MILNER ZERO MINIMUM FLOW

Water resource policy, planning, and practice should continue to provide for full development of the Snake River above Milner Dam recognizing that the exercise of water rights above Milner Dam has and may reduce flow at the Dam to zero.

Discussion:

Idaho Code § 42-203B(2) provides that “[f]or the purpose of the determination and administration of rights to the use of the waters of the Snake River or its tributaries downstream from Milner Dam, no portion of the waters of the Snake River or surface or ground water tributary to the Snake River upstream from Milner Dam shall be considered.” This provision was enacted in 1986 to confirm and clarify the Milner zero minimum stream flow and the “two rivers” concept. Policy 4B reaffirms the Milner zero minimum stream flow and the “two rivers” concept, which have appeared in each successive revision of the Idaho State Water Plan.

Figure 1 shows the annual volume of natural flow passing Milner Dam from 1980 through 2011. Because of year-to-year variability of the natural flow passing Milner Dam, the optimum development of the natural flow will be achieved through storage in surface water reservoirs above Milner Dam and in the ESPA.

Implementation of managed recharge will have an effect on the flow characteristics of the Snake River above and below Milner Dam. ~~Accordingly, while t~~The Eastern Snake Plain Aquifer Comprehensive Management Plan (“ESPA CAMP”) established a long-term annual hydrologic target of 150,000 to 250,000 acre-feet of managed recharge to ~~, this target should~~ be phased in to allow for informed water management and planning.~~”~~ The Phase I managed recharge hydrologic target for the Snake River Basin above Milner ~~is~~ was to recharge between 100,000 and 175,000 acre-feet on an average annual basis. The recharge target was subsequently raised to 250,000 acre-feet on an average annual basis. ~~Based upon data gathered during this initial phase of managed recharge, the Board will consider in 2019 whether to implement the ESPA long-term managed recharge hydrologic target.~~[1]

The initial recharge goals of the ESPA CAMP have been achieved. In 2025, the Idaho Legislature passed Senate Concurrent Resolution 110 which recognized that “ESPA groundwater levels, Snake River reach gains, and ESPA spring discharges increased from 2015 to 2020, but have since declined to near 2015 levels despite considerable groundwater conservation, and managed aquifer recharge~~, and cloud seeding activities . . .~~” Senate Concurrent Resolution 110 directed the IWRB to establish a state-funded ESPA managed recharge goal of 350,000 acre-feet on an average annual basis. The state-sponsored 350,000 acre-feet on an average annual basis

[1] The Board entered into a Memorandum of Agreement with Idaho Power Company as part of the 2009 Framework Reaffirming the Swan Falls Settlement dated May 6, 2009, that sets forth additional understandings between the Idaho Power Company and the Board regarding implementation of managed recharge.

will be based on a 15-year rolling average. Achieving the state-sponsored 350,000 acre-feet recharge goal may require development of additional managed recharge infrastructure. It is recognized that, given the variability of the water supply, this goal may be developed over time.

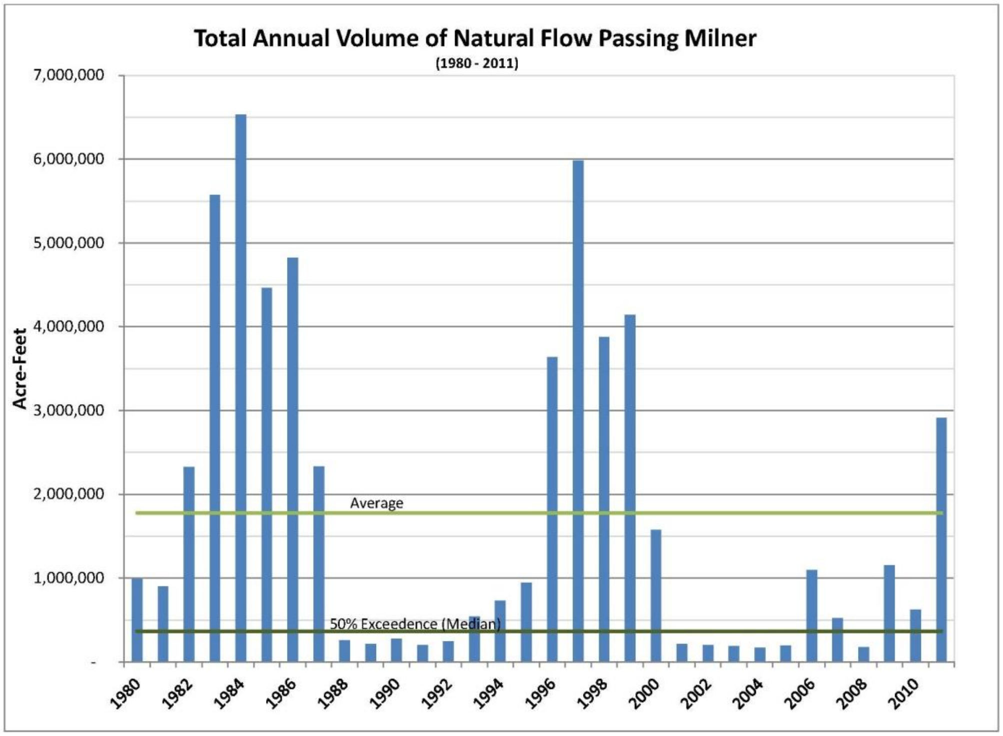

Figure 1 Total Annual Volume of Natural Flow Passing Milner Dam

As discussed in Policy 4E, development of new surface storage will take time. In the interim, the Board will cooperate with stakeholders to explore ways to optimize the management of flows that are currently passing over Milner Dam to first meet water supply needs above Milner Dam, and second to shape any remaining unappropriated flows for hydropower and other uses below Milner Dam.

Consistent with Idaho Code § 42-203B(2), no use of unappropriated flows passing Milner Dam by downstream users establishes a right to call on such flows now or in the future.

Implementation Strategies:

- Develop and maintain a reliable supply of water for existing uses and future beneficial uses above Milner Dam.
- Assess the feasibility of construction of new on-stream and off-stream storage in the Snake River Basin above Milner Dam.
- Implement a sustainable aquifer recharge program
- Address water management and reservoir operation needs through the Upper Snake River Advisory Committee.

- Measurement and Monitoring Implementation Strategy:
  - Continuously improve the Eastern Snake River Aquifer Model ("ESPAM"), the Snake River Planning Model ("SRPM"), and the Snake River Water Right Accounting Program.
  - Promote linkage of the models and their use in evaluation of impacts of various management decisions on Snake River flows, aquifer levels, and reservoir operations.
  - Undertake measurement and monitoring of the combined river and aquifer system to facilitate water management and planning in the Snake River Basin above Milner Dam.
  - Investigate, test, and adopt new water measurement and modeling methods and technologies that improve water management capabilities.
- Implement and maintain cooperative water resource agreements and partnerships with neighboring states, the federal government, and Indian tribes in managing the water resources of the Snake River above Milner Dam.

Milestones:

- Process in place that provides recommendations to optimize the management of the water resources and the reservoir system above Milner Dam.
- ~~A managed aquifer recharge program above Milner Dam implemented that recharges between 100,000 and 175,000 acre-feet on an average annual basis by 2019 and data gathered to assess the efficacy of the program.~~
- Projects implemented that enhance the water supply above Milner Dam.
- ~~Implement a~~ state-sponsored managed aquifer recharge program with a goal of achieving ~~between 150,000 and~~ 350,000 acre-feet of recharge on an average annual basis, as measured by a 15-year rolling average.

4D - CONJUNCTIVE MANAGEMENT OF THE ESPA AND SNAKE RIVER

The Eastern Snake Plain Aquifer and the Snake River below Milner Dam should be conjunctively managed to provide a sustainable water supply for all existing and future beneficial uses within and downstream of the ESPA.

Discussion:

The ESPA is approximately the size of Lake Erie and underlies more than 10,800 square miles of southern Idaho, stretching from St. Anthony to King Hill. It is one of the largest and most productive aquifers in the world, estimated to contain 1 billion acre feet of water. Most of the ESPA is in direct hydraulic connection with the Snake River. The Snake River alternately contributes water to and receives water from the ESPA. Small changes in aquifer storage can have significant impacts on the Snake River

The volume of water stored in the ESPA derives from natural inputs (precipitation, tributary underflow, seepage from rivers) and from irrigation related inputs (seepage from canals and farm fields). The volume of water stored in the ESPA increased dramatically during the first half of the 20th century as large irrigation canals transported millions of acre feet of water from the Snake River out on to the Eastern Snake River Plain. Crops were irrigated by flood irrigation, and the water not consumed by the crops percolated into the ESPA as "incidental recharge. As a result, the groundwater table rose across the ESPA by as much as 30-50 feet. The flow of springs near American Falls and in the Thousand Springs reach also increased dramatically. Thousand Springs flows increased from 4,200 cfs prior to irrigation to about 6,800 cfs by the late 1950s. Since then spring flows have declined as a result of more efficient surface water irrigation practices, the termination of winter canal flows, ground water pumping, and drought. Spring flows in the Thousand Springs reach in 2024 ~~currently~~ are about ~~5,200~~4,500 cfs, a decline of just over 3~~2~~0% ~~over the past sixty years~~. While spring discharges from the ESPA remain above pre-irrigation levels, the decline from peak levels has created conflicts between surface and groundwater users, and in some instances between senior and junior groundwater users.

In most years when irrigation demands exceed water being accumulated to upstream storage reservoirs, flows at Milner Dam are reduced to zero until the end of the irrigation season. At these times the Snake River flow at the Murphy Gage consists mostly of ESPA discharge from the Thousand Springs area.

Recognizing a hydraulic connection between the ESPA and the Snake River, the 1986 State Water Plan identified the need conjunctive management of ground and surface water resources. In recent years, the State has implemented scientific measures to increase knowledge of the hydraulic connection between the ESPA and the Snake River, and implemented measures to improve aquifer conditions in, and spring discharge from, the ESPA. Continuation of these efforts is fundamental to ensuring an adequate water supply for existing and future water demands within the Eastern Snake River Basin.

Conjunctive management of the Snake River Basin water resources is also key to meeting the Murphy minimum stream flows. The 1984 Swan Falls Settlement explicitly recognized effective water management of the ESPA and Snake River – and associated policies and recommendations laid out in the State Water Plan – as the means of ensuring the Murphy minimum average daily flow while optimizing the development of the Snake River Basin: "[t]he State Water Plan is the cornerstone of the effective management of the Snake River and its vigorous enforcement is contemplated as a part of the settlement." [2]

[2] This policy addresses conjunctive management of the Eastern Snake River Aquifer and the Snake River and not water rights administration. Water rights administration is the enforcement of the relative rights of water right holders under the prior appropriation doctrine. As noted in Policy 1E conjunctive management is broader and encompasses actions that can be taken to optimize the benefits and value of Idaho's water resources. While conjunctive management is not a substitute for water rights administration, it is in the public interest to

Building on the existing conjunctive management efforts, the Idaho Legislature in 2006, adopted Senate Concurrent Resolution 136, which requested the Idaho Water Resource Board to develop a CAMP for the Eastern Snake River Plain Aquifer. In January 2009, the Board adopted the ESPA CAMP the goal of which is to "[s]ustain the economic viability and social and environmental health of the Eastern Snake Plain by adaptively managing the balance between water use and supplies." The objectives of the plan are to increase predictability for water users by managing for a reliable supply, creating alternatives to administrative curtailment, managing overall demand for water within the Eastern Snake Plain, increasing recharge to the aquifer, and reducing withdrawals from the aquifer.

The long-term objective of the ESPA CAMP is to effectuate a net annual ESPA water budget change of 600 thousand acre-feet (kaf) by the year 2030. This change is to be achieved through implementation of measures designed to reduce demand on and to augment the water supply of the ESPA. Approximately 100 kaf of demand reduction is to be achieved through groundwater to surface water conversions, and another 250-350 kaf of demand reduction is to be achieved through various measures designed to retire existing water rights. Aquifer recharge is expected to increase the ESPA water supply by 150-~~250~~ 350 kaf.

The ESPA CAMP uses a phased approach to achieving the long-term change in the water budget. The goal of ~~Phase I of~~ the ESPA CAMP is to implement measures that will result in a net annual change in the ESPA water budget of ~~between 200 kaf and 300~~600 kaf. The recommended actions to achieve this change include ground- to-surface water irrigation conversions, managed aquifer recharge, and augmentation of supplies through demand reduction and weather modification. ~~ESPA CAMP Phase I strategies are to be implemented by 2018 with ongoing monitoring and evaluation of the intended and unintended effects of the strategies. The Phase I monitoring and evaluation studies will be used to select, design, and implement Phase II strategies that will lead to an additional 300-400 kaf water budget change.~~

The initial recharge goals of the ESPA CAMP have been achieved. In 2025, the Idaho Legislature passed Senate Concurrent Resolution 110 which ~~recognized that "ESPA groundwater levels, Snake River reach gains, and ESPA spring discharges increased from 2015 to 2020, but have since declined to near 2015 levels despite considerable groundwater conservation, managed aquifer recharge, and cloud seeding activities . . ." Senate Concurrent Resolution 110~~ directed the IWRB to establish a state-funded ESPA managed recharge goal of 350,000 acre-feet on an average annual basis. The state-sponsored 350,000 acre-feet on an average annual basis will be based on a 15-year rolling average. Achieving the state-sponsored 350,000 acre-feet recharge goal may require development of additional managed recharge infrastructure. It is recognized that, given the variability of the water supply, this goal may be developed over time.

Policy 4D embraces the conjunctive management goals and objectives of the ESPA CAMP. Implementation of the ESPA CAMP will improve the opportunities to adaptively manage and

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conjunctively manage the ESPA and the Snake River to lessen or obviate the need for broad-scale water rights administration to accomplish general water-management goals.

optimize water supplies within and downstream of the ESPA, may result in: increased gains in some river reaches; improved storage carryover; increased aquifer levels; opportunities for municipal and industrial growth; reductions in overall consumptive use; increased spring discharge rates; and an ongoing public process for assessing the hydrologic, economic, and environmental issues related to the implementation of management strategies.

Most of the human made changes to the ESPA water balance during the past decades are reflected in current aquifer levels and spring flows. Continued changes in irrigation practices (e.g., conversion from gravity irrigation to sprinkler irrigation) and future climate variability, however, may create additional impacts to ESPA aquifer levels and aggregate spring discharge. Such impacts affect not only the ESPA area but also the Snake River downstream of the ESPA, because aggregate spring discharge from the Thousand Springs reach is the primary source of river flows in the Milner to Murphy reach during portions of some years.

To date, efforts to monitor and measure ESPA groundwater levels, diversion volumes, and river reach/gains have focused on the ESPA, individual springs discharging water from the ESPA, and reaches of the Snake River hydraulically-connected with the ESPA. Because of the importance of the ESPA discharge on downstream reaches of the Snake River, however, it is imperative that an enhanced spring-flow monitoring program be developed to provide the information necessary for identifying, tracking, and predicting future spring discharge trends. Such a monitoring program needs to include long-term measurements of aggregate annual spring discharge (as opposed to point-in-time discharge from individual springs) and ESPA ground water levels.

Sustaining Snake River minimum stream flows downstream of the ESPA may require short-term and long-term adaptive management measures. A monitoring program aimed at identifying long-term spring discharge trends in the Snake River Thousand Springs reach should be designed to support the development of one or more adaptive management "triggers" based on pre-determined observed or predicted change in aggregate spring discharge rate, aquifer levels, and/or Snake River flow. The triggers should be used to initiate adaptive management measures that address the cause – or impacts – of any unacceptable decline in Snake River flow downstream of the ESPA.

Monitoring efforts and adaptive management measures are crucial to sustaining the economic viability and social and environmental health of the ESPA and the Snake River. Successful adaptive management strategies, built on the principles of conjunctive management of ground and surface water, supported by scientific understanding and reliable data that take into account the complex and interrelated nature of Snake River subbasins, will accomplish two goals: 1) ensure an adequate and sustainable water supply for existing and future uses, and 2) reduce conflicts between ground and surface water users.

Implementation Strategies:

- Implement actions delineated in the ESPA CAMP that will enhance aquifer levels and spring flows.

- Continue existing efforts to measure and monitor ground and surface water diversions, water levels, spring discharge rates, and Snake River reach gains/losses, and quantify ground and surface water interactions.
- Develop and implement a monitoring program to better predict the occurrence and duration of future low flows in the Snake River.
- Create a working group to assist in the development of a spring monitoring program.
- Update the Snake River: Milner Dam to King Hill Part B State Water Plan to incorporate ESPA CAMP goals and objectives and to account for water management developments since its adoption.
- Implement a state-sponsored managed aquifer recharge program with a goal of achieving ~~between 150,000 and~~ 350,000 acre-feet of recharge on an average annual basis, as measured by a 15-year rolling average.

Milestones:

- ESPA CAMP hydrologic conjunctive management targets met or exceeded.
- Snake River flows at the Murphy and Weiser Gages remain at or above established minimum stream flows.
- Reduced water-related conflict in the Snake River Basin.
- Revision of Part B of the State Water Plan.

4E - SNAKE RIVER BASIN NEW STORAGE

Development of new on-stream, off-stream, and aquifer storage is in the public interest; provided, however, applications for large surface storage projects in the Milner to Murphy reach of the Snake River should be required to mitigate for impacts on hydropower generation.

Discussion:

ESPA Managed Recharge Pilot program

Recharging aquifers as a water supply alternative has significant potential to address water supply needs, in addition to addressing conjunctive management issues. ~~Pursuant to the ESPA CAMP,~~ The Board has completed ~~is undertaking~~ a five-year pilot program of managed aquifer recharge to the Eastern Snake Plain Aquifer. One of the potential benefits of managed recharge in the ESPA is increased water storage in the aquifer. Effectiveness monitoring and evaluation results will be used to select and design future managed recharge strategies and projects.

Surface Water Projects

New Snake River surface storage projects should be investigated and constructed if determined to be feasible. Although there are major dams and reservoirs designed for water storage, flow regulation, and flood control on the Snake River and its tributaries, their existing capacity is insufficient to provide the water supply and management flexibility needed for the myriad of existing and future beneficial uses.

Diversion of water from the main stem of the Snake River between Milner and the Murphy Gaging station for storage during the period November 1 to March 31 will have a significant impact on hydropower generation. Thus, any new storage projects in this reach should be coupled with provisions that mitigate for the impact of such storage depletions on hydropower generation. The term "mitigation" is defined as causing to become less harsh or hostile, and is used here rather than "compensate" which connotes equivalence. Methodology will be developed for use in calculating impacts on hydropower generation as part of any application to construct new storage within this reach of the Snake River.

A number of studies focusing on water storage as one potential measure for addressing water supply demand and flood risk reduction are underway. This section provides a brief description of the most significant studies that have been initiated or are in the planning process.

Henry's Fork Project/Teton River Basins

The Board and the U.S. Bureau of Reclamation are conducting a study of water resources in the Henry's Fork/Teton River Basins to develop alternatives for improving water supply conditions in the Eastern Snake Plain Aquifer and upper Snake River Basin. These alternatives include new water storage projects, enlargement of existing reservoirs, and conservation and water management strategies, including managed aquifer recharge and automated water delivery systems.

Minidoka Dam Enlargement

In the 1980s, the Bureau of Reclamation and irrigation districts initiated the required planning process and feasibility studies to replace the spillway and two canal headworks due to the state of deterioration and potential for ongoing damage to sections of the Minidoka Dam. In 2008, the Board partnered with the Bureau of Reclamation to also evaluate the structural raising of Minidoka Dam to accommodate a 5-foot rise in normal reservoir surface elevation, in conjunction with planned spillway repairs. The study found that a 5-foot rise is technically feasible, and would provide an additional 67,000 acre-feet of storage with an average annual yield of 33,000 acre-feet. Funding for the enlargement of Minidoka Dam, however, is currently not available. If economic or other conditions change, the Board will consider further evaluation of this storage option.

~~**ESPA Managed Recharge Pilot program**~~

~~Recharging aquifers as a water supply alternative has significant potential to address water supply needs, in addition to addressing conjunctive management issues. Pursuant to the ESPA CAMP, the Board is undertaking a five-year pilot program of managed aquifer recharge to the Eastern Snake Plain Aquifer. One of the potential benefits of managed recharge in the ESPA is increased water storage in the aquifer. Effectiveness monitoring and evaluation results will be used to select and design future managed recharge strategies and projects.~~

Lower Boise River Interim Feasibility Study

The lower Boise River corridor, from Lucky Peak Dam to its confluence with the Snake River has experienced rapid population growth and significant urban development over the past several decades. As a consequence, there is renewed interest in addressing water supply and flood control issues. Interest has also been expressed in environmental restoration, to include habitat preservation, aesthetics and recreation along the Boise River.

In 2009, the Board and the U.S. Army Corps of Engineers partnered to conduct an Interim Feasibility Study focused on water storage potential and flood reduction in the Boise River Basin. A preliminary analysis ranked an enlargement of Arrowrock Reservoir as the highest priority alternative, followed by the construction of a new reservoir at the Alexander Flat site and a new reservoir at the Twin Springs site. A preliminary analysis completed in 2011 concluded that based on existing information, raising Arrowrock Dam is technically feasible. The evaluation identified a number of uncertainties that will be addressed during future study and data collection efforts, as funding becomes available.

To help address future water needs in the Treasure Valley and southwest Idaho, the Idaho Water Resource Board (IWRB) partnered with the Bureau of Reclamation to investigate and undertake a project to raise Anderson Ranch Dam 6 feet that should be completed by 2031. This would provide an additional 29 kaf.

Weiser-Galloway Gap Analysis, Economic Evaluation and Risk-Based Cost Analysis (Gap Analysis)

Water storage on the Weiser River and at the Galloway site has been studied for decades. In 1954, the Corps received a study authorization resolution for the Galloway Project from the U.S. Senate Public Works Committee. In the early 1970s, federal lands for the potential Galloway dam and reservoir site were classified and withdrawn for hydropower purposes by the Federal Power Commission (now FERC). In 2008, Idaho House Joint Memorial 8 directed the Board to investigate water storage projects statewide, including the Weiser-Galloway Project. The Board and the Corps partnered to conduct a "Gap Analysis" which was completed in March 2011. The Gap Analysis was designed to inform decision makers of critical information gaps that need to be addressed before deciding whether to move forward with comprehensive new environmental, engineering, and economic feasibility studies. The analysis identified two critical information gaps that must be resolved before moving forward:

1. Determine the safety, suitability, and integrity of geologic structures at the potential dam and reservoir site.

2. Evaluate whether basin and system benefits would be realized by analyzing a series of system operating scenarios with a range of new storage options on the Weiser River. Potential benefits include flood risk reduction, hydropower, additional water storage, pump back, irrigation, recreation, and flow augmentation requirements for anadromous fish recovery. On July 29, 2011, the Idaho Water Resource Board authorized expenditure of up to $2 million to address these questions, and the required studies are currently underway.

Implementation Strategies:

- Expand state-sponsored managed recharge capacity to allow for the opportunistic capture of flood flows. ~~Expanding recharge capacity to allow for the capture of flood water.~~ ~~Implement a long-term managed aquifer recharge program to achieve an average annual recharge of 250,000 - 300,000 acre feet. In recognition that implementation of managed recharge will have an effect on the flow characteristics of the Snake River above and below Milner Dam and in order to confirm the relative merits of managed recharge, the Board's managed recharge program will be limited to not more than 175,000 acre-feet on an average annual basis until January 1, 2019.~~
- Evaluate the economic, social and environmental benefits and costs of the proposed surface projects.
- Continue partnership with BOR on Anderson Ranch Dam raise

Milestones:

- Increase managed aquifer recharge capacity.~~Aquifer managed recharge .program implemented.~~
- Actions taken to determine feasibility of identified storage projects.
- Completion of Anderson Ranch Dam raise.

ESPA CAMP Changes

3 .0 RECOMMENDATIONS

3.1 Long-Term Hydrologic Goal

The Plan establishes a long-term goal of 600 kaf average annual change to the aquifer water budget with implementation occurring over a 20-year period. A 600 kaf water budget change is considered an appropriate long-term goal considering present and future water needs, hydrologic impacts, and cost. It is currently estimated that achieving the long-term 600 kaf goal will cost more than $600 million. Full implementation of the long-term goal is dependent on many variables including water availability and funding. As such, specific actions will need to be developed by the Board after consideration of the recommendations submitted by the Implementation Committee. The Plan, by adopting a mix of strategies represents a balanced approach to modifying the water budget. Specifically, the Plan includes aquifer recharge, groundwater to surface water conversions, and demand reduction efforts. Careful consideration was given to the following factors in the development of the long-term goal:

- Ability to target actions to accomplish specific hydrologic goals in specific locations.
- Time frame and ease of implementation.
- Environmental and economic impacts.
- Practicality, including financing and public and political acceptance.

The Plan provides for the implementation of the following management strategies:

Ground Water to Surface Water Conversions	Approximately 100 kaf/year annual average (by acquiring water supplies below Milner Dam to replace water required from the Upper Snake River for salmon flow augmentation).
Aquifer Recharge	Approximately 150-~~250~~ 350 kaf/year (using the Board's natural flow water permit and storage water when available).
Demand Reduction	Approximately 250-350 kaf/year (using voluntary mechanisms based on the principle of willing seller/willing buyer to reduce aquifer and spring flow demands, including CREP, purchases, subordination agreements, fallowing and crop mix changes, and other mechanisms).
Pilot Weather Modification Program	Implement a 5-year pilot weather modification project in the Upper Snake River Basin and potentially the Wood River system, with state, local and other agency support. Include a detailed monitoring program for the weather modification program.

Table 2 — Plan Hydrologic Targets

PLAN HYDROLOGIC TARGETS		
ACTION	**PHASE I TARGET (KAF)**	**LONG-TERM TARGET (KAF)**
Ground Water to Surface Water Conversion	100	100
Managed Aquifer Recharge	100	150-~~250~~350
Demand Reduction		250-350
Surface Water Conservation	*50*	
Crop Mix Modification	*5*	
Rotating Fallowing, Dry-Year Lease Agreements and CREP Enhancements.	*40*	
Buy Outs, Buy Downs, and/or Subordination Agreements	*No Target (Opportunity-Based)*	
Weather Modification	50*	No Target
TOTAL	**200-300**	**600**

*50 KAF was used in hydrologic modeling, based on a conservative estimate provided in the Upper Snake Weather Modification Feasibility Study.