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|  | System Optimization Review |
|  | Board of Control for Triangle Irrigation District and Wood River Valley Irrigation District #45 |
|  | 8/9/22 |
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# Abbreviations

|  |  |
| --- | --- |
| 1 cfs | 449 gpm = 50 Miner’s Inch |
| 1 Miner’s Inch | 8.98 gpm = 0.02 cfs |
| BOC | Board of Control for the Wood River Valley Irrigation District 45 and the Triangle Irrigation District |
| cfs | cubic feet per second |
| gpm | gallons per minute |
| SCADA | Supervisory Control and Data Acquisition (software for integrating components and monitoring operations) |
| TID | Triangle Irrigation District |
| WRVID45 | Wood River Valley Irrigation District No. 45 |
| Div45  | The entire system of low head dam, main gate, adjoining canals, laterals, and ditches and the variety of controls and flow monitoring structures. |
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# Introduction

## Purpose

The Wood River Valley Irrigation District was founded around 1915 to deliver Big Wood River irrigation surface water rights to the northern section of the Bellevue Triangle, located just south of the City of Bellevue, Idaho. The Big Wood River flows south out of the central mountains of Idaho. It is most widely known for its flow through the surrounding local communities of Ketchum, Sun Valley, Hailey, and Bellevue in the Wood River Valley, with access to all types of outdoor recreation, most notably skiing and fishing. There are several nature preserves in the Wood River Valley and eight to ten irrigation canals serving over 300 users, including large multi-generation farms and the four municipalities mentioned. The region is currently experiencing unprecedented population growth and drought.

In 2015, legislation or judicial decree led to the division of the original Wood River Valley Irrigation District into two sub-districts: the Wood River Valley Irrigation District No. 45 (WRVID45) and the Triangle Irrigation District (TID). With some exceptions, the WRVID45 now includes the smaller acreage properties generally located in the northern section of the Bellevue Triangle, while the TID includes the larger acreage properties generally located in the southern section. Both districts jointly utilize a portion of the original water delivery infrastructure made up of a low-head dam in the Big Wood River, an adjacent take-out structure (Diversion 45), and other various diversion works. The system also includes control gates and laterals to deliver up to 377 cfs toirrigate approximately 9,000 acres of land and roughly 200 users.

A third entity, the Board of Control for the WRVID45 and the TID (BOC), oversees the operation and management of the mutually owned infrastructure (Diversion 45). The BOC Board is comprised of members from both irrigation districts and operates and maintains the structures and personnel to deliver water through the canals to each private diversion.

All water rights in the State of Idaho have origination or priority date and are activated together at the beginning of the irrigation season. Water rights are then “cut” as water available in the River diminishes, typically in mid-summer. One of the local irrigation canals, known as the Baseline Bypass Canal, serves more senior water right holders than other water delivery systems upstream, including the Diversion 45, so its water delivery requirement holds precedence. Based on water availability, smaller and more junior water rights are reduced, and during dry years, they might not be activated at all.

Idaho Water District 37 manages water delivery from the Big Wood River into the user delivery systems; therefore, District 37 is responsible for determining when and which water rights are “cut” or turned off. Whenever a more senior water right user must make a call for water, water delivery to Diversion 45 and all other users is reduced or shut off.

Originally, these surface water delivery systems were designed with only gravity flow and flood irrigation practices in mind. As a result, excessively large quantities of water were spread out over relatively small areas, resulting in a significant level of water infiltration down into natural underground aquifers. With the increase in groundwater pumping and efficient sprinkler systems, modern irrigation practices have resulted in more areas being watered with less surface water. The unintended effect of this shift is that the underground aquifers are being slowly depleted while less water is infiltrating down from the surface. In recent years, as the connection between surface water and groundwater has become better understood, we have begun to recognize where this incidental “ditch loss” provides benefits to underground water sources in some areas and, in nearby areas, seems to provide little to no known benefit. Efforts to line these ditches need to be carefully understood to not damage beneficial recharge, and to limit water loss where no incidental benefit is occurring.

There are many significant water delivery issues that need to be addressed. Water loss in antiquated and crumbling diversion structures that have had little or no maintenance and conflicting water user interests in the basin highlight the need for impacted stakeholders to work together. As an example: cottonwood trees, known to consume large quantities of water, have overgrown the canals along some lengths. Efforts to eliminate older cottonwoods have diminished in recent years due to resistance from many in the nearby communities, which resulted in significant rifts within the communities themselves. Developing solutions where more water can be delivered through the canals while at the same time saving many of the trees need to be explored.

# Existing System

## Description of Existing Facilities

This section will give an overview of the system and some major structures and canals that serve an important role in the operation of the system. **Appendix A** includes a previously developed list of the structures that are a part of the Div45 system with an associated map.

### System Overview

The Diversion 45 irrigation system (Div45) currently serves approximately 9,000 acres of land and roughly 200 users. An overview of the system can be seen in **Figure 1**. This area is often called the “Bellevue Triangle”. The system is widely used for irrigation and plays an extremely important role in the region. **Figure 2** and **Figure 3** show the same map, but with the Div45 canals, laterals, and key structures labeled. The current maximum canal capacity flow is unknown.

### Main Diversion

The system is supplied by the Big Wood River at the Diversion 45 gate. This structure was designed to divert up to 350-400 cfs. During low water flows, temporary earth diversion structures needs to be made in the river to divert water towards the main gate. There is no fish deterrence structure, so fish are regularly trapped throughout the irrigation system. The main gates have recent repairs to address leaks when closed and the retaining walls on either side of the structure have been recently upgraded and are in good condition.

### Upper Canal

The Upper Canal transports water from the main diversion gate to the 3 distribution laterals: Highway 75, Center, and East laterals. Ed’s Drop is a structure on the Upper Canal, which ends at Gannett Divide.

### Ed’s Drop

A canal-bottom stabilization structure on the Upper Canal. It is a drop structure to allow flow while stabilizing the channel bed and provide head for a nearby takeout. The structure has had patch work done to extend service life but is in poor condition.

### 75 Lateral Divide

100-year-old concrete and steel structure that allows flow into the 75 Lateral

### 75 Lateral

This lateral comes off the Upper Canal and parallels Highway 75 south to serve irrigators along the western edge of the Triangle. This lateral is in good condition. It transports surface water to 18 private take-outs and a fourth system lateral, Walker Bench Lateral.

### Meyers Diversion

Private take-out structure on the 75 Lateral for 4 users.3 users are on the opposite side of Highway 75. There is a culvert adjacent to the structure that goes under the road.

### Walker Divide Structure and Culvert

Allows water from 75 Lateral into Walker Bench Lateral. The diversion structure works well. Adjacent to this structure is a 42-inch x ~60 ft culvert under State Highway 75.

### Walker Bench Lateral

Is located along the top of a 40-foot gravel pit bank and serves 7 users, some with senior rights. It ends where excess flow can be diverted into Baseline Canal, near State Highway 75.

### Gannett Divide

Divides the lower end of the Upper Canal into the Center Lateral and East Lateral.

### Center Lateral

This lateral serves the west side of Gannett Rd and the center of the Triangle, down to the Kingsbury Divide. It is suspected to have significant water loss due to seepage. Barker Drop and take-out, plus two large Bellevue Farms take-outs are located on this lateral. This section ends at Kingsbury Divide where two other laterals start: West Kingsbury and East Kingsbury.

### Barker Drop

This large drop structure is on the Center Lateral just north of the Labrador Lane bridge and serves as a private take-out.

### Bellevue Farms Drop

Is a large drop structure located on the Center Lateral near Bellevue Farms.

### Kingsbury Divide

Splits the Center Lateral into West and East Kingsbury and one private take-out.

### West Kingsbury

Delivers water to 7 private take-outs and empties into 2-3 ponds near Baseline Rd.

### East Kingsbury

Delivers water to 10 take-outs, including a large mid-system recharge pond, Rinker Pit. Turns east after going under Browning Lane and pools into a low spot. It ultimately rejoins the East Lateral, passes through Elliot’s Pond, and ends near Loving Springs.

### East Lateral

This lateral splits off the Upper Canal at the Gannett Divide and serves the east side of Gannett Rd. This lateral is known to be relatively stable and hold water well. There is some infiltration on the southern half due to a long, winding course. Infiltration in this area is known to support Silver Creek, which boasts world-renowned fly-fishing opportunities. It serves 8 take-outs, rejoins with East Kingsbury, passes through Elliot’s Pond, and ends near Loving Springs.

### Bypass Canal

This canal is not part of the Diversion 45 system but is still worth noting due to its operation needs that affect all other users in the region. This canal was built to route Big Wood River water around a 5-mile long, flat, gravel sink where there is no surface flow during the dry summer months. It then puts some water back into the river about 3.5 miles downstream, then again, another 2 miles further downstream. This canal serves some of the most senior water users in the valley and thereby can limit other river water users.

## Existing Flows and Estimated Losses

The BOC records help break down flow amounts for structures in the system based on shares (**Table 1**). The Div45 operator has indicated maximum flows seen from recent experience and variation from the full water rights. The full water right flows are used for calculations in sizing and costs later in this report.

Table 1, Existing System Flows

|  |  |  |
| --- | --- | --- |
| **Structure** | **All Decreed Rights** | **Max Recently Observed** |
| Main Diversion Gate into Upper Canal | 377 cfs | 260 cfs |
| 75 Diversion Gate into Hwy 75 Lateral | 93 cfs | 68 cfs |
| Walker Diversion into Walker Lateral | 25 cfs | ~12-15 cfs |
| Walker Diversion into Lower Hwy 75 Lateral | 53 cfs | ~30-35 cfs |
|   |  |  |
| Gannett Diversion into Center Lateral | 129 cfs | ~80-85 cfs |
| Bellevue Farms N Diversion | 10 cfs |  |
| Bellevue Farms S Diversion | 5 cfs |  |
| Kingsbury Divide into Kingsbury West | 35 cfs | 31 cfs |
| Kingsbury Divide into Kingsbury East | 77 cfs | 50 cfs |
|   |  |  |
| Gannett Diversion into East Lateral | 142 cfs | ~40-50 cfs |
| East Lateral Flow at Upper Cove | 39 cfs | 30 cfs |

Figure 1. Div45 System Overview

Insert Figure 1

Figure 2, Div45 System Canals

Insert Figure 2

Figure 3, Div45 System Structures

Insert Figure 3

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# Existing System Evaluation

## Existing Deficiencies

The Diversion 45 system (Div45) was reviewed for deficiencies, operation needs, and upgrades. Overall structure and canal integrity, ditch loss, and service delivery needs were detailed to assist with this assessment. In general, the Div45 system is fragile. Any level of failure (including private take-outs) can put the nearby infrastructure at risk due to flooding, scour, sediment deposition, bank failures, etc. The localized deficiencies listed below are generally in the order they appear while going downstream starting with the western-most lateral.

### Low Head Dam

This is a low concrete dam that extends across the river from one bank to the other and provides stability to the riverbed adjacent to the top of the canal system. It is in a state of disrepair and close to failure. In addition to risk of losing reliable water delivery to irrigators, there are significant safety concerns for recreators near the dam. The BOC has recently received a WaterSMART grant to help with repair expenses. During periods of low flow, the dam does not provide enough head to divert water into Div45. Temporary gravel diversion dams need to be created in the river channel to push water towards the diversion gate. This is a shortcoming as heavy construction equipment is needed to alter flows in the riverbed during low flows. The west end of the dam appears to be in danger of erosion.

### Main Diversion Gate

The Main Diversion Gate is where water from the Big Wood River is diverted into Div45 system. The main gates need upgrades to allow for better operation. Fish often enter the canal system and become trapped. Installation of fish screens, described in Section 4.1.22, should be considered.

### Ed’s Drop

Functions, but is in poor structural condition. The structure has had patch work completed to extend service life. There is significant spalling and deterioration of the concrete with scour holes present. The section below the drop is suspected to have significant water loss due to seepage in a deep plunge pool.

### 75 Lateral Divide

Still functions well but has some leakage through the walls that should be patched. Controls need upgrades for better operation.

### Meyer’s Diversion Culvert

The culvert has settled below the existing ditch bottom and is more than half full of gravel. Due to its size, length, and location under a busy highway, cleaning is difficult and costly.

### Walker Divide Culvert

The culvert has settled below the existing ditch bottom and is more than half full of gravel. Due to its size, length, and location under a busy highway, cleaning is difficult and costly.

### Walker Bench Lateral

Is located on top of a tall gravel bank, so re-routing of this water and elimination of a large length should be considered to prevent potential bank failures and to reduce ditch loss.

### Gannett Divide

Is noted as being in poor condition and needing repair or replacement. Concrete is deteriorated with cracks and spalling present. The spillways and gates are known to leak while closed and the controls should be upgraded for better operation.

### Center Lateral

Serves senior users but is unable to carry water during the low flow season due to infiltration ditch loss for the length of this 3-mile stretch. This loss needs to be studied and remedied. There is evidence of bank erosion working towards Gannett Road which needs to be stabilized.

### Barker Drop

The old concrete is damaged, leaks, creates unnecessary standing water, and contributes to significant ditch loss due to the deep plunge pool. It should be replaced.

### Bellevue Farms North Take-out and Flume

Recent repairs have limited the ability of some users to access their water. There is a deep scour pool that is suspected of significant ditch loss with bank scour issues and a gravel bar that has formed. There is also erosion on the east bank of the adjacent downstream stretch which has reduced the right-of-way width, limiting access. The flume is located just downstream of the private diversion structure and should be replaced due to poor condition.

### Bellevue Farms Drop

Is noted to be in poor condition and in need of repair and stabilization.

### Lack of Services

The properties of Whittaker, Tedesco, Green, Drussel, Nisson, and Iverson currently own water rights but do not have access to a surface water canal. Whittaker has lost access do the private ditch. The rest have previously used supplemental wells to obtain water, but IDWR is requiring the wells be used for supplemental purposes only, not as a main source. Canal access to these properties is needed.

### Right of Way

The Diversion 45 system’s right-of-way is not entirely accessible. Right of way access is extremely important to maintain canals and structures.

### Flow Monitoring and Controls

The system currently uses crude methods for determining flows throughout the system. Many of the measurement structures are old and deteriorating. There is also not an abundance of flow measurement structures, producing localized unknown active flows. This can make operation of the system challenging. Fluctuations are also often an issue which are difficult to resolve. The system needs an updated flow monitoring system.

The controls for the gates are old and difficult to operate. It currently takes a lot of force to operate the gates, making fine adjustments challenging. The system needs updated remote controls.

### Asset Georeferencing

The system does not have a GIS based mapping system to store information digitally.

### Bypass Canal

The Bypass Canal is not part of Div45 but the effects of it can be felt upstream. The Bypass serves some of the most senior water users in the region while having a very high rate of ditch loss. This creates a water shortage upstream when the Bypass Canal users call for water. This Bypass Canal requires ditch loss prevention methods in place to help during low flows, reducing water calls from the senior users.

# System Improvements

## Deficiency Upgrades

With the existing system deficiencies identified, a list of upgrade projects was developed. This allows for the deficiencies to be addressed for system optimization. Most of these projects were developed in conjunction with the Div45 manager, stakeholders, and J-U-B Engineers over multiple on-site meetings. Each upgrade is related to a deficiency described previously in Section 3.1. The projects are listed in order based on system priorities and input from the Div45 manager. Many of these upgrades are related to another and can be completed in coordination with one another. Related projects are referenced in the individual upgrade sections. The engineer’s estimated costs are provided in Section 4.2.

### Low Head Dam Repair

Due to the deteriorated condition of the dam, it needs repair/replacement. This project is mostly designed and a WaterSMART Grant has been recently awarded. The project will repair the existing dam with new gravel fill, a new top cap, grading to fill scour holes and prevent erosion, and a “V” notch cut into the dam to allow for sediment flow and fish passage.

### Earth Diversion Stabilization

During low river flows, temporary gravel diversion dams are needed and are created with heavy machinery in the river. This is due to the insufficient head available at the main diversion gate. To correct this, upstream stabilization and channel routing methods will need to be completed. This will include a 2D hydraulic model of the river and dam to determine best flow routing and stabilization techniques. A study of the effects of this on the dam will also be needed. Stone armoring and large woody materials will be used for erosion protection. This could be done in conjunction with the Low Head Dam repair. Fish passage will be a continuation from the currently proposed dam upgrades. It could be completed in conjunction with the Main Diversion upgrades mentioned later.

### Bypass Canal Loss Mitigation

During low flows, senior water right holders located in the southern end of the Bypass Canal can make a water call and shut down much of the irrigation activity upstream, including the Div45. Reducing ditch loss in this canal will help get these senior users their water with less impact on users upstream. This can be accomplished in two ways:

1. Consolidate the two canals into one canal near the Alpine Kennels dividing structure. Eliminating a stretch of canal here will reduce losses from two canals to one. This will require excavation and fill to widen the east bypass section (the upper portion of the Baseline Canal). To return Bypass flows back to the Senior users, a new structure with drops and appropriate scour protection will be required near the Mule Shoe Ln area to send flows back into the remaining west bypass and to the river.
2. Lining of the canal is another option to prevent loss. This should be done carefully to address any recharge concerns. However, the Bypass Canal was intended for water delivery and not for recharge. It runs between and parallels the Big Wood River and the Div45 75 Lateral which both could be used for intentional recharge in place of the Bypass Canal.

These solutions can be completed in conjunction with one another. A flow measuring and water loss study needs to be completed on the Bypass Canal to determine the most efficient areas for canal lining.

### Late Season Senior water delivery at end of Kingsbury Lateral East and East Lateral

A gravel filled culvert and a very narrow length of ditch at the Cove Ranch restrict flows, especially in late season. A flat section of recently re-routed ditch restricts low flows from getting past Browning Lane near Gannett Rd.

### Walker Bench Lateral Elimination

Currently, the Walker Lateral diverts flow to the west, then back to the east to service a farm user. This is inefficient, losing water to infiltration along the way. This is remedied by abandoning the Walker Lateral service and diverting the shares to stay in the Highway 75 Lateral. A new service can be made near the corner of Pero Rd, piped under the road, and to the users downstream.

### Center Lateral Loss Mitigation

The Center Lateral is known to have a significant amount of infiltration loss, often resulting in users downstream not receiving water during low flows. Reducing loss in this should be considered a priority for the proper operation of the system. This can be accomplished in two ways:

1. Abandon the upper section of the Center Lateral altogether. This results in the Center Lateral shares being sent into the East Lateral. The East Lateral will require excavation to increase capacity to handle the additional flow. Downstream near the intersection of Gannett Rd and Kingsbury Ln, the shares needed for the Center Lateral can be piped under the roadway from the East Lateral back to the Center Lateral. This allows flow to bypass a large portion of the existing Center Lateral that is suspected of significant ditch loss. If this is completed, there are some users in the Bellevue Farms area that will need to be served. This would be completed by piping their shares from the Upper Canal to the Bellevue Farms take out. This upper section of the Center Lateral would become private. Some other deficiencies would also be addressed by this such as sections 4.1.8, 4.1.11, 4.1.12, 4.1.13, 4.1.14, 4.1.16, and 4.1.20. This includes some right of way concerns that would become private, structures in need of repair that would become abandoned along with the lateral, and scour concerns that would no longer be an issue.
2. If the upper portion of the Center Lateral is not abandoned as mentioned above, then lining the canal is a viable method of reducing loss and providing water to users. Since groundwater recharge is a concern, a flow/loss study needs to be completed to determine the best areas for lining to still allow for some recharge while being able to deliver water to users. However, delivery of water to users should have priority.

### Main Gate Controls

The main gate controls are difficult to operate and should be upgraded. This can be completed in tandem with the Flow Monitoring/Remote Controls in Section 4.1.9.

### Right of Way Access Study

Since the right of ways are not clearly defined for the BOC, a study needs to be completed to determine access and current easements mapped.

### Flow Monitoring/Remote Control Installation

Currently, little is known about fluctuation or flows in the system and the effects an adjustment can have on the rest of the system. Remote controls with flow monitoring equipment will allow for data to be logged and controlled remotely to manage the flows and demands in the system in real time. All the diversion structures need a flow monitoring and control device. The replacement controls should be power assisted for smooth operation.

### Ed’s Drop Seepage and Structure Repair

The Upper Canal below Ed’s Drop is suspected to have a significant amount of seepage. A study needs to be completed to determine the amount of loss occurring in this section. Lining of this area can be completed in coordination with a new structure since the structure is deteriorated and in need of replacement. This will require stabilization and scour prevention with the new structure.

### Gannett Divide Structure Repair

This structure needs leaks and deteriorated concrete repaired or replaced. Since the structure needs flow monitoring and operation equipment, redesign and replacement of the structure is recommended.

### Barker Drop and Take-out Repair

This structure is in poor condition with deteriorated concrete. The structure should be replaced with appropriate scour countermeasures.

### Bellevue Farms Drop Repair

This structure is in poor condition with deteriorated concrete and scour holes present. The structure should be replaced, and scour holes filled in. Scour countermeasures should be in place to prevent future erosion. Should the upper Center Canal be abandoned, this structure would no longer be a part of the system.

### Bellevue Farms North Take-Out and Flume Repair

The structures are noted to be in poor condition and should be repaired or replaced. The flume scour hole will need to be filled in with prevention measures in place. The bank erosion here should also be restored and armored to allow travel along the right-of-way.

### Walker Divide Culvert Repair

The culvert here should be re-designed and replaced to prevent sedimentation and allow for maintenance.

### Center Lateral Bank Restoration

If the upper section of the Center Lateral is abandoned as described in Section 4.1.6, this is not an issue. However, if the Center Lateral continues to be used, there is a bank scour issue near Gannet Rd at the north end of Bellevue Farms. This needs to be addressed and stabilized. Stabilization can be completed in conjunction with the Center Lateral lining in Section 4.1.6, if that option is chosen over lateral abandonment.

### 75 Lateral Diversion Repair

The cracking in the concrete needs to be patched to prevent and seepage and prolong structure service life. Controls need to be upgraded for better operation.

### Main Gate Fish Deterrence

The existing controls have no means of keeping fish out of the irrigation system. This leads to many fish trapped and fish rescues, often coordinated by Trout Unlimited, common in the system. To keep fish out of Div45, a fish screen should be sized to keep juvenile and older fish out with a return piping downstream of the updated dam structure. Trash racks upstream of the gates should be installed to keep large debris out of the system while paddle wheels or electric motors will spin the screen to keep debris from building up on the screen. This can be completed along with the Earth Diversion in Section 4.1.2 and other Main Gate upgrades discussed. This fish screen should be installed below the irrigation gates.

### Asset Georeferencing

Digital record of the system should be mapped with information embedded in the data in a GIS styled format. This may be appropriate to work with the Flow Monitoring/Remote Controls in Section 4.1.9.

### Whittaker Service

The service to Whittaker property should be re-established. This can be completed by either re-establishing the existing take-out and ditch or by creating a new take-out off the Center Lateral. Re-establishing the existing takeout and ditch would be beneficial to complete with the piping to Bellevue Farms as mentioned in Section 4.1.6.

### Green and Tedesco Services

Services need to be provided to the Green and Tedesco properties. This can be completed by digging a ditch off the East Kingsbury Lateral along the north end of the Clearwater property. A structure can be placed at this corner to service the Tedesco property. The ditch can continue south to service the Green property. This will require easement acquisition.

### Drussel, Nisson, and Iverson Services

Services need to be provided to the Drussel, Nisson, and Iverson properties. This can be completed with a ditch from the East Kingsbury Lateral heading south from Browning Lane along the west side of the Gardner property. This will require easement acquisition.

## Estimated Sizing and Costs

Sizing and costs currently in progress. Found in **Appendix B**.

# Conclusions and Recommendations

Div45 has many locations where upgrades are needed to improve water efficiency and reliability. This SOR seeks to define the existing system and its deficiencies and develop solutions to those deficiencies with associated costs. Div45 is an important part of the region and needs to be maintained in a balance with stakeholder concerns and environmental needs.

## Funding

Project funding is an integral part of project implementation. Funding opportunities to help pay for building and implementing priority projects may include:

1. **US Bureau of Reclamation WaterSMART Program**
	1. Water Energy Efficiency Grants

Eligible projects that conserve and result in quantifiable and sustained water savings or improved water management, including:

* + Canal Lining/Piping
	+ Municipal Metering
	+ Irrigation Flow Measurement
	+ Supervisory Control and Data Acquisition and Automation (SCADA)
	+ Irrigation Measures
	+ High-Efficiency Indoor Appliances and Fixtures
	+ Renewable energy projects that increase the use of renewable energy sources in managing and delivering water and/or projects that upgrade existing water management facilities resulting in quantifiable and sustained energy savings, including:
		- Installation of a small-scale hydroelectric facility
		- Installation of solar-electric, wind energy, or geothermal power systems
	1. Drought Response Program: Drought Resiliency Project Grants

Eligible projects that increase the reliability of water supplies through infrastructure improvements, including:

* System modification improvements
* Storing water and/or recharging groundwater supplies
* Developing alternative sources of water supply, including water treatment

Projects that improve water management through decision support tools, modeling, and measurement, including:

* Developing water management, water marketing, and modeling tools to help communities evaluate options and implement strategies to address drought.
* Installing water measurement equipment and monitoring instrumentation devices to track water supply conditions accurately.
	1. Small–Scale Water Efficiency Project Grants

Eligible projects are small water efficiency improvements that have been identified through previous planning efforts and with a total construction cost not to exceed $200,000. Projects eligible for funding include:

* Installation of flow measurement or automation in a specific part of a water delivery system
* Lining of a section of a canal to address seepage
* Other similar projects that are limited in scope
	1. Environmental Water Resources Project Grant

Eligible project that benefit ecological values with a nexus to water resources management, including:

* Water conservation and efficiency projects that result in quantifiable and sustained water savings and benefit ecological values (i.e., canal lining or piping, irrigation flow measurements, and SCADA)
* Water management or infrastructure improvements to mitigate drought-related impacts to ecological values
* Watershed management or restoration projects benefiting ecological values that have a nexus to water resources or water resources management (i.e., improving stream channel structure and complexity)
1. **Natural Resources Conservation Service Watershed Program**
	1. Watershed and Flood Prevention Operations PL-566 Grant Program

Eligible projects that protect and restore watersheds up to 250,000 acres through the following purposes:

* Erosion and sediment control
* Watershed protection
* Flood prevention
* Water quality improvements
* Rural, municipal and industrial water supply
* Water management
* Fish and wildlife habitat enhancement
* Hydropower sources
	1. Regional Conservation Partnership Program (RCPP)

Eligible projects:

* Projects on agricultural or nonindustrial private forest land or associated land on which NRCS determines an eligible activity would help achieve conservation benefits (i.e., improved condition of natural resources resulting from implementation of conservation activities)
* Eligible conservation activities on public lands when those activities will benefit eligible lands as determined by NRCS and are included in the scope of an approved RCPP project
	1. Environmental Quality Incentives Program (EQIP)

Eligible projects that:

* Improved water and air quality
* Conserved ground and surface water
* Increased soil health and reduced soil erosion and sedimentation
* Improved or created wildlife habitat, and mitigation against drought and increasing weather volatility (includes water conservation, piping, and canal lining)
1. **Idaho Department of Water Resources (IWRB)**
	1. Project Loans: Help to financially assist, develop, and support the development of water resources of the state through the construction, rehabilitation, improvement, or extension of existing systems. The funds must be used in the public interest to develop water projects as deemed by the IWRB. Approved funds are available to irrigation districts, irrigation organizations, water user associations, and municipal or private corporations.
	2. Flood Management Grants: IWRB is authorized to award grants for the financing of flood-damaged stream channel repair, stream channel improvement, flood risk reduction, and flood prevention projects.
	3. Aging Infrastructure Grants & Loans: Projects that rehabilitate or improve Idaho’s water infrastructure support the Idaho economy, provide economic value, and ensures long-term water resource stability and sustainability.

In 2022 the Idaho legislature appropriated to the Idaho Water Resource Board (IWRB) $75,000,000 to be used for expenditures, loans, or grants for water projects, including studies, to address water sustainability, rehabilitate or improve aging water infrastructure or support flood management. The legislature said that “no more than one-third of this money shall be used for grants and that consideration for the following is required: the value of existing hydropower to the state’s economy, providing water for future development and addressing aging water storage, and delivery infrastructure for projects that provide environmental, safety, or recreational benefits.

## Additional Parties

Additional stakeholders and agencies other than the BOC are involved. It is understood that the BOC may no longer be the lead sponsor once more appropriate sponsors are identified for future projects and funding opportunities. Trout Unlimited, Flood Control District #9, Wood River Land Trust, Blaine County, and the City of Bellevue, and others, have all expressed an interest at the time of writing this report.

## Limitations of Report

This report was developed using existing flows known by the BOC. No survey was completed for this report. Future development in flows and land are not included in this report. Cost estimates and sizing were prepared based on these assumptions. Exact locations are not portrayed and need further analysis. If any data sources used are found to be in error, these records will need to be updated.

## Additional Work and Recommendations

Some additional work is recommended to continue for a detailed system evaluation. It is recommended to complete system-wide survey to aid in future modeling and decision making. Consider additional updated mapping/hydraulic modeling of the system. A water loss study for the entire system should be completed.

### Next Steps

There are a few steps that should be taken to smooth the implementation process.

1. If lead sponsor changes, complete RFQ process like how BOC previously did it.
2. Pursue funding opportunities.
3. Consider SOR project implementation priority rank updates as needs progress.
4. Consider methods of fund matching (i.e. adjusting user rates).
5. Develop implementation schedule based on funding procurement times.

**Appendices**

**Appendix A – Div45 System Structures**

**Appendix B – SOR Project Costs**

**Appendix A**

**Div45 System Structures**

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**Appendix B**

**SOR Project Costs**

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|  | **System Optimization Review** |
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