

# Frenchman Valley Appraisal Study

## Problems, Objectives, Constraints, Opportunities

### Problems

1. **Water demands exceed available water supplies** – Current water demands in the study area exceed water availability. All water needs cannot be fully met.
2. **Declining Streamflows Above and Below Enders Reservoir**  
The surface water supply is depleted. Ground water development and conservation measures above Enders Reservoir have resulted in the subsequent depletion of the surface flows of the Frenchman River, reducing both the natural flow and storage water supplies available to the irrigators in the Frenchman Unit. The Frenchman Valley and H&RW Irrigation Districts are dependent on Enders Reservoir to provide supplemental irrigation water. Declining streamflows affect the following:
  - Irrigation Districts - Irrigation Districts may not be able to continue without supplemental storage water from Enders
  - Federal Investment - If the irrigation districts cannot continue, future payments to the federal government and O&M of project facilities by the Districts will be jeopardized.
  - Groundwater Recharge - Under existing project operations, there is a recharge benefit to the project area. Stopping district operations may harm groundwater users in the project area and possibly those outside the area.
  - Recreation - Declining inflows lead to lower reservoir levels resulting in decreased recreation, fish and wildlife benefits at Enders Reservoir. If recreation benefits continue to diminish, the Nebraska Game and Parks Commission may have difficulty in justifying future investments in recreation facilities.
3. **Compact Compliance** – Nebraska's consumptive use is limited to Nebraska's allocation as specified by the Republican River Compact.
4. **Declining groundwater levels** – withdrawals from the groundwater aquifer exceed groundwater recharge.
5. **Water quality** – One of the identified benefits to the Frenchman Cambridge Division with a full water supply included maintaining water quality. Reduced streamflows and reduced water supplies of the Frenchman Unit have resulted in negative effects on water quality in the area.

## Purpose

Provide alternative water management scenarios to partners/stakeholders for future planning.

**Comment [a1]:** Note that the purpose section of the appraisal study is in another section of the document. The following statement of purpose would be incorporated into this section.  
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## Objectives

The water and related land resource problems and opportunities identified in this study will be stated as specific planning objectives and will provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes in the study area conditions. The following preliminary planning objectives will be updated during the study:

### *Optimize the economic and environmental benefits of the water resources in the study area*

- Optimize economic benefits to the study area of irrigation, including surface and groundwater irrigation
- Optimize economic benefits of Enders Reservoir for recreation, fish and wildlife
- Evaluate environmental benefits/values to the study area of recreation, fish and wildlife, and water quality.
- Evaluate economic benefit of flood control provided by Enders Dam
- Minimize adverse environmental impacts.

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## Existing Constraints

Study alternatives will be developed within the existing constraints with the possible exception of specific changes that would potentially require additional legislation or other actions in order to change the constraints.

The following existing constraints will be considered in developing alternatives to address the problems;

- Amount of water physically available – location, timing
- Final Settlement Stipulation and Proposed Consent Judgment
- Republican River Compact, including meeting sub-basin allocations (including the right of Colorado to use all the Virgin water supply in the basin in Colorado)
- State water laws and regulations
- Federal Reclamation laws
- \* Integrated Management Plans for the Upper and Middle Republican Natural Resource Districts

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**Comment [jbw2]:** I moved this statement from the Settlement line to the Compact line because I believe Colorado's right is from the Compact, not from the settlement.

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\* Frenchman Unit authorization - The Frenchman Unit of the Frenchman-Cambridge Division was authorized by the Flood Control Act of December 22, 1944 as amended.

\* Frenchman Valley and H&RW Irrigation District water contracts with the United States.

\* Constraints that have more flexibility or latitude regarding potential changes than other listed constraints.

**Deleted:** Republican River Water Conservation District regulations in Colorado

**Deleted:** The Frenchman Unit Project is operated in accordance with

**Deleted:** Federal Reclamation laws and regulations.

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## Opportunities

Opportunities will be reviewed in an attempt to balance competing water demands with available water supplies. All reasonable solutions will be considered. Study partners will have opportunities to provide input on all alternatives.

Modeling efforts will be needed for various scenarios, including the No Action alternative. Existing groundwater models will be enhanced/modified in order to determine future water supplies. The groundwater modeling results will/may need to be incorporated into a surface water model or reservoir operations model.

Modeling outputs for various scenarios will be presented to stakeholders to further evaluate and develop alternatives.

There may be opportunities to:

1. Continue existing operations as is with Enders storage and natural flows being utilized for direct surface water diversions for irrigation benefits for the Frenchman Unit.
2. Utilize Enders storage and/or the natural flows to provide groundwater recharge benefits for groundwater irrigators in the area below Enders and/or areas served by the Culbertson and Culbertson Extension canals.
3. Utilize Enders Reservoir for recreation, fish and wildlife benefits.
4. Utilize Enders storage and/or natural flows for the State of Nebraska's compliance with the Republican River Compact.
5. Increase restrictions on groundwater irrigation and/or provide additional incentive programs in order to improve streamflows and/or inflows to Enders Reservoir for irrigation and/or recreation.
6. Increase restrictions on groundwater irrigation and/or provide additional incentive programs in order to reduce consumptive use for Compact compliance.
7. Implement any combination of the above opportunities.

**Deleted:** inflows to Enders Reservoir

3/22/2007

## ENDERS RESERVOIR Water Supply Estimates

**Constants**

Frenhman Valley                      9292  
 H & RW                                      11915  
 Total Acres                                21207

**Usable Pickup (cfs)**                      20

Assume 1 wk / inch of farm delivery

Most Probably Evap (inches)              41

Top Of Cons                              3112.3      42,910

Enders Shutoff Content	Inches from Enders	Estimated Delivery Efficiency	Inches From Pickup	Loss to Headgate Pickup	Storage for 1" Delivery	Enders Storage Needed	Enders Estimated Seepage	Enders Estimated Evap	Total Inflow Needed
3089.40	0.00	50.0%	0.00	65.0%	5438	0	2534	2904	5438
14,009	3.00	50.0%	0.24	65.0%	5438	15031	2534	3758	21324
	6.00	50.0%	0.47	65.0%	5438	30063	2534	4442	37039
	9.00	50.0%	0.71	65.0%	5438	45094	2534	4783	52412
	12.00	50.0%	0.94	65.0%	5438	60126	2534	5125	67735
3099.00	0.00	50%	0.00	65.0%	5438	0	2896	4100	6996
23,789	3.00	50%	0.24	65.0%	5438	15031	2896	5125	23052
	6.00	50%	0.47	65.0%	5438	30063	2896	5808	38767
	9.00	50%	0.71	65.0%	5438	45094	2896	6492	54432
	12.00	50%	0.94	65.0%	5438	60126	2896	7175	70197
3082.40	0.00	50.0%	0.00	65.0%	5438	0	2171	2221	4392
8,948	3.00	50.0%	0.24	65.0%	5438	15031	2171	2733	19936
	6.00	50.0%	0.47	65.0%	5438	30063	2171	3246	35480
	9.00	50.0%	0.71	65.0%	5438	45094	2171	3758	51024
	12.00	50.0%	0.94	65.0%	5438	60126	2171	4100	66397

Kiese

Mastring  
Phillips

Rob Davis

Bill Peck

① Basin Diversions for Culbertson Account for  
Canals

Wergin

Good

Williams

Schneidh

Koester

Edgerton

Hallum

GEAR Scenario to Target Inflows  
to Eiders to accomplish different means

② Target Baseflows below Eiders / Target Flow Levels  
~~to~~

Kiese - Depletions to Flows from Conservation  
measures

Conservation measure affect runoff  
but not baseflow

③ Plot Runoff over time

④ Add moderate wet scenario

⑤ Late April Mtg of This Group

⑥ Add 05 & 06 Data

GPC Target Elevations & what takes to  
hold them Also Inflows for delivering  
6" to both Districts ~~6" or one 6" to~~  
Just Frenchman Valley Also 3" allocations  
values both to keep like at a certain level  
and to keep at level to deliver the  
3" & 6"

20 of inflow needed for 3" & to meet Reservoir levels