Frenchman Valley Appraisal Study
Initial Modeling Needs

Modifying existing Republican River Compact Model

Input considerations for modeling effort
- Upper Republican Natural Resource District Integrated Management Plan
- Middle Republican Natural Resource District Integrated Management Plan
- Republican River Water Conservation District in Colorado
- Conservation Reserve Enhancement Program (CREP)
  - Colorado, Nebraska
- Environmental Quality Incentives Program (EQIP)
- Frenchman Valley Irrigation District–9,295 acres
- H & RW Irrigation District–11,695 acres
- Estimated 65% of releases from Enders reach Culbertson Diversion Dam
- Estimate District delivery system efficiency at 50%

Exiting Conditions – assuming no reservoir releases.

1. Future water supply at Enders Reservoir (without releases)

   Incorporate Upper Republican Natural Resource District's Integrated Management Plan regulations on upstream groundwater wells, new restrictions from the Republican River Water Conservation District in Colorado, CREP, EQIP, etc.

2. Future water supply at the Culbertson Diversion Dam (near Palisade) (without any releases from Enders)

   Incorporate Upper Republican Natural Resource District's Integrated Management Plan regulations on upstream groundwater wells, new restrictions from the Republican River Water Conservation District in Colorado, CREP, EQIP, etc.

3. Future water supply at the Frenchman River Gauge at Culbertson.

   Without diversions into Culbertson Canal and without releases from Enders.

Irrigation Alternatives

1. **Frenchman Valley ID Only** - Using future water supply at Culbertson Diversion Dam (from 2 above), what reduction in allocation would be required to supply the Frenchman Valley Irrigation District project irrigators with a minimum of 6 inches of water per acre. (assuming 65% of releases from Enders Reservoir reach Culbertson Diversion Dam, and assuming a delivery efficiency of 50%)

Example–to supply 3 inches per acre from Enders (assume 3 inches/acre from natural flow)

3 in/ac X 9295 acres / 50% delivery efficiency / 65% water released reaches div. dam

7,150 AF of Enders–to deliver 3 inches per acre to FVID only

2. **Frenchman Valley ID and H & RW ID** - Using future water supply at Culbertson Diversion Dam (from 2 above), what reduction in allocation would be required to supply both the Frenchman Valley Irrigation District and the H & RW Irrigation District project irrigators with a minimum of 6 inches of water per acre. (assuming 65% of releases from Enders Reservoir reach Culbertson Diversion Dam, and assuming a delivery efficiency of 50%)

   Example–to supply 3 inches per acre from Enders (assume 3 inches/acre from natural flow)

   3 in/ac X 20,990 acres / 50% delivery efficiency / 65% water released reaches div. dam

   16,146 AF of Enders–to deliver 3 inches per acre to FVID and H&RW ID

Recreation Alternatives (Enders elevations of 3089.4, 3099.0)

1. **Elevation 3089.40** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3089.40?

   Estimated 4,900 AF inflow needed to sustain Enders elevation of 3089.40 (to offset evaporation losses and seepage losses).

2. **Elevation 3099.00** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3099.00?

   Estimated 6,200 AF inflow needed to sustain Enders elevation of 3099.0 (to offset evaporation losses and seepage losses).

Combination – Irrigation & Recreation Alternative

1. **Elevation 3089.40 & FVID only** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3089.40 and supply FVID with 3 in/ac?

Estimated 4,900 AF inflow needed to sustain Enders elevation of 3089.40 (to offset evaporation losses and seepage losses) and from example above, an additional 7,150 AF from Enders needed to supply 3 in/ac to FVID.

2. **Elevation 3089.40 & FVID and H&RW ID** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3089.40 and supply FVID and H&RW with 3 in/ac?

   Estimated 4,900 AF inflow needed to sustain Enders elevation of 3089.40 (to offset evaporation losses and seepage losses) and from example above, an additional 16,146 AF from Enders needed to supply 3 in/ac to FVID and H&RWID.

3. **Elevation 3099.00 & FVID only** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3099.00 and supply FVID with 3 in/ac?

   Estimated 6,200 AF inflow needed to sustain Enders elevation of 3099.00 (to offset evaporation losses and seepage losses) and from example above, an additional 7,150 AF from Enders needed to supply 3 in/ac to FVID.

4. **Elevation 3099.00 & FVID and H&RW ID** - What reduction in allocation would be required to meet and/hold Enders Reservoir at elevation 3099.00 and supply FVID and H&RW with 3 in/ac?

   Estimated 6,200 AF inflow needed to sustain Enders elevation of 3089.40 (to offset evaporation losses and seepage losses) and from example above, an additional 16,146 AF from Enders needed to supply 3 in/ac to FVID and H&RWID.

Groundwater Recharge Alternative

Modeling results from above alternatives could be used to analyze the groundwater recharge alternatives.

1. Utilizing natural flows only
2. Utilizing natural flows and occasional Enders Releases.
3. Using only existing distribution system
4. With possible additional recharge storage facilities along existing distribution system.
5. Determine area benefiting from recharge.