

# **Analysis of Bighorn Lake Operating Criteria**

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# Project Goals

- **Comparison of historical to recent operations**
- **Document differences between historical and recent operations**
- **Identify findings, recommendations, and potential improvements to operational criteria**





# Methods-Statistical Approach

- **Statistical comparison of periods**
  - Inflows-determine if the periods are statistically similar
  - Pool elevation, storage, outflow, generation
- **Expected Results**
  - Determine if inflows are statistically similar for analysis periods
  - If so, determine if anticipated benefits were realized in period 2010-2017

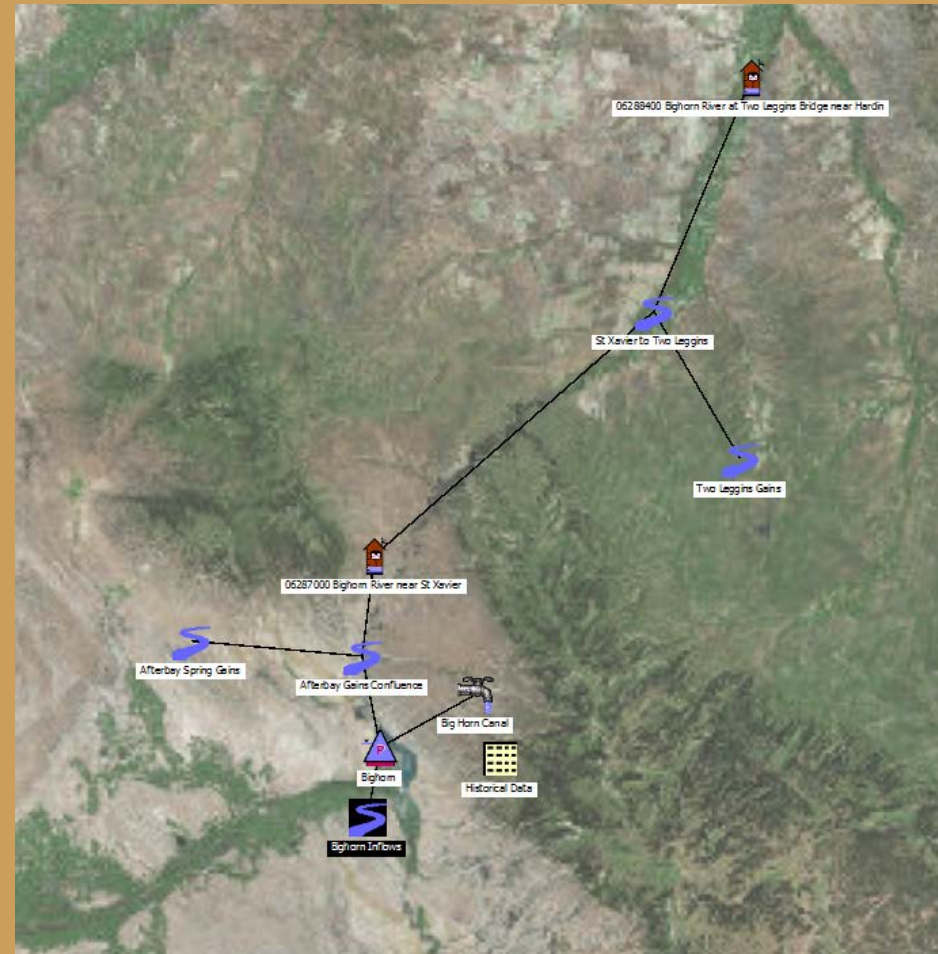


# Modeling Approach-RiverWare Background

- Developed and maintained by the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES) at University of Colorado Boulder (CU)
- Developed with substantial support from Reclamation, US Army Corps of Engineers, and Tennessee Valley Auth.
- Notable applications:
  - Reclamation's Colorado River Simulation System (CRSS) long term planning and mid-term operations models
  - Upper Missouri and Milk-St Marys Basin Studies
- RiverWare provides a construction kit for hydrologic modeling: river/reservoir network setup, "Rules" language for simulations, modeling algorithms, solvers, etc...

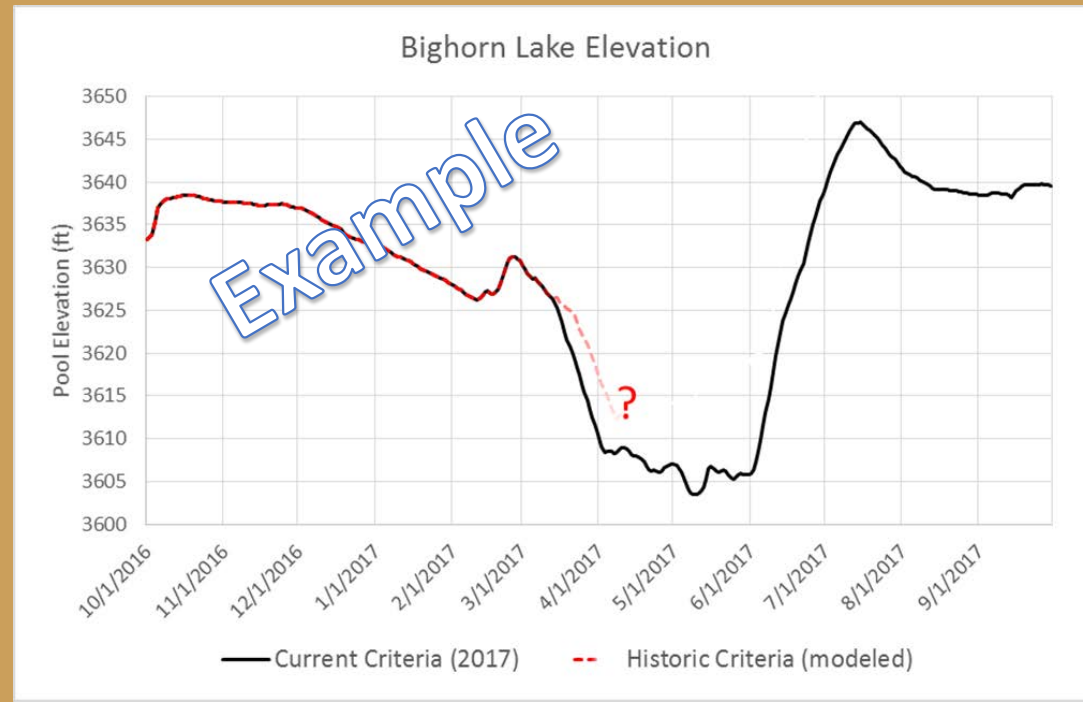
# Methods-Modeling Approach

- Modeled comparison
  - Uses RiverWare software
  - Incorporates all physical and operational restrictions
  - Represents current and historical operating criteria
  - Allows us to examine “what if” Reclamation used historical criteria from 2010-2017
  - Use “perfect” and historical 1<sup>st</sup> of month forecasts



# Expected Results

- Determine differences in benefits for 2010-2017 period between historical, current criteria, and actual operations
- Determine potential causes for any deviations from expected benefits
- Allows us to quickly examine alternate scenarios and make recommendations





# Analysis Timeline

- Statistical Analysis-Completed Spring 2018
- RiverWare Model Developed-Spring 2018
- Modeling Analysis Completed-Fall 2018



# Other Relevant Research

- **Model development**
  - **Daily model-parallel operations during runoff season**
  - **Enhanced representation of upstream depletions**
- **Forecasting research**
- **Risk-based operational criteria**





**Questions?**