

# **Newlands Project Planning Study**

## **RiverWare User's Meeting**

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**August 27, 2013**



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# Agenda

- **Overview of Newlands Project**
- **Newlands Project Planning Study**
- **Use of RiverWare**



# OVERVIEW OF THE NEWLANDS PROJECT



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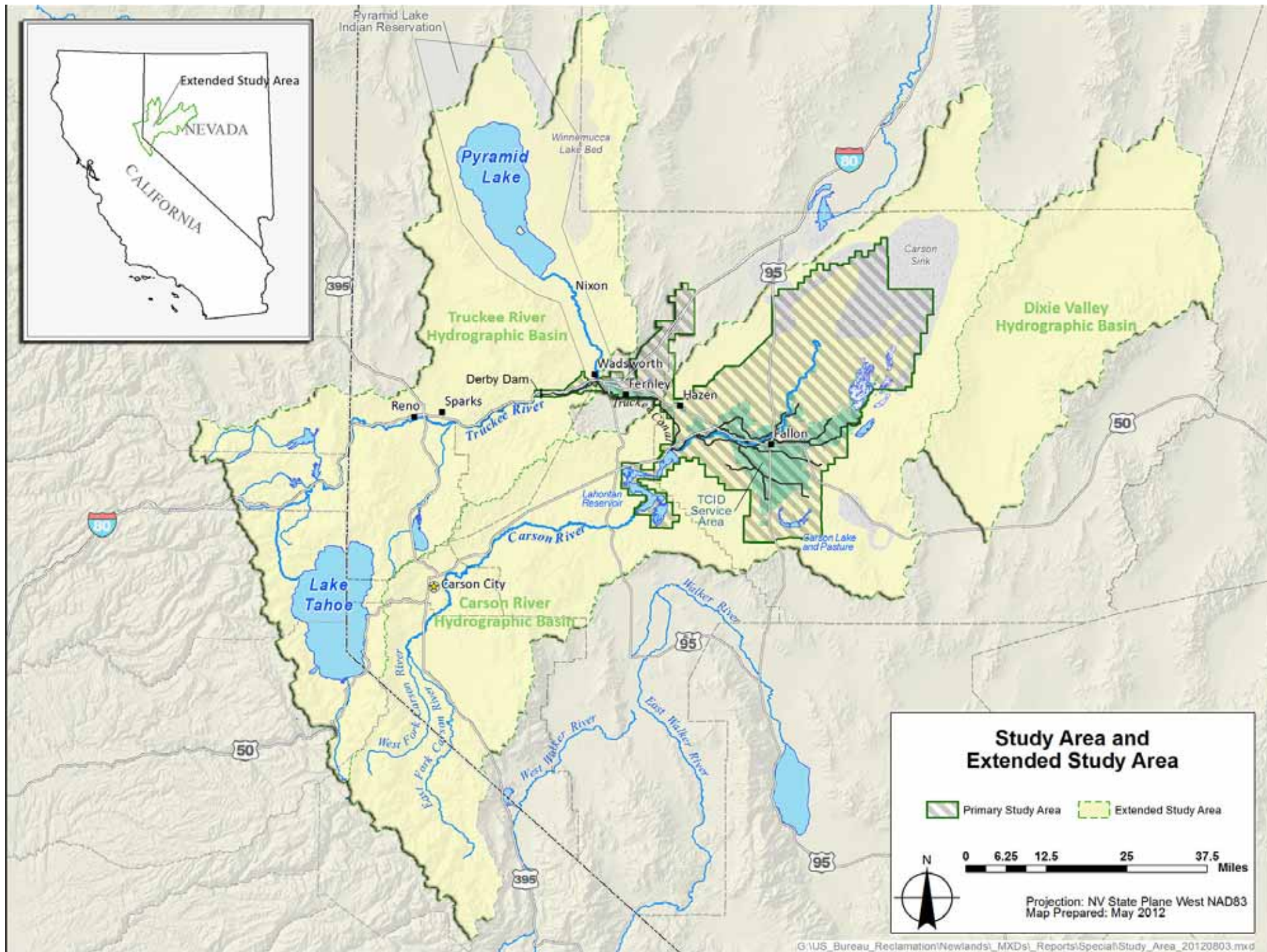
# RECLAMATION



# Newlands Project Background

- Federal irrigation project started under the Bureau of Reclamation in 1903.
- Serves water rights in the Truckee and Carson divisions.
- Operated and maintained by the Truckee-Carson Irrigation District (TCID) under contract with Reclamation since 1926.







# A Century of Changes

- Once exclusively agriculture
- Now includes wetlands and municipal users
- Urbanization – Conversion of agricultural land to residential neighborhoods



# Fernley 1948



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# Fernley 2001



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# Fernley 2008



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# Truckee Canal Breach

- January 4, 2008 – Truckee Canal flows increased sharply overnight to 750 cfs
- ~4 am January 5 – 50 feet of embankment collapsed.
  - 590 properties flooded
  - No fatalities





# Truckee Canal Rewatering

- **March 2008 – Canal flows resume at a reduced flow of 150 cfs**
- **May 16, 2008 – Reclamation conditionally approves increasing the canal flows to a maximum 350 cfs**



350 cfs, 6-7 ft. deep, 6-7 ft. freeboard



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# Purpose and Authorization

- **2009 Federal Omnibus Appropriations Act:**  
Funding to “determine the full extent of rehabilitation needed for the canal to resume flows above 350 cubic feet per second.”
  - Assess the canal’s problems and risks.  
*2011 Risk Assessment*
  - Develop canal risk reduction alternatives.  
*2011 Corrective Action Study*
  - Conduct a planning study to investigate Project alternatives.  
*2013 Planning Study*



# NEWLANDS PROJECT PLANNING STUDY



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# Planning Study Objectives

**Formulate alternatives to meet the following objectives:**

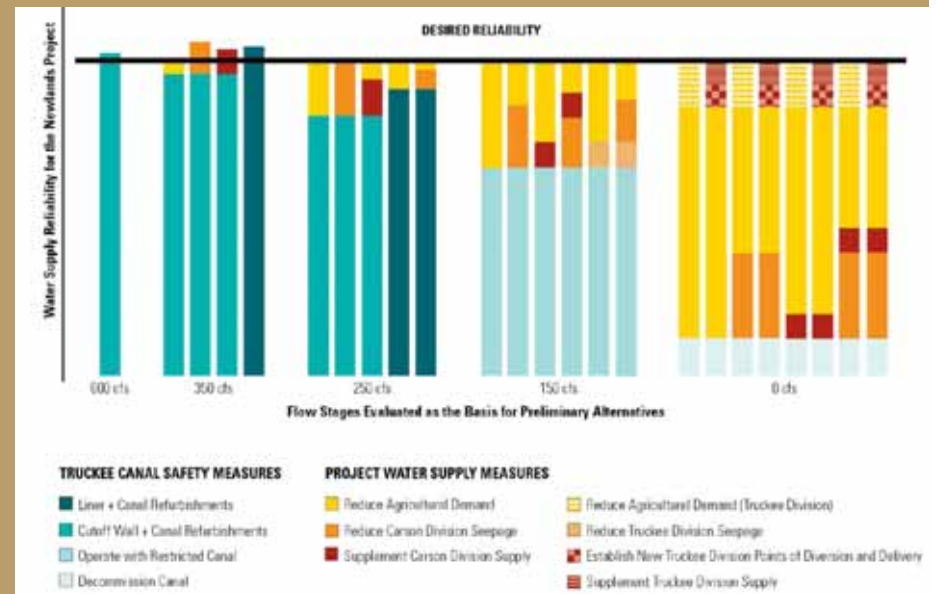
- **Reduce public safety risk from operating the Truckee Canal.**
- **Satisfy the exercise of Newlands Project water rights.**

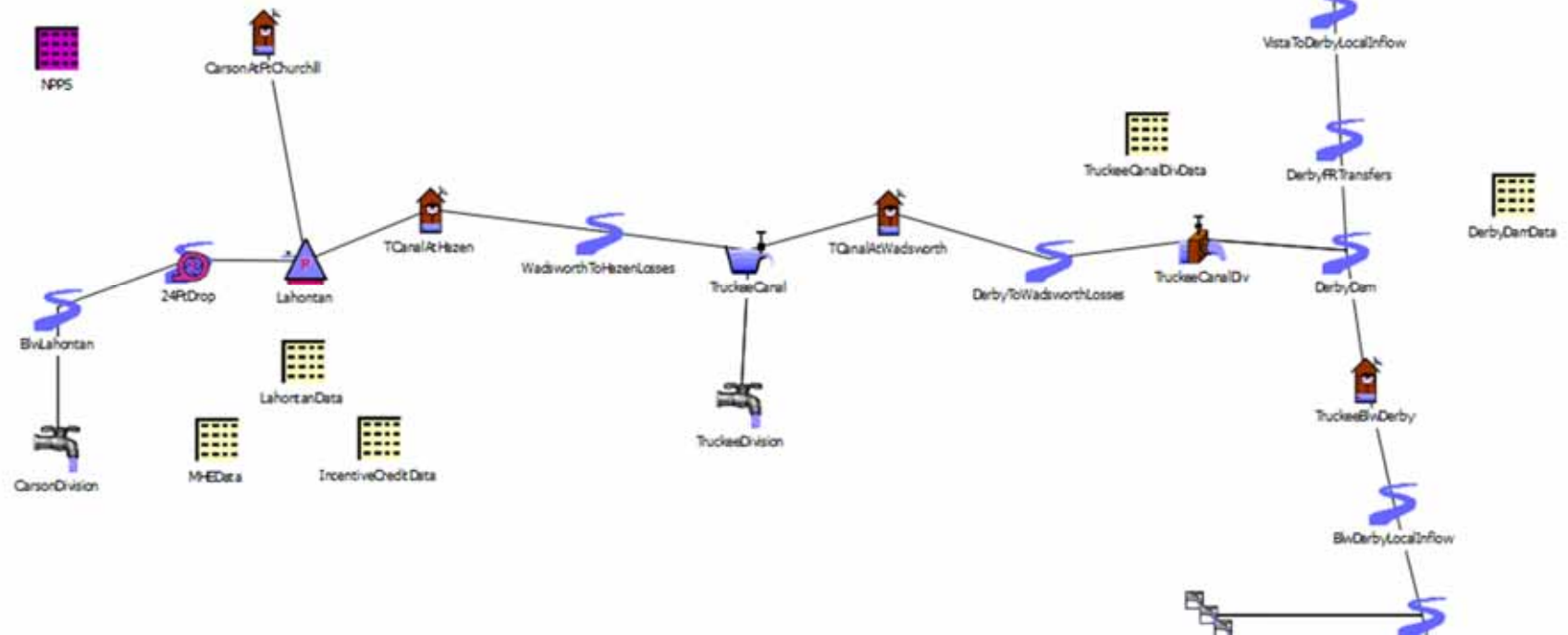




# Study Water Supply Objective

- Study based on:
  - Historical hydrology
  - 0-600 cfs Truckee Canal
  - Current regulations





# RIVERWARE IN THE NEWLANDS PROJECT PLANNING STUDY

# Modeling Overview

- **PWRE contracted with MWH to perform modeling for the Newlands Project Planning Study**
- **Used the Truckee River Existing Conditions Planning Model**
  - 100 Year Historic Hydrology Dataset
  - Daily Timestep
  - ≈2 Hour Run Time
  - **Modeled Preliminary Alternatives (64 Model Runs)**
    - **6 Reference Scenarios**
      - 0 cfs, 150 cfs, 250 cfs, 350 cfs, 600 cfs, and 900 cfs Truckee Canal Capacity
    - **59 Alternative Scenarios**
      - 11 Measures Considered in addition to Truckee Canal Capacity
      - Combined for 24 Preliminary Action Alternative Plans
  - **Modeled Final Alternatives (21 Model Runs)**
    - 7 Final Action Alternative Plans



# Overview Summary

1. That is a lot of model runs...
2. That is a lot of time...
3. That is a lot of models to keep track of...
4. That is a lot of data to compile...
5. That is overwhelming.

**We needed to get organized.**

# Study Organization

- Created a list of scenarios to be studied
  - Varying the Truckee Canal Capacity,
  - Varying Demands, Etc.
- Determined the model changes that need to be made for each scenario
- Grouped scenarios based upon model changes
- Created a “Run Menu”

|    |        | Truckee Canal Capacity |         |         |         |         |         | T.Canal Seepage |     |
|----|--------|------------------------|---------|---------|---------|---------|---------|-----------------|-----|
|    |        | 0 cfs                  | 150 cfs | 250 cfs | 350 cfs | 600 cfs | 900 cfs | Current         | 15% |
| 1  | Test 1 | x                      |         |         |         |         |         | x               |     |
| 2  |        |                        | x       |         |         |         |         | x               |     |
| 3  |        |                        |         | x       |         |         |         | x               |     |
| 4  |        |                        |         |         | x       |         |         | x               |     |
| 5  |        |                        |         |         |         | x       |         | x               |     |
| 6  |        |                        |         |         |         |         | x       | x               |     |
| 7  | Test 2 |                        | x       |         |         |         |         |                 | x   |
| 8  |        |                        |         | x       |         |         |         |                 | x   |
| 9  |        |                        |         |         | x       |         |         |                 | x   |
| 10 |        |                        |         |         |         | x       |         |                 | x   |
| 11 |        | x                      |         |         |         |         |         | x               |     |

# MRM vs. Batch Mode

## MRM

- Each run must have the:
  - Same Timestep
  - Same Duration
  - Same Output Slots
    - RiverWare keeps track of the run number and updates the DMI accordingly
- Automated Process
  - RiverWare initiates runs without user interaction
- Preconfigured within RiverWare
- Specify Inputs through a DMI
  - Change the Truckee Canal capacity or other series slot
- Does not save model with results
  - If additional output data is needed, the model needs to be re-run

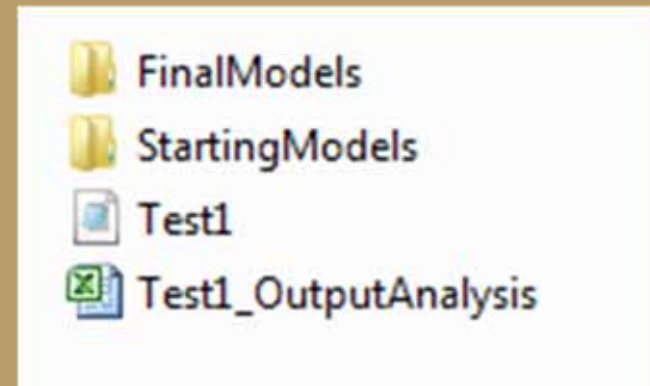
## Batch Mode

- Each run can have different:
  - Timestep
  - Duration
  - Output Slots
    - DMI's can be invoked through a script
- Automated Process
  - Initiate runs using a script without user interaction
- Not Preconfigured within RiverWare
- Specify Inputs through a script
  - Change the Truckee Canal capacity or other scalar slot
- Saves model with results
  - If additional output data is needed, open up the model and export it



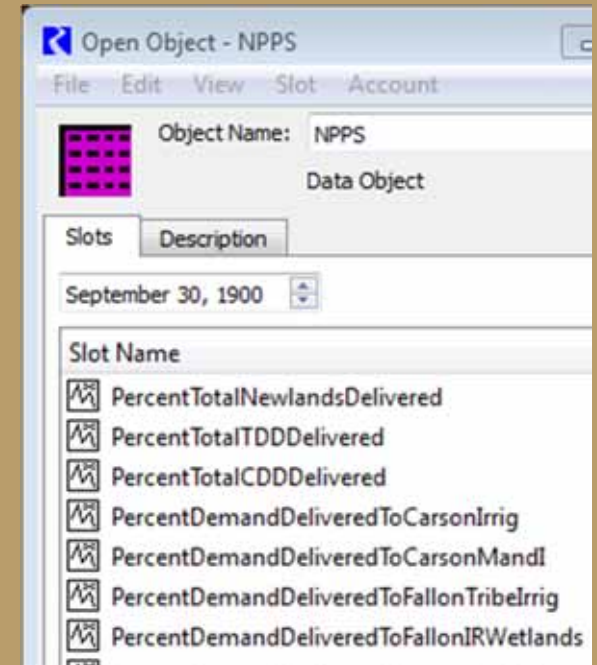
# File Organization

- Set up a file structure for making runs in batch mode
  - Script File
  - Starting Model Folder
    - GFS
    - Ruleset
    - Model
  - Final Models Folder
    - Saved with run results and input changes from the script
  - Output File



# Model Preparation

- Created a list of desired output values
- Created a new data object to store the output slots
- Created an Output DMI
  - Requested new RiverWare development to facilitate collection of output:
    - Components of a RiverWare Dataset can now be configured through a script.



# Model Preparation

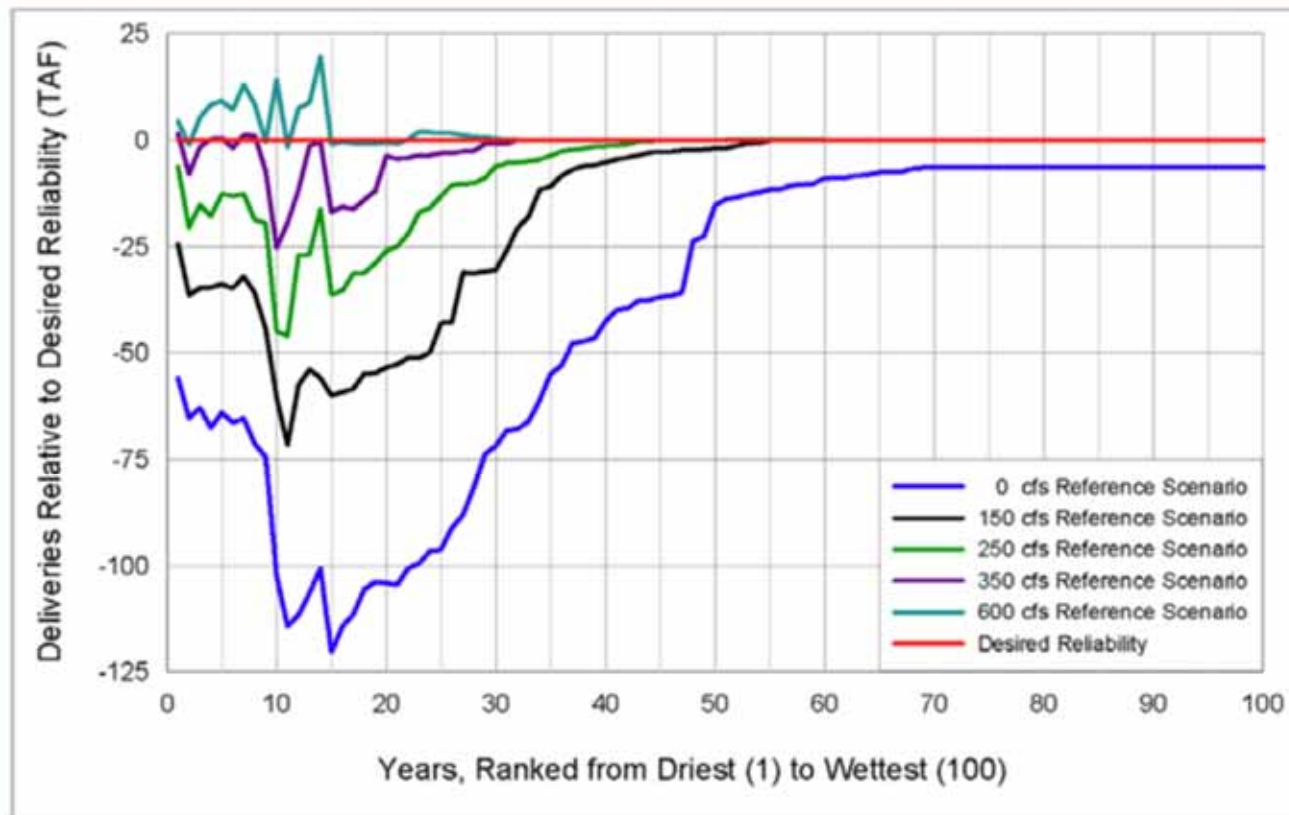
- **Developed study specific RiverWare logic that pertains to all scenarios and updated the base model.**
- **Created a “Starting” model for each test**
  - **Made the changes that applied to all scenarios within the test**
  - **Changes that varied between the scenarios were set via the script**



# Batch Mode

- **Wrote a Script for each test (.rcl file)**
  1. **Open the Starting Model**
  2. **Load the GFS**
  3. **Load the Ruleset**
  4. **Set Slot Values**
  5. **Run the Model**
  6. **Set Output DMI Parameters**
  7. **Run Output DMI**
  8. **Perform a Save As on the Model**
  9. **Close the Model**
  10. **Repeat for the next Scenario**

# Results



Key: cfs = cubic feet per second; TAF = thousand acre-feet

**Figure 4-8. Summary of Differences Between the Desired Reliability and Reference Scenarios, Expressed in Volume**

## 350 cfs, Lined Canal

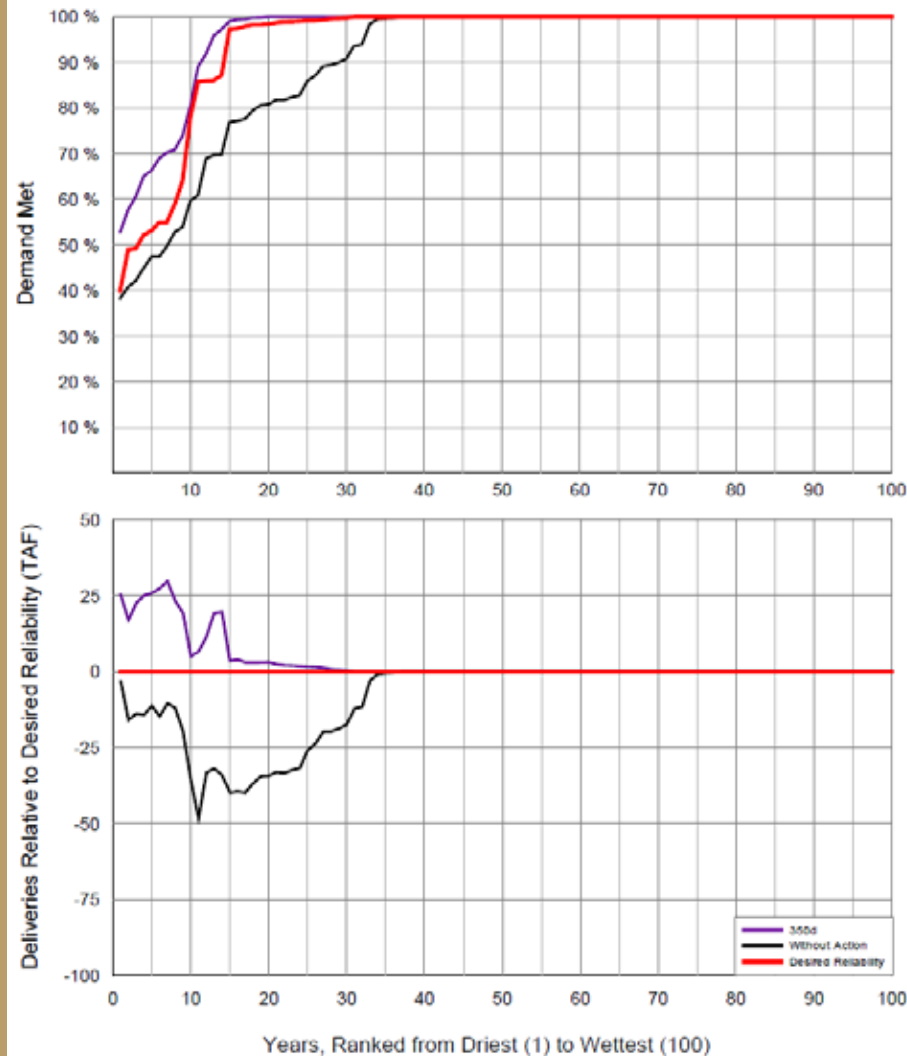


Figure 5-9. Water Supply Performance of Alternative 350.d

## 250 cfs, Lined Canal, Dry Year Demand Reduction

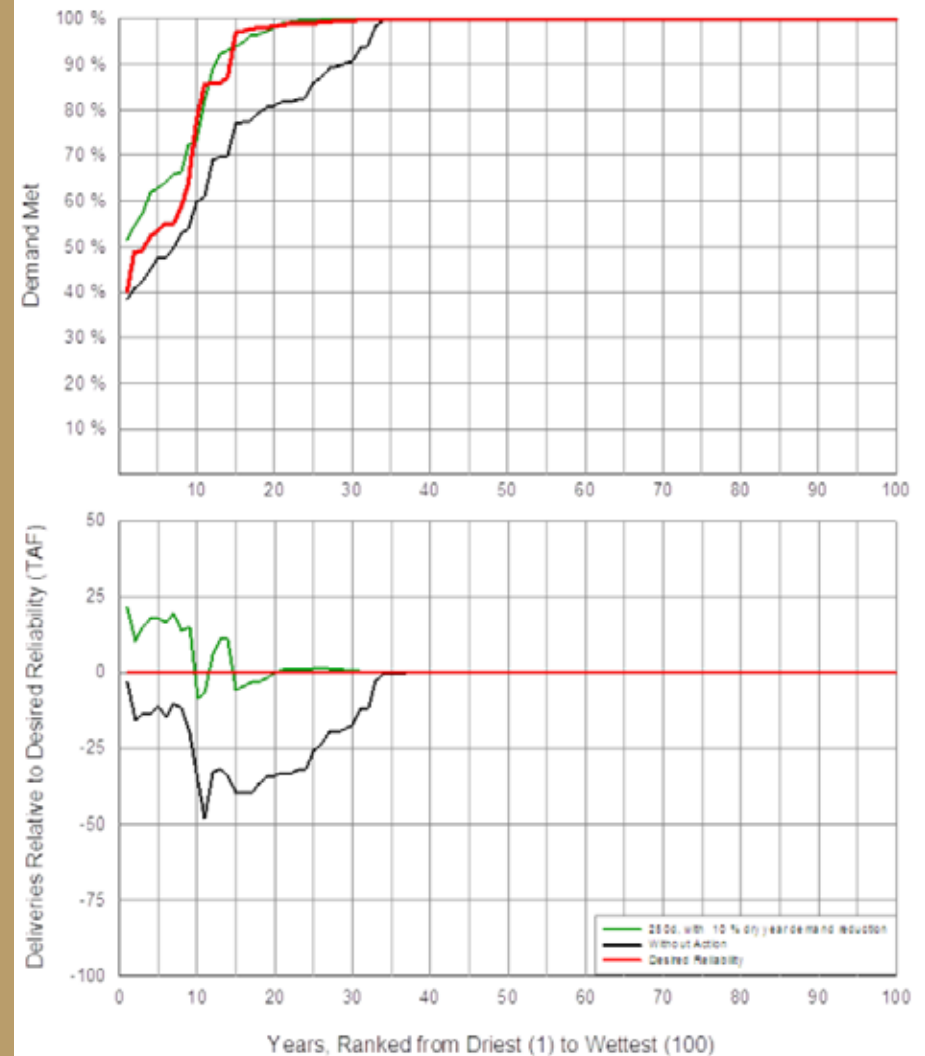


Figure 5-12. Water Supply Performance of Alternative 250.d





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