Weiser/Snake River Operational Analysis

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RiverWare User Group Meeting

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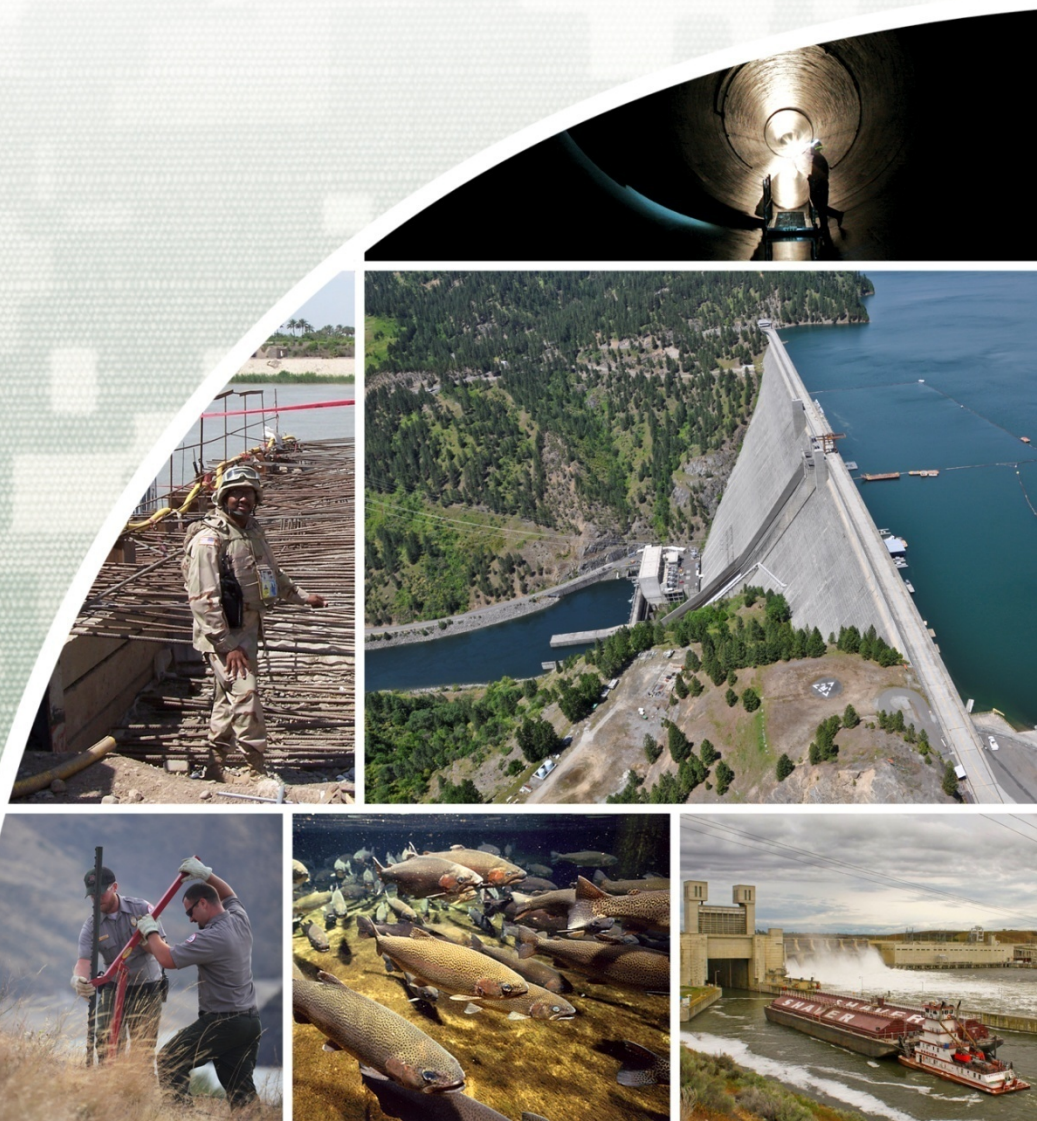

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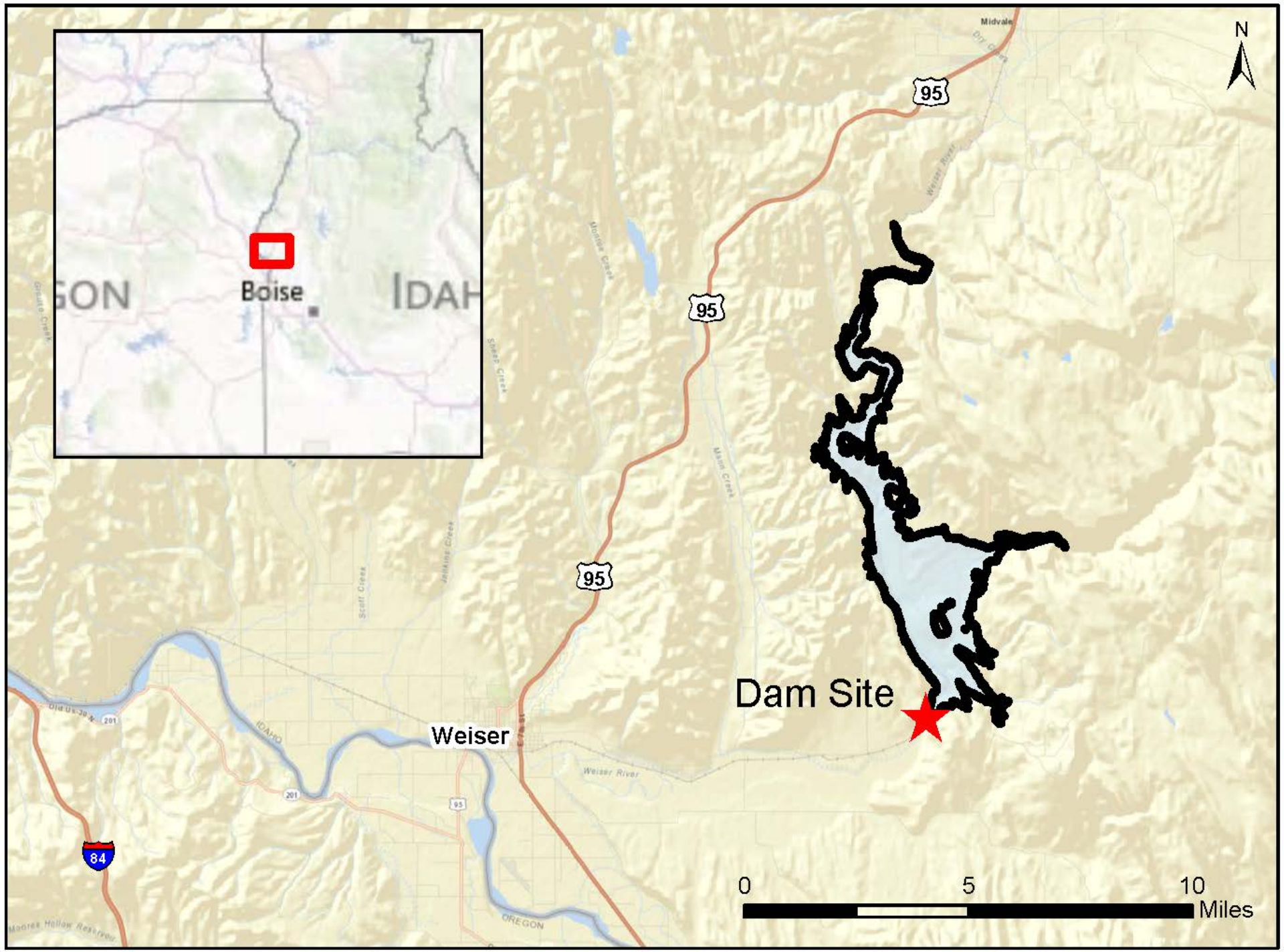
Presentation Overview

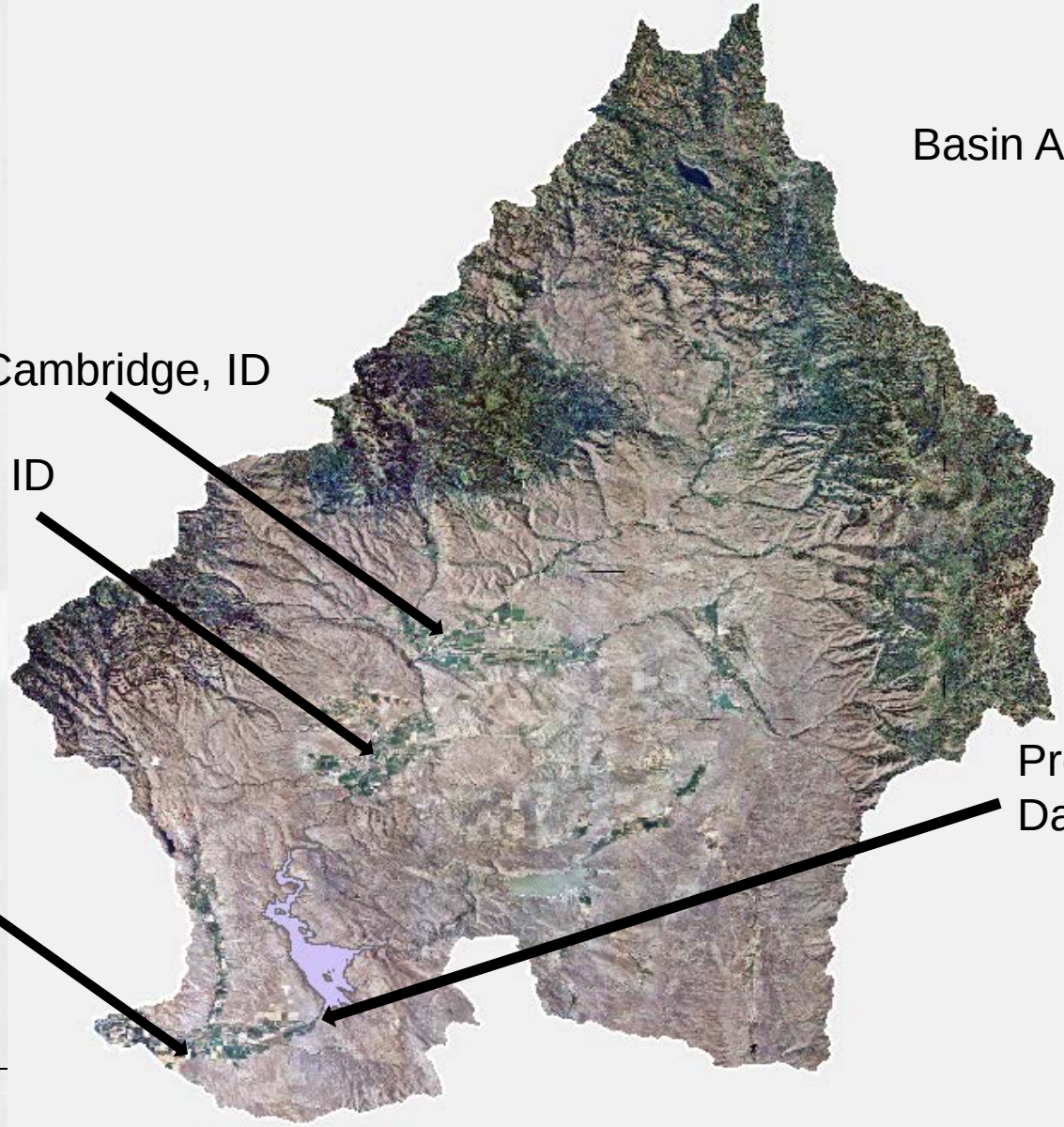
- Purpose of Analysis
- Methodology
- Optimization Results
  - Historical Hydrology
  - Climate Change Hydrology
  - Stochastic Hydrology
- Summary of Findings
- Conclusion

Purpose of the Analysis

The purpose of this analysis is to evaluate operations scenarios for the Weiser-Galloway Project that *maximize economic outputs*. This analysis evaluates the at-site hydropower potential, combined with flow augmentation storage exchanged with other Snake River reservoirs, as well as water supply for the Weiser River Basin. This analysis also considers flood risk management, recreation and a minimum stream flow for the Weiser River Basin modeled alternatives.

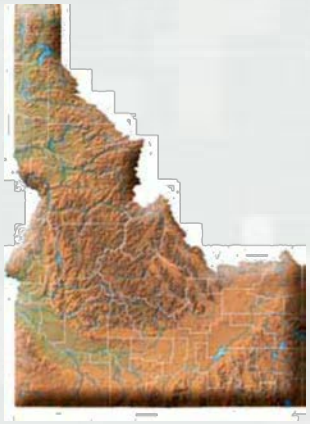

Boise
Midvale
95
95
95
Dam Site
Weiser
84
N
0
5
10
Miles

Analysis Area



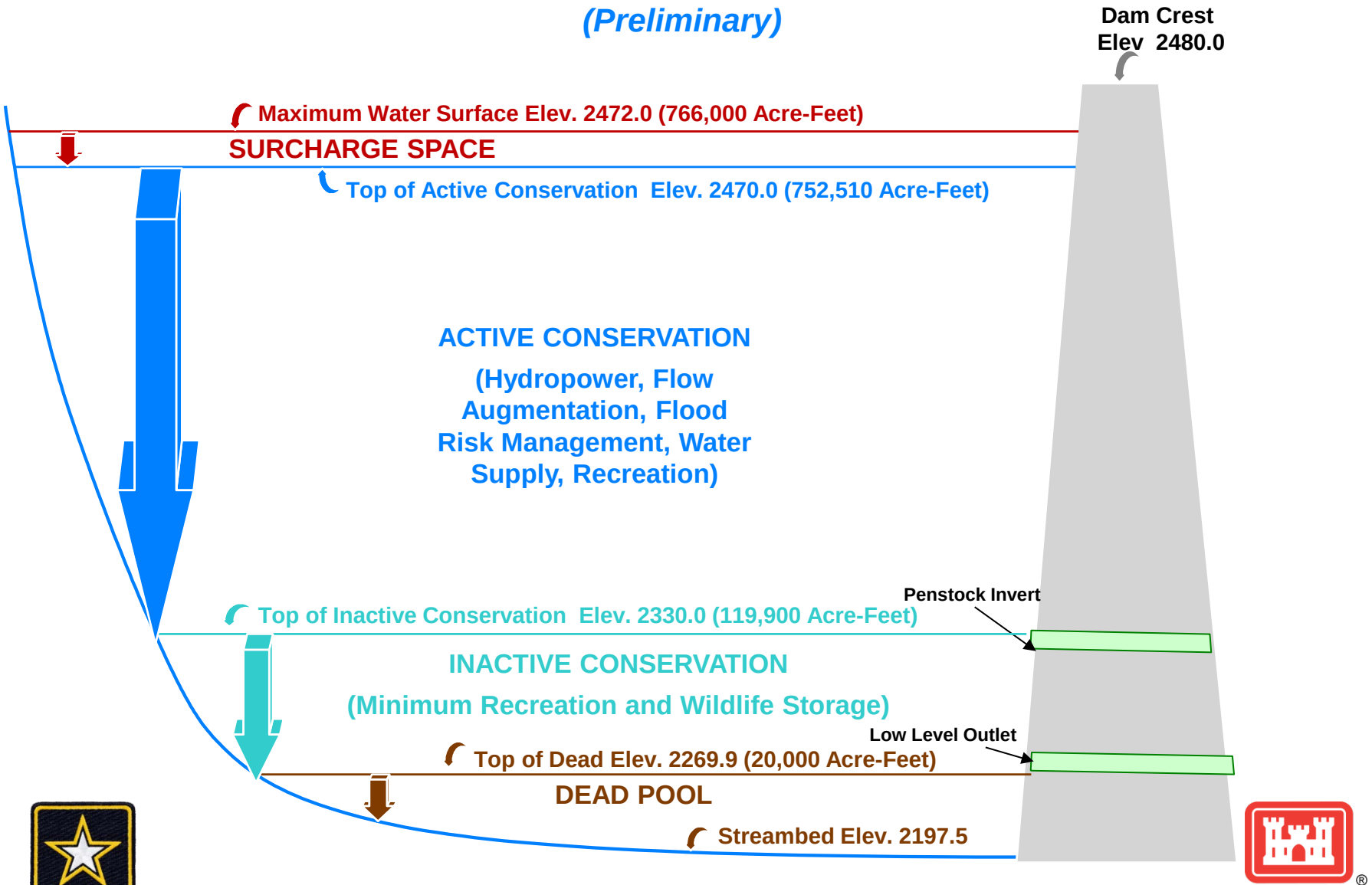
Initial Pertinent Reservoir Data

- Hydraulic Height: 283 ft
- Total Storage: 752 kaf
- Active Storage 632 kaf
- Inactive and Dead Storage 120 kaf
- Power Head: 100 kaf
- Powerhouse Hydraulic Capacity: 3,300 cfs
- Powerhouse Rated Power: 60 MW
- PMF Spillway/Outlet Capacity: 180,000 cfs



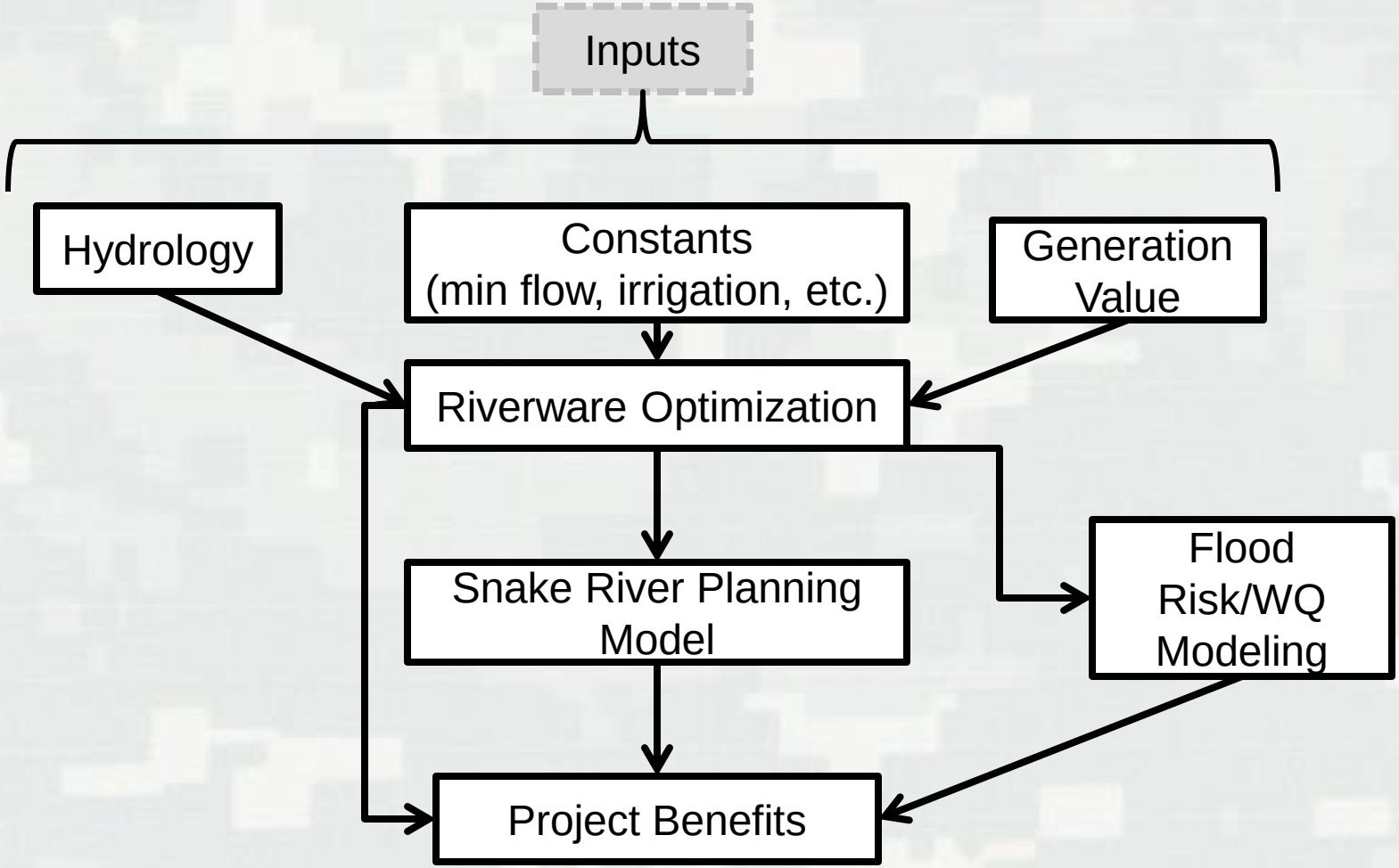
GALLOWAY RESERVOIR ALLOCATIONS

(Preliminary)



Modeling Assumptions

- Separate baselines for the ‘With and Without Project’ Condition
- Four Scenarios for Each Alternative Representing Flow Augmentation and Additional Demands
- Optimization Constraints Include:
  - Delivery of existing level of diversions
  - Minimum flow of 50 cfs at dam
  - Maximizing at-site hydropower
  - Maximum discharge 3,000 cfs (flow augmentation)


Inputs
Hydrology
Constants
(min flow, irrigation, etc.)
Generation
Value
Riverware Optimization
Snake River Planning
Model
Flood
Risk/WQ
Modeling
Project Benefits

Reservoir Modeling

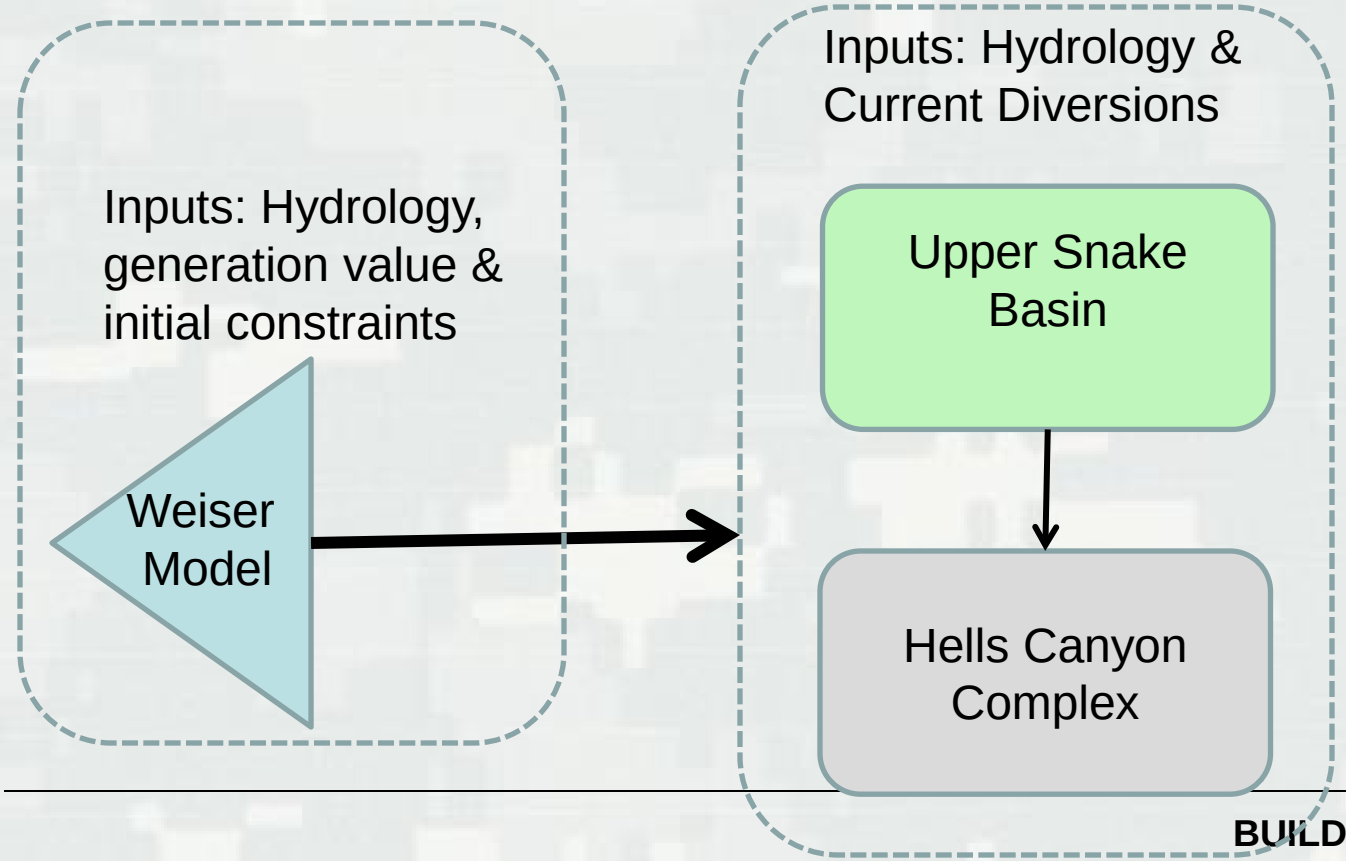
Collaborative Process

RIVERWARE OPTMIZATION:

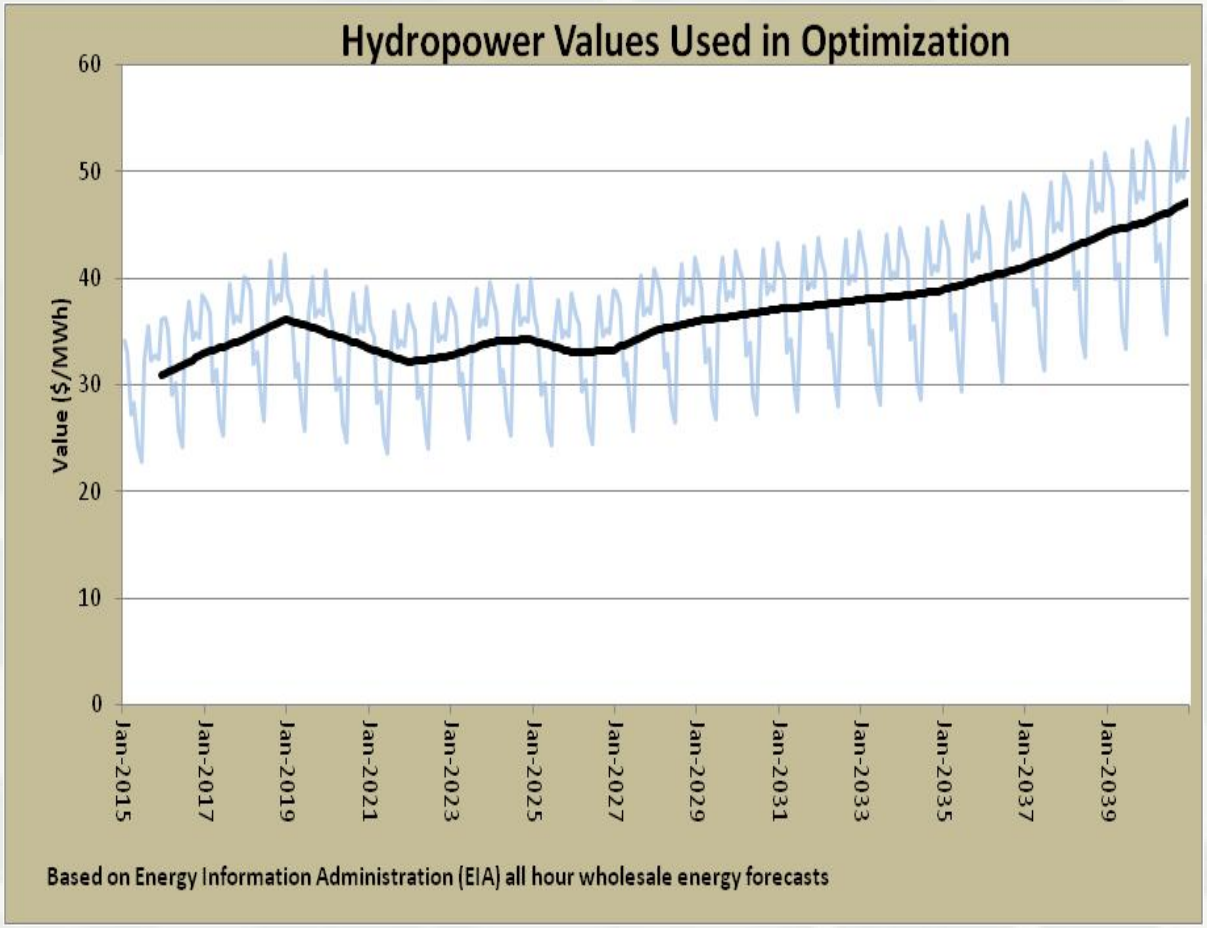
- Rule development for maximizing hydropower
- Iterative process for constraints

SRPM:

- Utilized Existing Model
- Current Operations
- Combined with ESPA groundwater Model

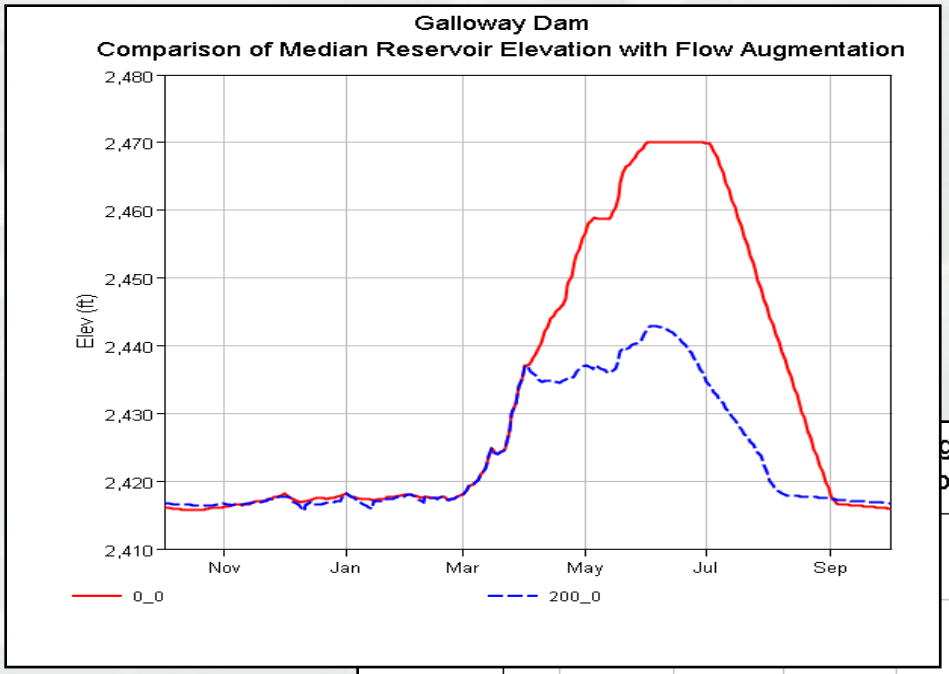


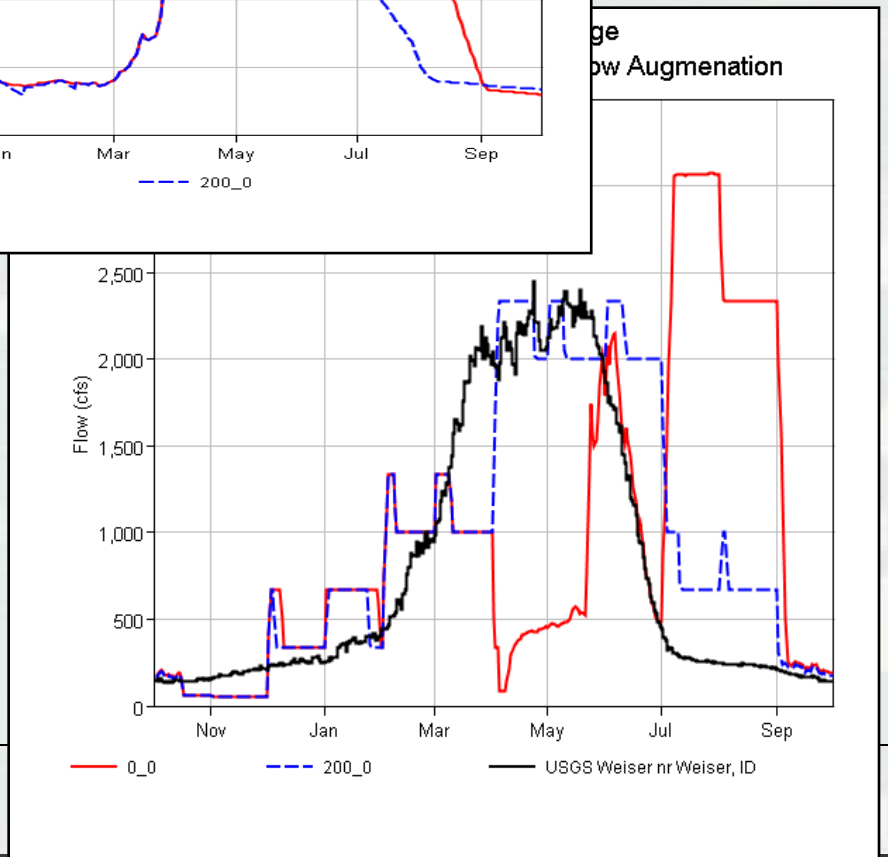
Example Input-Hydropower Valuation



- Other inputs included historical hydrology, evaporation, and irrigation demands
- Existing data was used when possible; some inputs were derived from analysis

Historical Hydrology Results

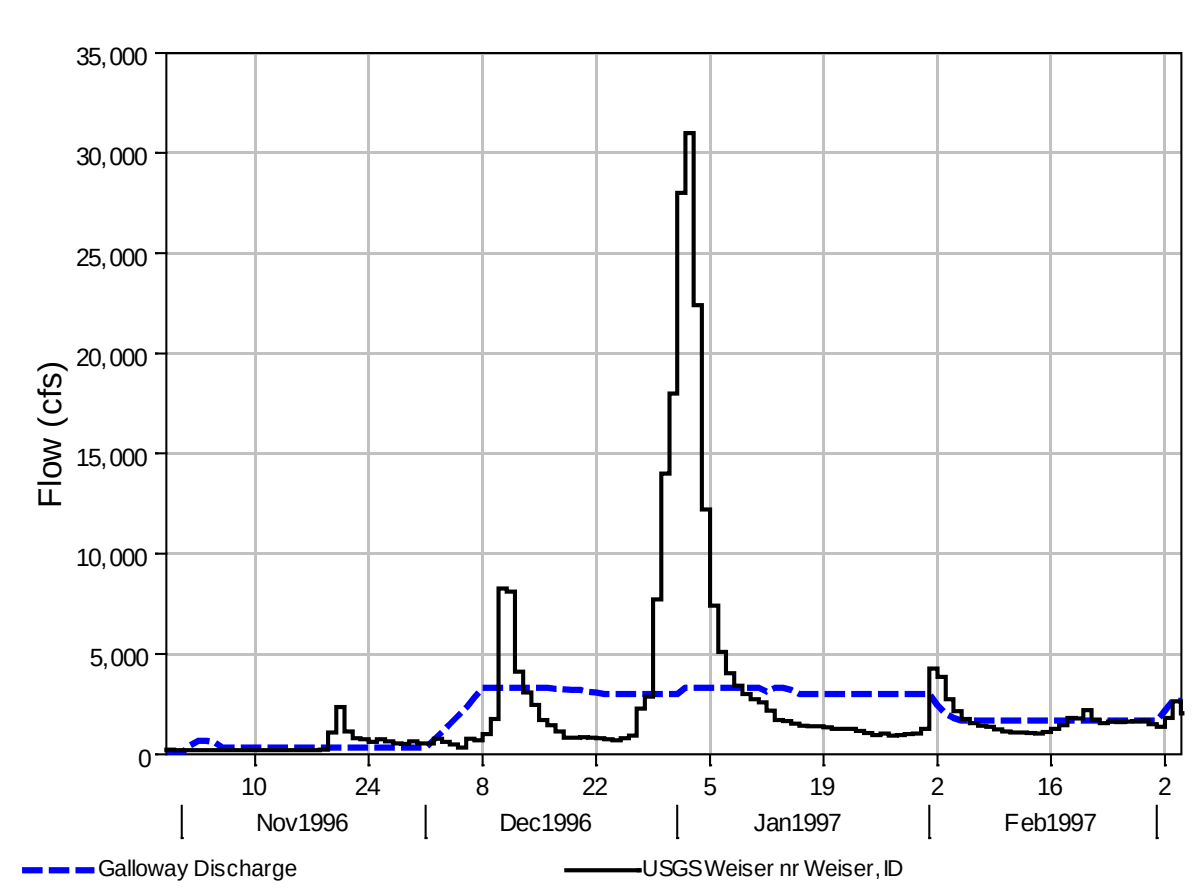




- 200 kaf Flow Augmentation can be delivered reliably; does impact refill & generation
- Potential Annual Generation 120-130 GWh (60 MW powerhouse)
- Benefits Weiser River with higher summer flows and cooler water

Historical Hydrology Results

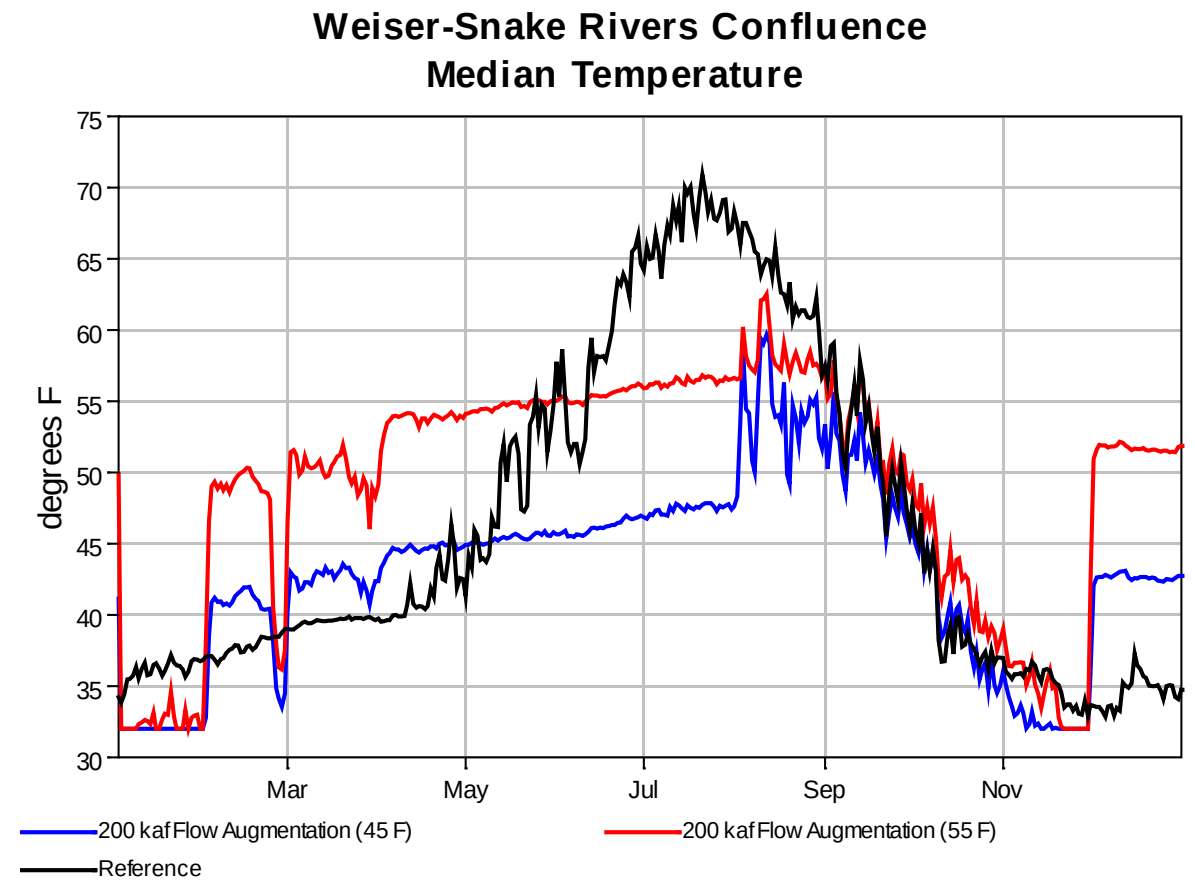
Flood Risk Reduction



- Existing 50% chance exceedance is 9,700 cfs
- Maximum Regulated Discharge <4,000 cfs
- Significant peak flow reduction during high runoff

Historical Hydrology Results

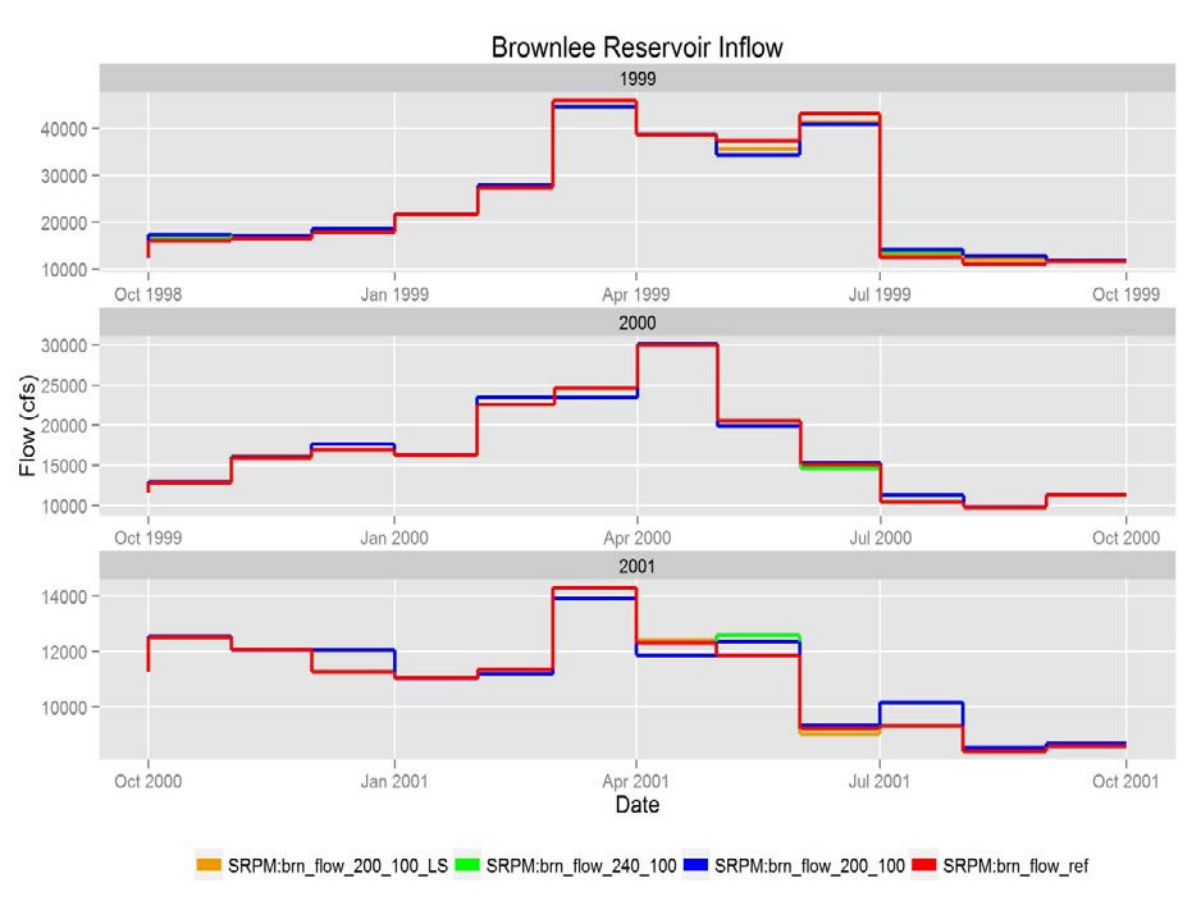
River Temperature Modeling



- Investigation based on using Hydraulic Model
- Significant temperature reduction for the Weiser River in summer
- Potential temperature benefit overall

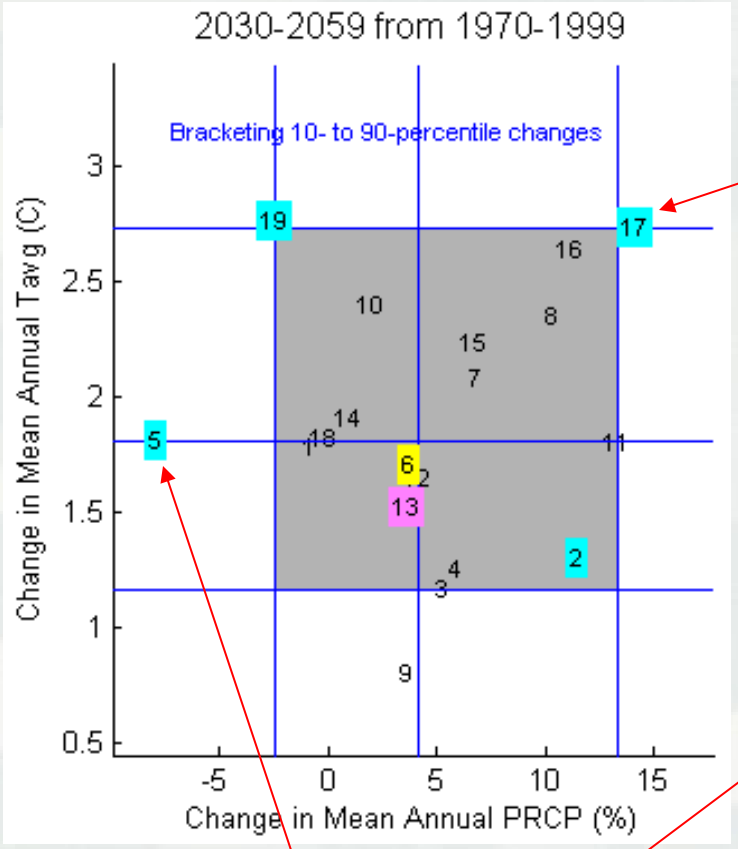
Historical Hydrology Results

Hells Canyon Complex

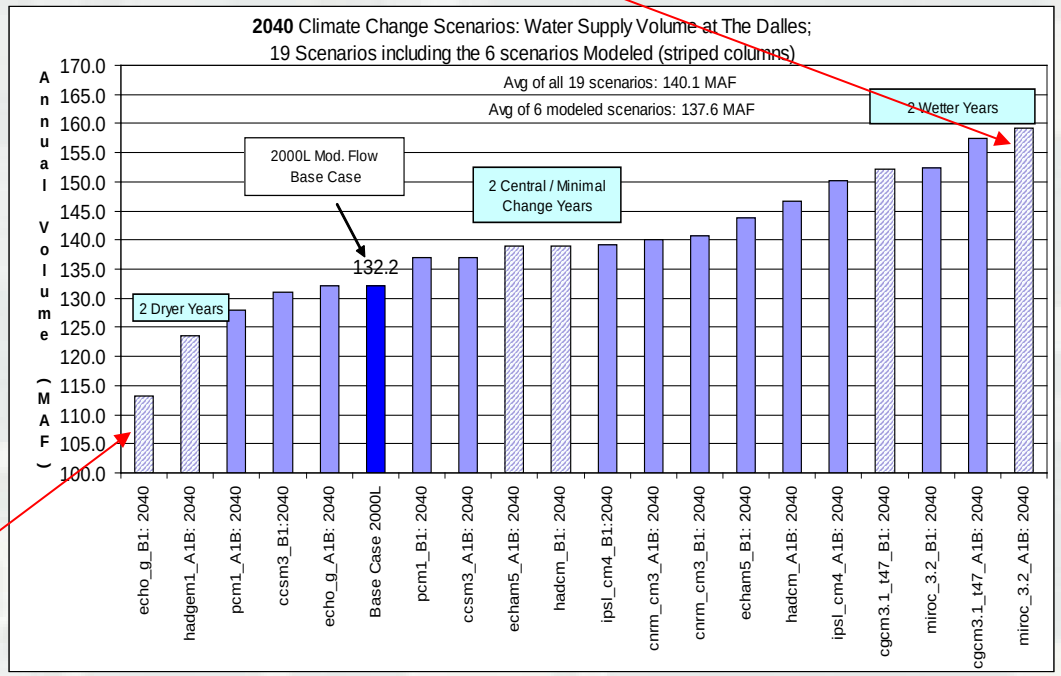


- Higher inflows during summer
- Reduced inflows during lower generation value periods
- Generally benefits HCC with better timing of inflows for generation

Climate Change Hydrology

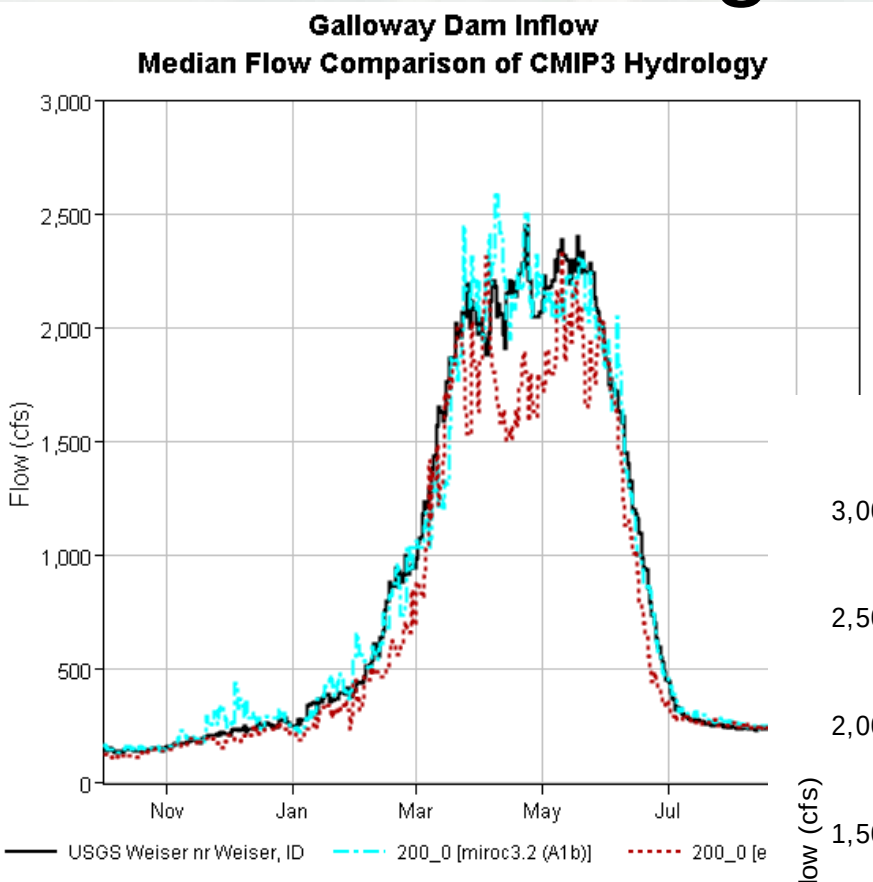


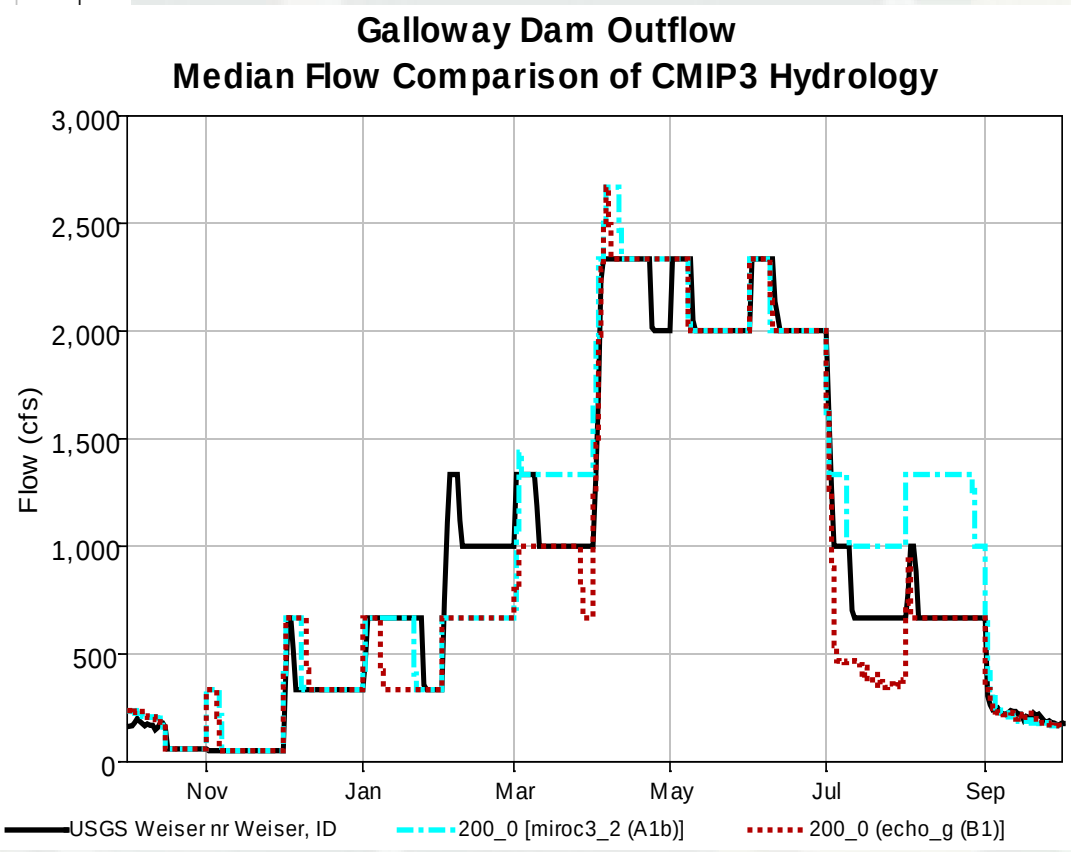
Wet Scenario



Dry Scenario

Climate Change Hydrology Results

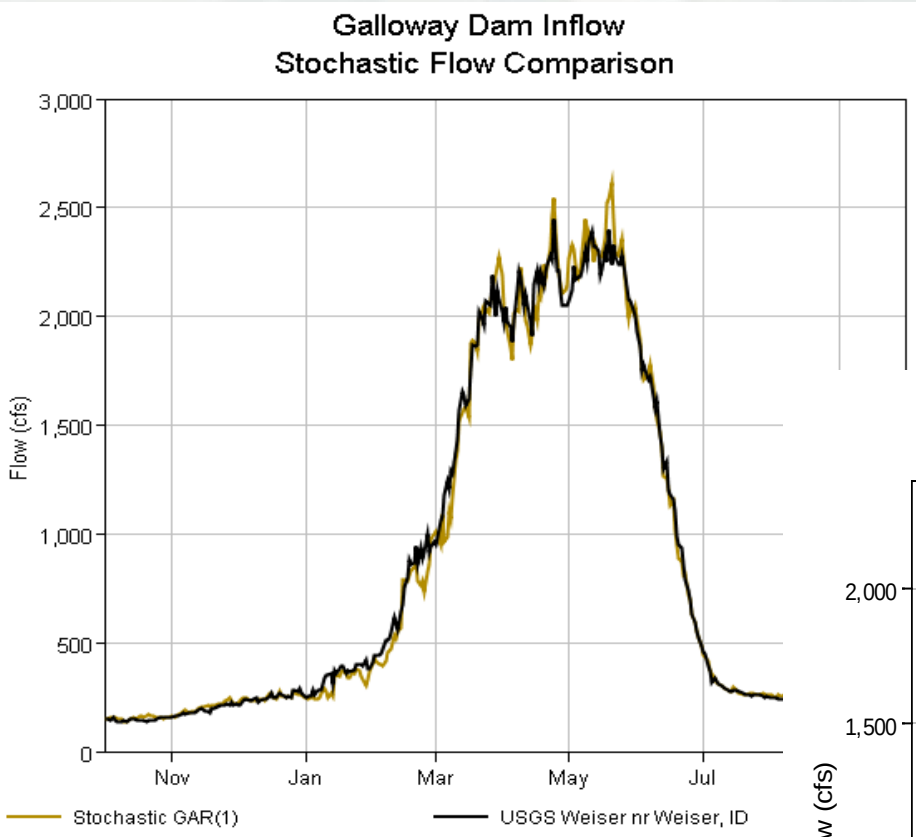


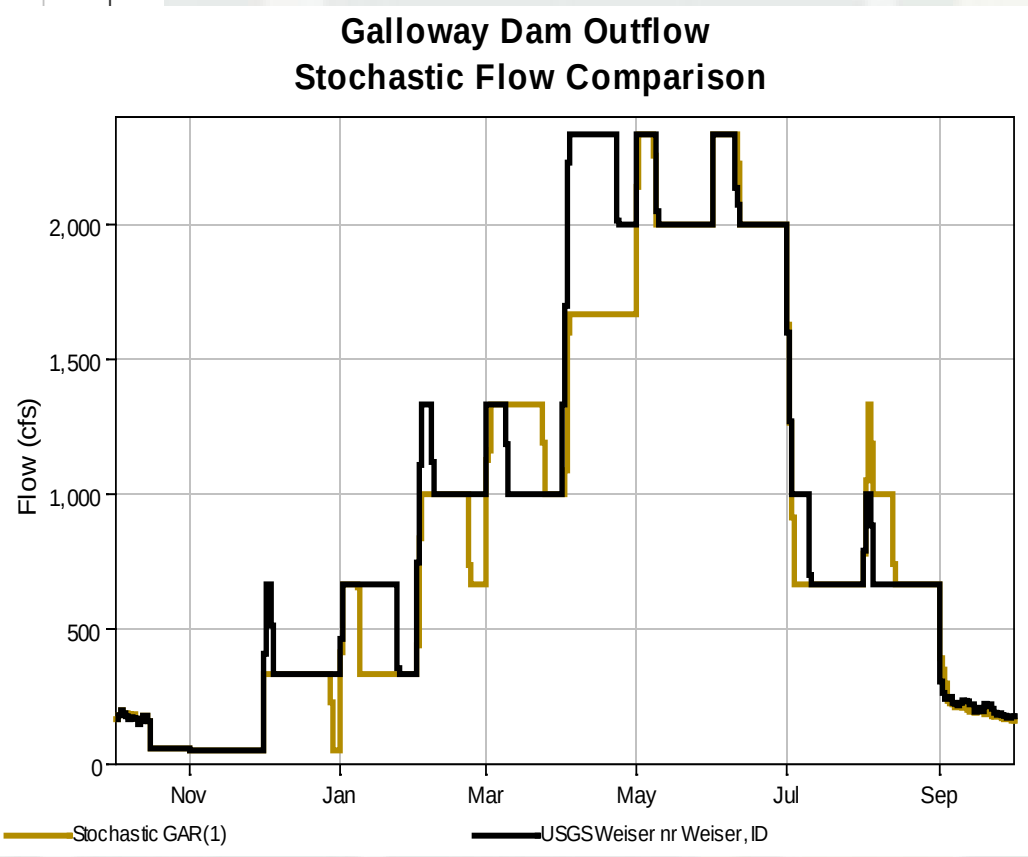


Stochastic Hydrology

- Generated using Gamma Autoregressive Model (annual)
- Disaggregated in R
- Used Tcl & python script to store data to/from RiverWare
- “MRM” process with optimization
- Run 100 30-yr datasets in batch mode

Stochastic Hydrology Results





Summary of Findings

- Optimized Flows:
  - Proved Positive for Storage at Weiser-Galloway
    - In-Basin and System-wide Potential Benefits
  - Allows for Flexibility and Reliability Meeting Upper Snake River Flow Augmentation
  - Relatively High Hydropower Potential
  - Significantly Reduced Flood Risk for Weiser, ID
  - Temperature Benefits for Weiser River

Conclusions

- Weiser-Galloway Project Could Be Used to Meet Multi-purposes
- Modeling Suggests Smaller Reservoir May Achieve Similar Economic Output
- Impacts to IPC Negligible under current modeling assumptions
- Relatively High Hydropower Potential
- Other Basin-Wide Implications
  - Groundwater Recharge
  - Water Supply

Acknowledgements

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