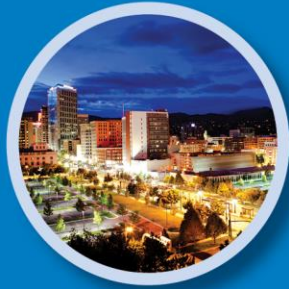


Bear River Capacity Project

November 7, 2017



Overview

- Challenges
- Explanation of Variable Renewable Energy and Emergency Back-up Power
- Detailed High Runoff management explanation
- 2017 Alexander Reservoir operation and high flows

Current Challenges

- **Challenge 1:** How to use existing facilities to efficiently support the integration of wind and solar power (variable renewable energy) into the energy supply?
- **Challenge 2:** How to better manage higher rainfall years and store additional water in Bear Lake?

Challenge 1: Support Variable Renewable Energy and Emergency Back-up Power

- Wind and Solar Power (variable renewable energy)
- Emergency Back-up Power
- Duration of generation when called upon - 15 minutes to 12 hours.
- Oneida and Cutler Hydro - currently provide spinning reserve – called out on average once per year
- **Soda Hydro - can also provide spinning reserve.**

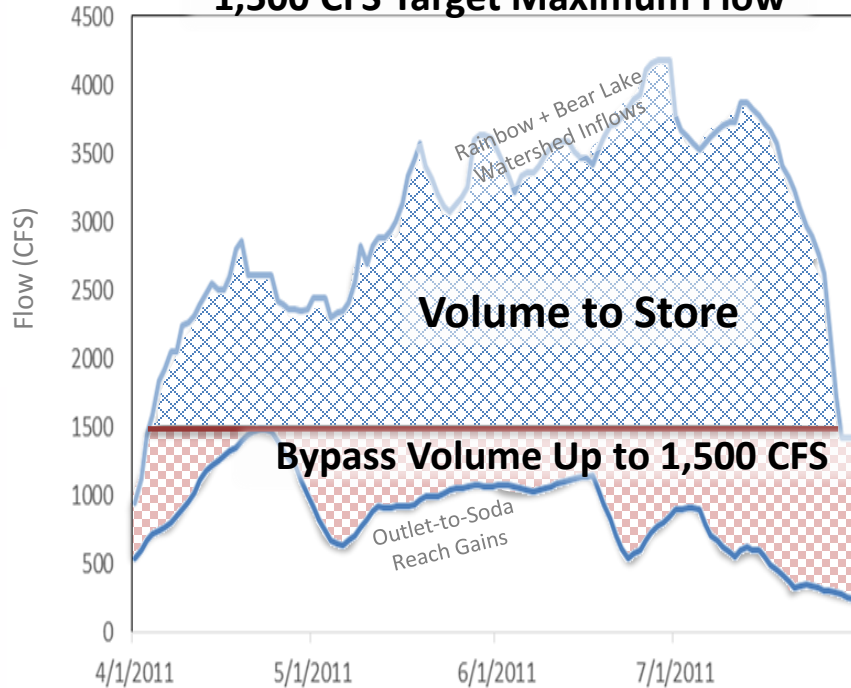
Challenge 2: High Runoff Management - Store or Bypass

- Only two ways to deal with high runoff:
 - Store and release later.
 - Bypass, release it as it comes in.
- How to determine when to do which?
 1. What is the maximum downstream target flow?
 2. How much storage space is necessary (planning) or available (during event)?

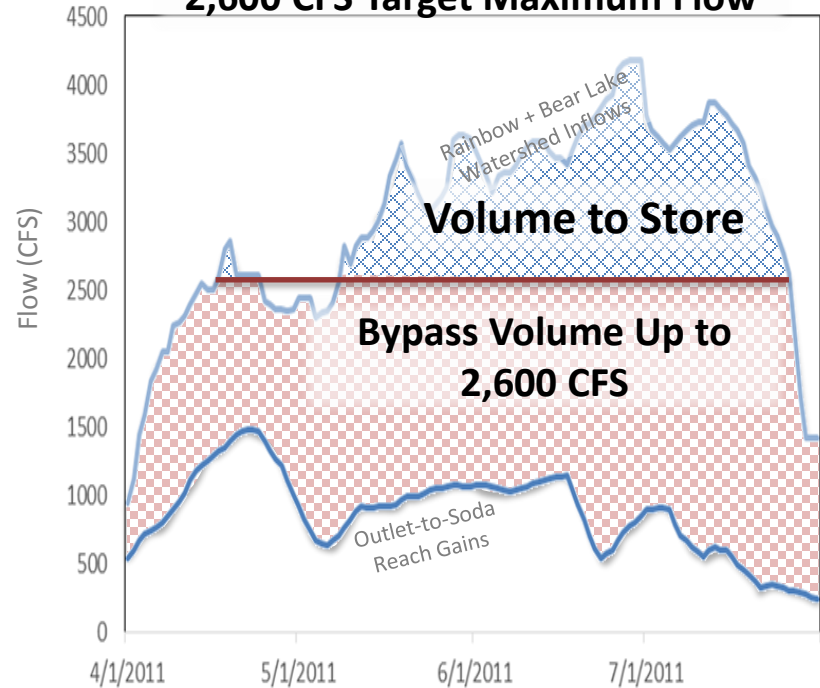
2011 Example

Bypass Volume Possible at 2 Target Maximum Flows

1,500 CFS Target Maximum Flow



2,600 CFS Target Maximum Flow



Higher Bear Lake Target Elevations

- Typically 5.65 feet of elevation of Bear Lake is reserved for flood control storage, based on Gentile Valley maximum target flow of 1,500 CFS
 - This results in a March 31 target elevation of 5,918.0 feet.
- IF Gentile Valley maximum target flow were 2,600 CFS
- THEN 2.65 feet of elevation could be reserved for flood control
 - Resulting in a March 31 target elevation of 5,921.0 feet.
- THEN, IF next year has low runoff,
- **There could be more water in Bear Lake at the beginning of drought.**

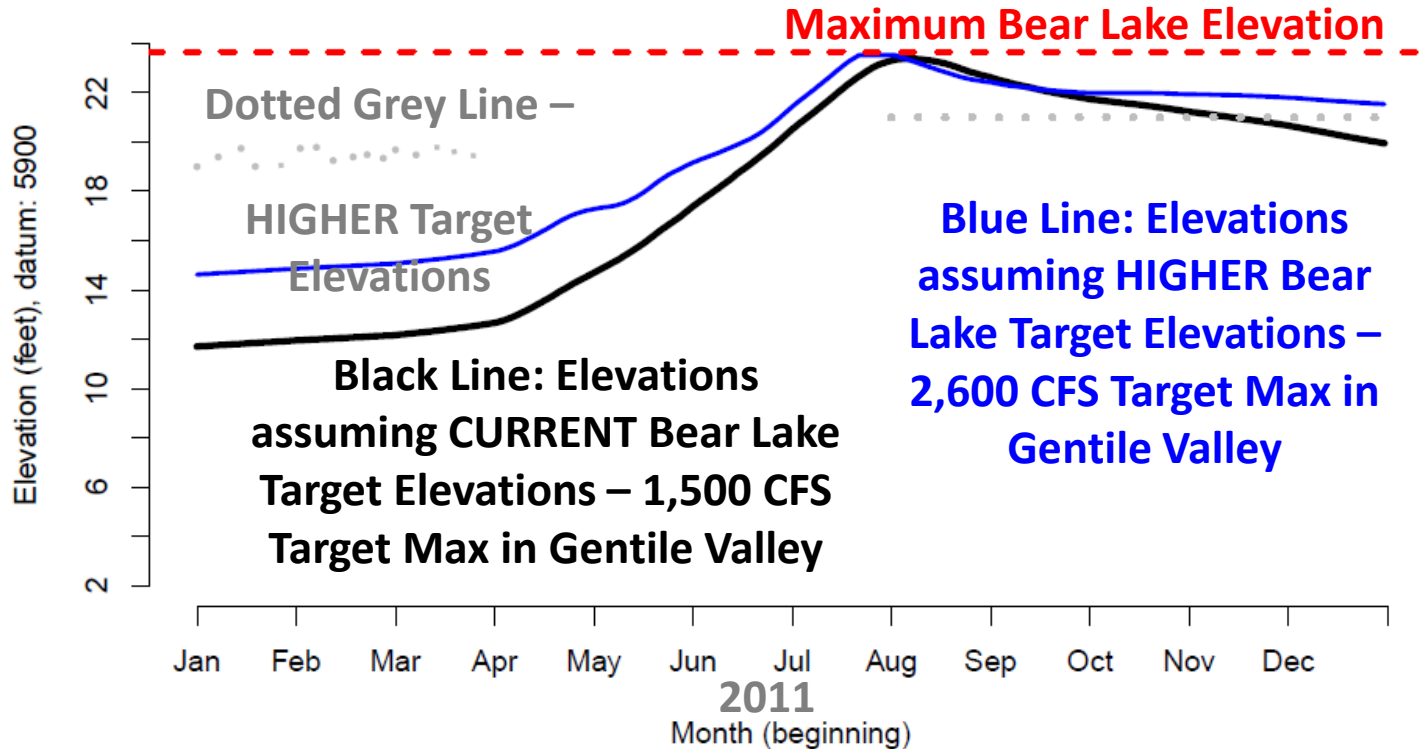
Example of How Higher Bear Lake Target Elevations Could Work: Replay 2011-2012

- Using the observed inflows from 2011 and 2012, how could operation of Bear Lake been different?
- Simulations of what could have happened...

For example, Bear Lake could have filled in 2011, IF it started with a higher Bear Lake elevation.

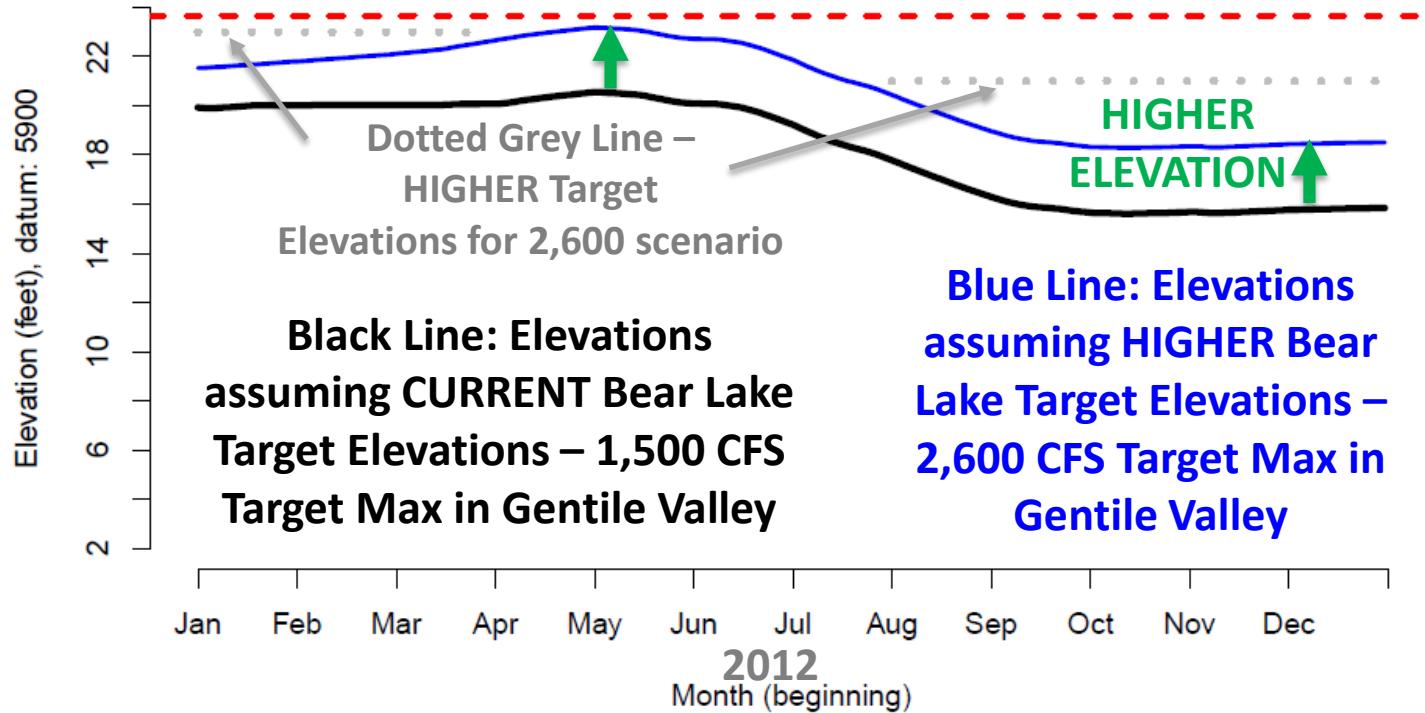
2011 Bear Lake Simulated Elevations

2011
What
If...



2012 Bear Lake Simulated Elevations

2012
What
If...

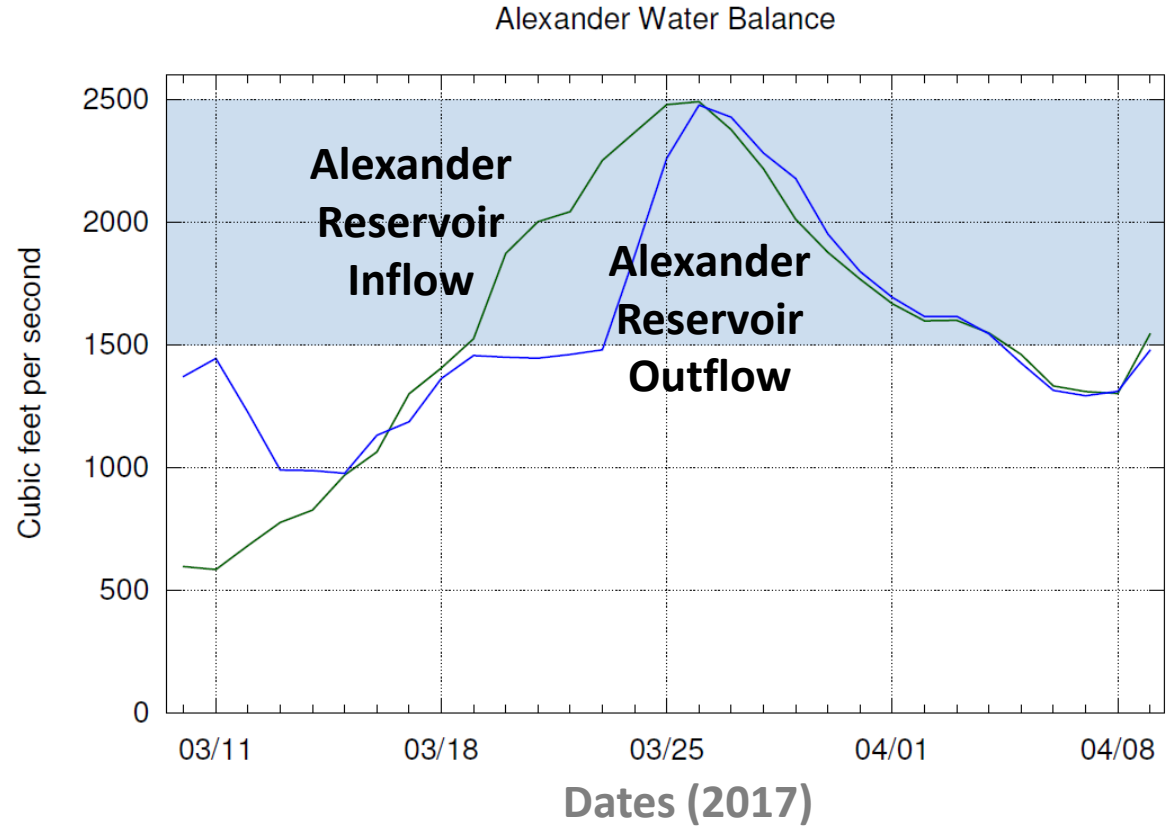


Future Scenarios

- There is only a 10% chance that Bear Lake will get low enough to justify use of the additional water.
- So, most likely, the water stored and not released over the winter will result in increased spill during the next abnormally wet spring runoff resulting in a more “normative hydrograph” compared to winter releases.
- If targets could be changed, it could result in higher water levels in Bear Lake.

2017 High Runoff Operations at Alexander Reservoir

2017 High Runoff Operations at Alexander Reservoir



2017 High Runoff Operations at Alexander Reservoir

