

Lake Powell Operations, Equalization and the Interim Guidelines

1. Background

- A. In 2007 the Colorado River Basin was facing the eighth drought year of the worst eight years in more than a century of record-keeping.
- B. In December 2007, after over two years of development through a public process, the Secretary of the Interior adopted the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Guidelines) in order to address water availability in the lower basin and operations of Lake Powell and Lake Mead during drought and low-reservoir conditions. Reservoir operating decisions under the Guidelines are to remain in effect through 2026.
- C. Among other things, the Guidelines provide direction to Reclamation on operations of Glen Canyon Dam (which impounds Lake Powell) to better ‘equalize’ the contents of Lake Powell and Lake Mead.
- D. Reclamation has been operating Glen Canyon Dam in accordance with the Guidelines since their adoption

2. Interim Guidelines

- A. The first five sections of the Guidelines address Lower Colorado River Basin issues including allocation of unused apportionment, Lake Mead operations, Lower Basin surplus and shortage operations and the implementation of California’s Colorado River Water Use Plan.
- B. Section 6 of the Guidelines addresses coordinated operation of Lakes Powell and Mead during the interim period.
- C. The objectives of the coordinated operations are: to avoid curtailment of uses in Upper Basin; minimize shortages in Lower Basin; and to not adversely affect yield for development in the Upper Basin through attempting to ‘Equalize’ or balance the contents of Lakes Powell & Mead as nearly as practicable by the end of each Water Year (Oct. 1 – Sept. 30) in September.
- D. Each month, Reclamation runs a computer model (24-Month Study) that projects operations of the Colorado River reservoirs out 2 years.
- E. There is a table of equalization elevations for Lake Powell in the Guidelines that is used in the determination of an operating ‘tier’ for Lake Powell.
- F. The projected January 1 elevation for Lake Powell in the August 24-Month Study run determines the initial operating tier and annual release from Lake Powell for the upcoming Water Year.
- G. Each month, through the water year, a new 24-Month Study is run and releases are adjusted based on actual and forecasted inflows, the projected end of water year contents of Powell and Mead and the particular operating requirements for the tier under which Glen Canyon is operating.

3. **Operating Tiers:** There are several operating tiers defined in the Guidelines--including Equalization, Upper Elevation Balancing, Mid-Elevation Release and Lower Elevation Balancing tiers--each of which has specific operational directions.
- A. **The Equalization Tier** applies when Lake Powell's projected January 1 elevation is above the elevation in the equalization table. The tier provides for Lake Powell releases of more than 8.23 maf during the Water Year until the content of the lakes equalizes or certain elevations are attained.
 - B. **The Upper Elevation Balancing Tier** applies when Lake Powell's projected January 1 elevation is below the elevation in the equalization table but above 3575 feet-above-sea level. The tier defines several different operations that may occur based on the projected elevations of lakes Powell and Mead and annual releases from Powell vary between 7.0 maf 9.0 maf.
 - C. There is also a provision in the Upper Elevation Balancing Tier for a shift to operations under the **Equalization Tier** if the April 24-Month Study projects Lake Powell will reach a certain elevation. This can result in the potential of releases significantly greater than 9.0 maf.
 - D. **The Mid-Elevation Balancing Tier** provides direction when Lake Powell's January 1 elevation is projected to be below 3575-feet-above-sea-level. The annual releases in this tier are either 7.48 maf or 8.23 maf dependent upon the projected elevation of Lake Mead.
 - E. **The Lower-Elevation Balancing Tier** applies when Lake Powell's January 1 elevation is projected to be below 3525-feet-above-sea level and provides for attempting to balance the contents of the two reservoirs by annual releases in the range of 7.0 maf to 9.5 maf.

Lake Powell Operational Tiers (subject to April adjustments or mid-year review modifications)		
Lake Powell Elevation (feet)	Lake Powell Operational Tier	Lake Powell Active Storage (maf)
3,700	Equalization Tier equalize, avoid spills or release 8.23 maf	24.32
3,636 – 3,666 (see table below)	Upper Elevation Balancing Tier release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.54 – 19.29 (2008 – 2026)
3,575	Mid-Elevation Release Tier release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.52
3,525	Lower Elevation Balancing Tier balance contents with a min/max release of 7.0 and 9.5 maf	5.93
3,370		0

The Lake Powell Operational Tiers table above is from the Interim Guidelines and depicts the relative elevations that determine the Operational Tiers for Lake Powell and the general release ranges for the tiers. The table referred to for the Upper Elevation Balancing Tier is the Lake Powell Equalization Elevation Table which depicts the year to year Lake Powell elevation that triggers Equalization, which changes annually.

4. **Previous Equalization**

- A. In 2008, the first year of operating under the Guidelines, Reclamation faced a shift from the Upper Balancing Tier to the Equalization Tier in April. When Reclamation began operating under the Guidelines in January of 2008, the annual release was projected to be 8.23 maf.
- B. The April 2008, 24-Month Study projections put operations into the Equalization Tier and resulted in an additional 750,000 acft being released in addition to what had been previously projected for the 2008 water year.

5. **2011 Projected Operations**

- A. The June forecast for the April – July inflows to Lake Powell is 12.6 maf or 159% of average, resulting in an annual projected inflow of approximately 16.5 maf. This represents the best year for inflows in the last decade and exceeds those of 2005 and 2008.
- B. The August 2010 24-Month Study resulted in the Upper Elevation Balancing Tier being the operating tier for Glen Canyon Dam in water year 2011 but also projected a shift in operations where Equalization would govern the operation beginning in April 2011 in accordance with the Guidelines. This study projected an annual release of 11.58 maf.
- C. In October, 2010, the 24-Month Study projected an annual release of 9.0 maf; however, given the hydrologic variability of the Colorado River System, it was also projected that the water year release from Lake Powell in 2011 could be in the range of 8.23 maf (10,150 mcm) to 13.4 maf (16,500 mcm) or greater.
- D. The April 2011 24-Month Study resulted in operations shifting to the Equalization Tier under section 6.B.3 of the Guidelines for the remainder of the year.
- E. The June 24-Month Study projects a Lake Powell WY 2011 annual release volume of 12.44 maf. Due to recent increases to the inflow forecast for Lake Powell, Equalization may not be fully achieved by the end of the water year. The projected Lake Powell releases will be updated each month to reflect changing hydrology in order to achieve the operation specified by the Equalization Tier.

To view currently projected monthly Glen Canyon operations visit <http://www.usbr.gov/uc/water/crsp/studies/> and select the current month.

For further information on the Interim Guidelines and other documents that makeup the ‘Law of the River’ visit <http://www.usbr.gov/lc/riverops/>