

The Use of Modeling in the Support of Basinwide Negotiations

*An Example from the Colorado
River*

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Compact Requirements

- Apportions to the Upper Basin and to the Lower Basin the exclusive beneficial consumptive use of **7,500,000 acre-feet** per year each
- In addition to that apportionment, the Lower Basin is given the right to increase its beneficial consumptive use by one million acre-feet per year

Compact Requirements

- Water for Mexico “shall be supplied first from the waters over and above . . . [the apportionments to the Upper and Lower Basins]; and if such surplus shall prove insufficient . . . the burden of such deficiency. . . shall be equally borne by the Upper Basin and the Lower Basin. . . .”
- The states of the Upper Division will not cause the flow at Lee Ferry to be depleted below an aggregate of **75,000,000 acre-feet** for any ten consecutive years

Lake Powell Operating Criteria

- Equalization
- Minimum Objective Release – 8.23 MAF
 - 7.5 MAF/yr + $\frac{1}{2}$ of the Mexican Treaty?
 - Ability to Reduce

Lower Basin Apportionment (Lake Mead)

- Surplus – >7.5 MAF apportioned according to Interim Surplus Guidelines
- Normal – 7.5 MAF
 - California – 4.4 MAF
 - Arizona – 2.8 MAF
 - Nevada – 0.3 MAF
- Shortage – <7.5 MAF
 - No Criteria

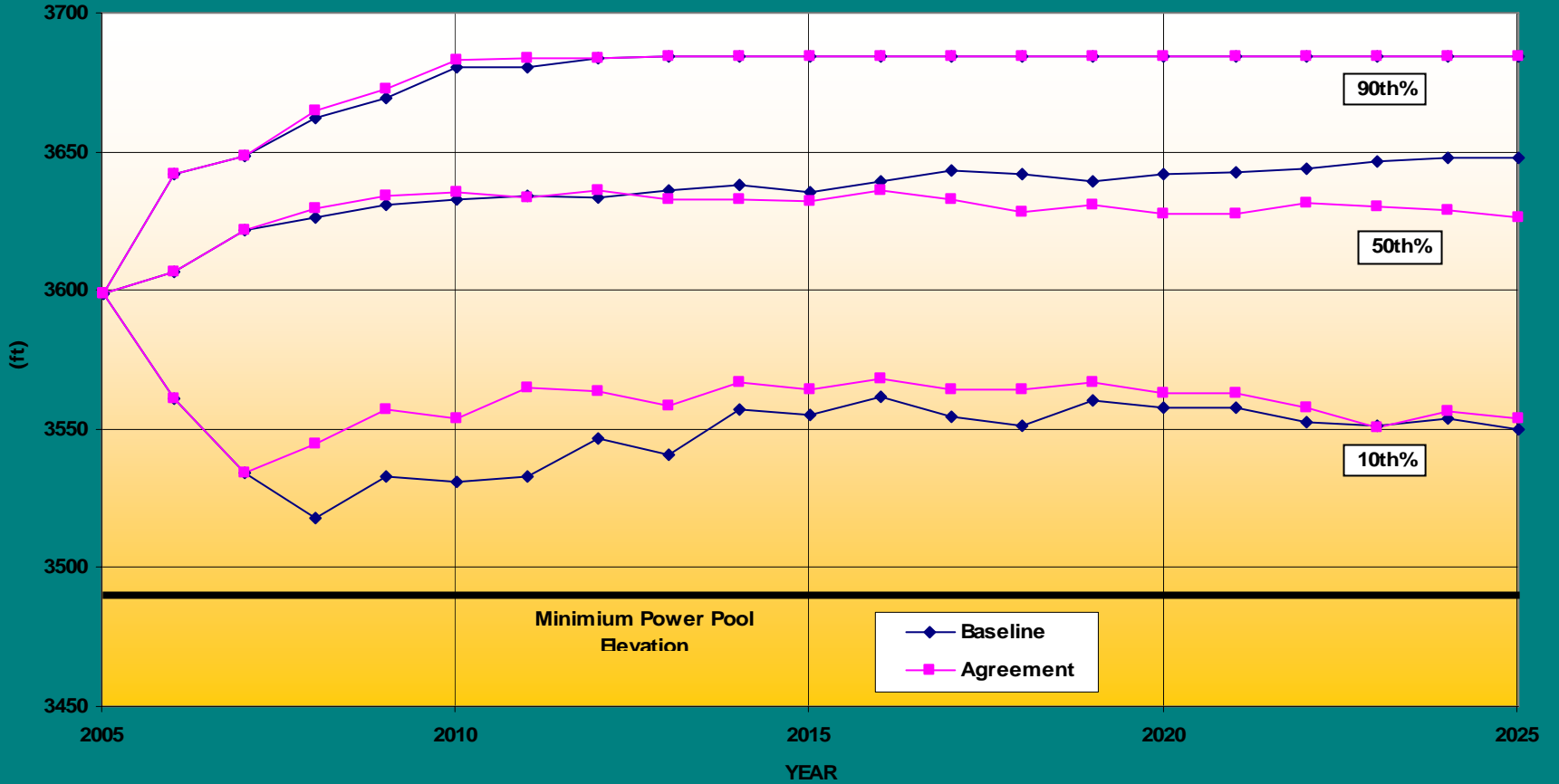
Mexican Treaty

- Guarantees an annual delivery of 1.5 MAF per annum
- Provides for an additional .2 MAF per annum when there is a surplus
- Allows the United States to reduce deliveries during an “extraordinary drought” by the same proportions as consumptive uses in the U.S. are reduced

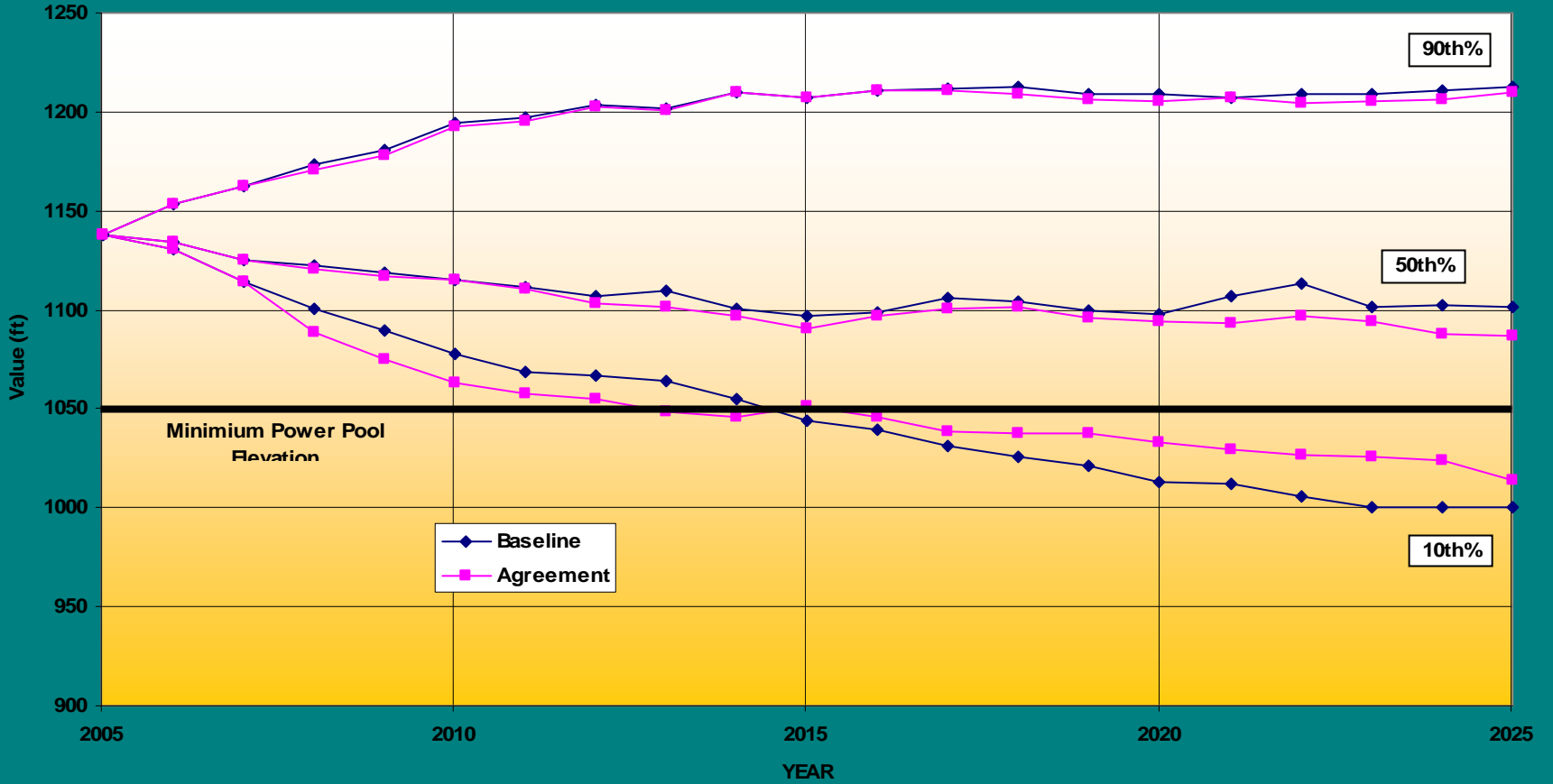
Key Modeling Assumptions

- Hydrologic Period of Record
- Upper Basin Depletions
- Reservoir Starting Elevations
- Maximum/Minimum Releases from Powell
- Equalization Levels from Powell
- Shortages to Mexico
- Shortages in Lower Basin
- Surplus Operations
- Protection of Power Pools
- Protection of SNWA Intake

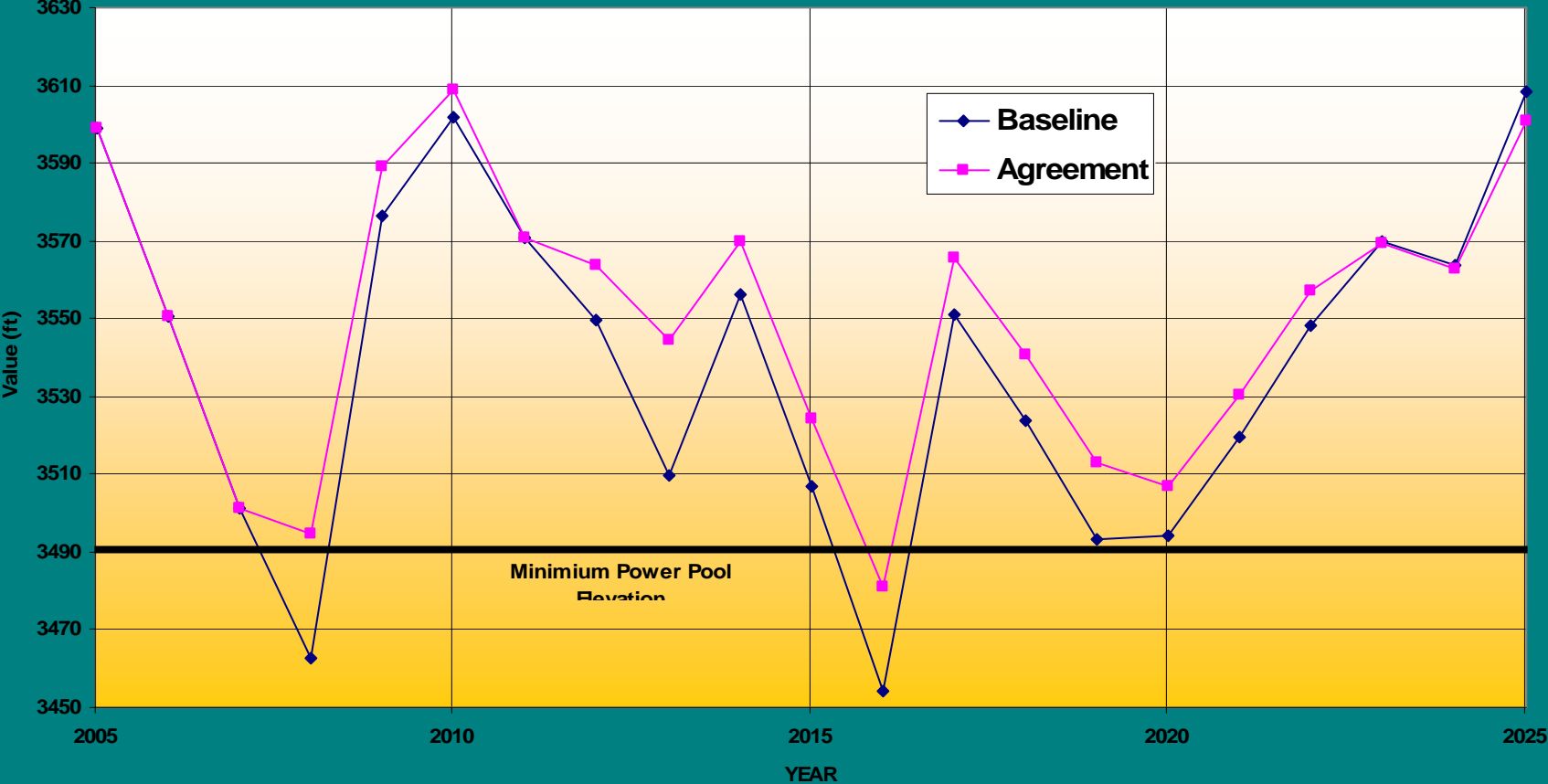
Powell Pool Elevations



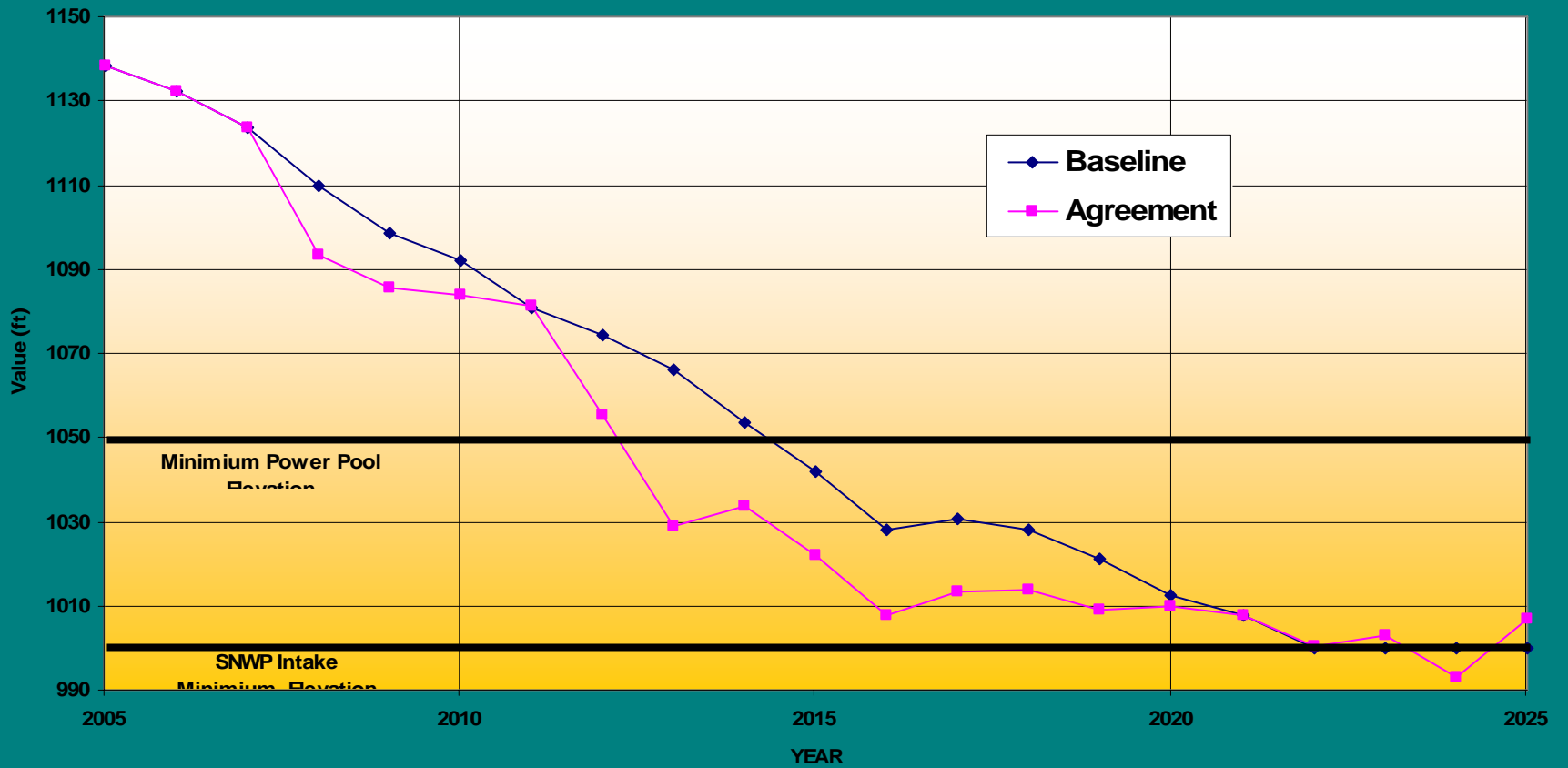
Mead Pool Elevation



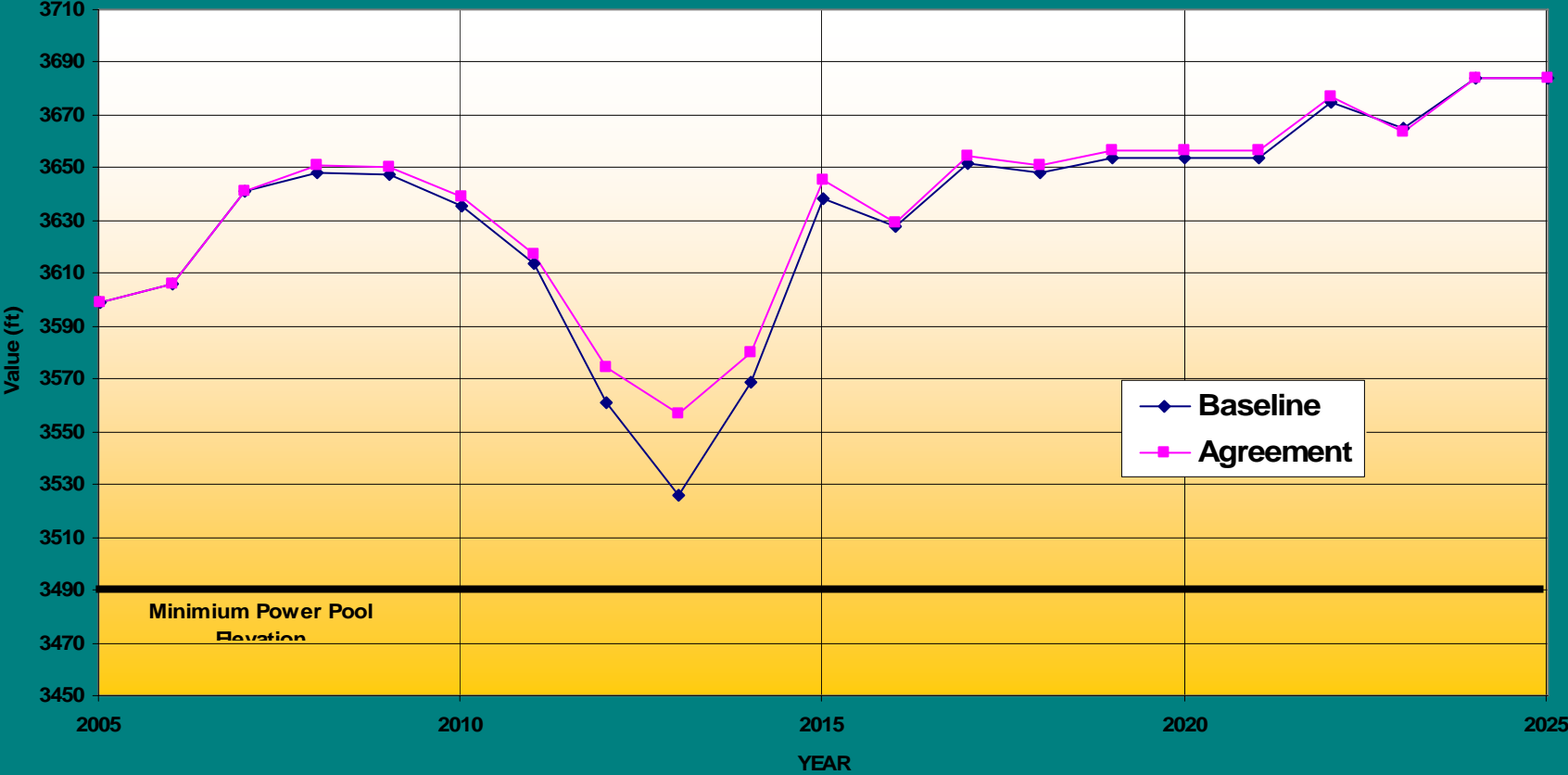
Powell Pool Elevation - Run 48



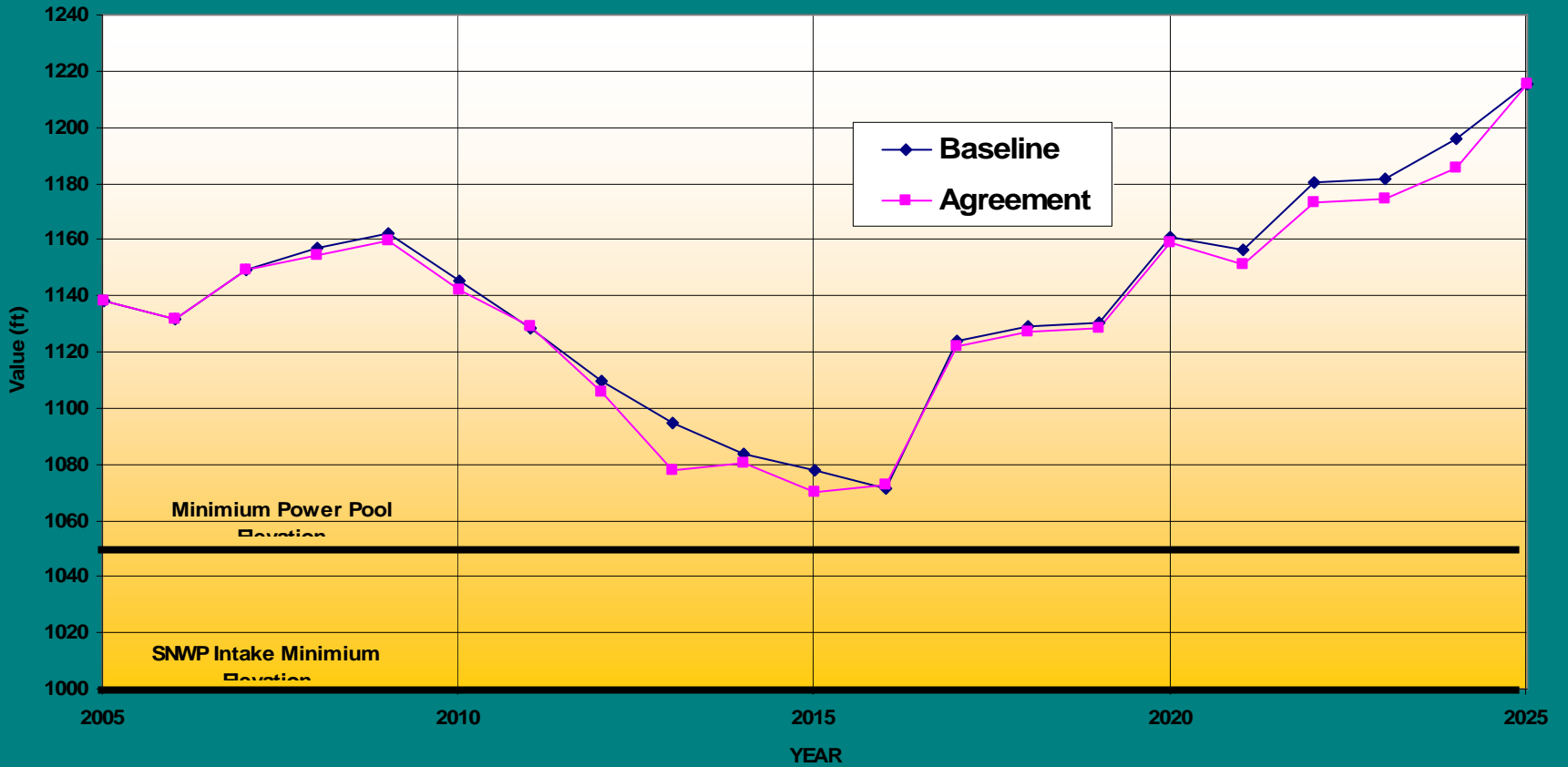
Mead Pool Elevation - Run 48



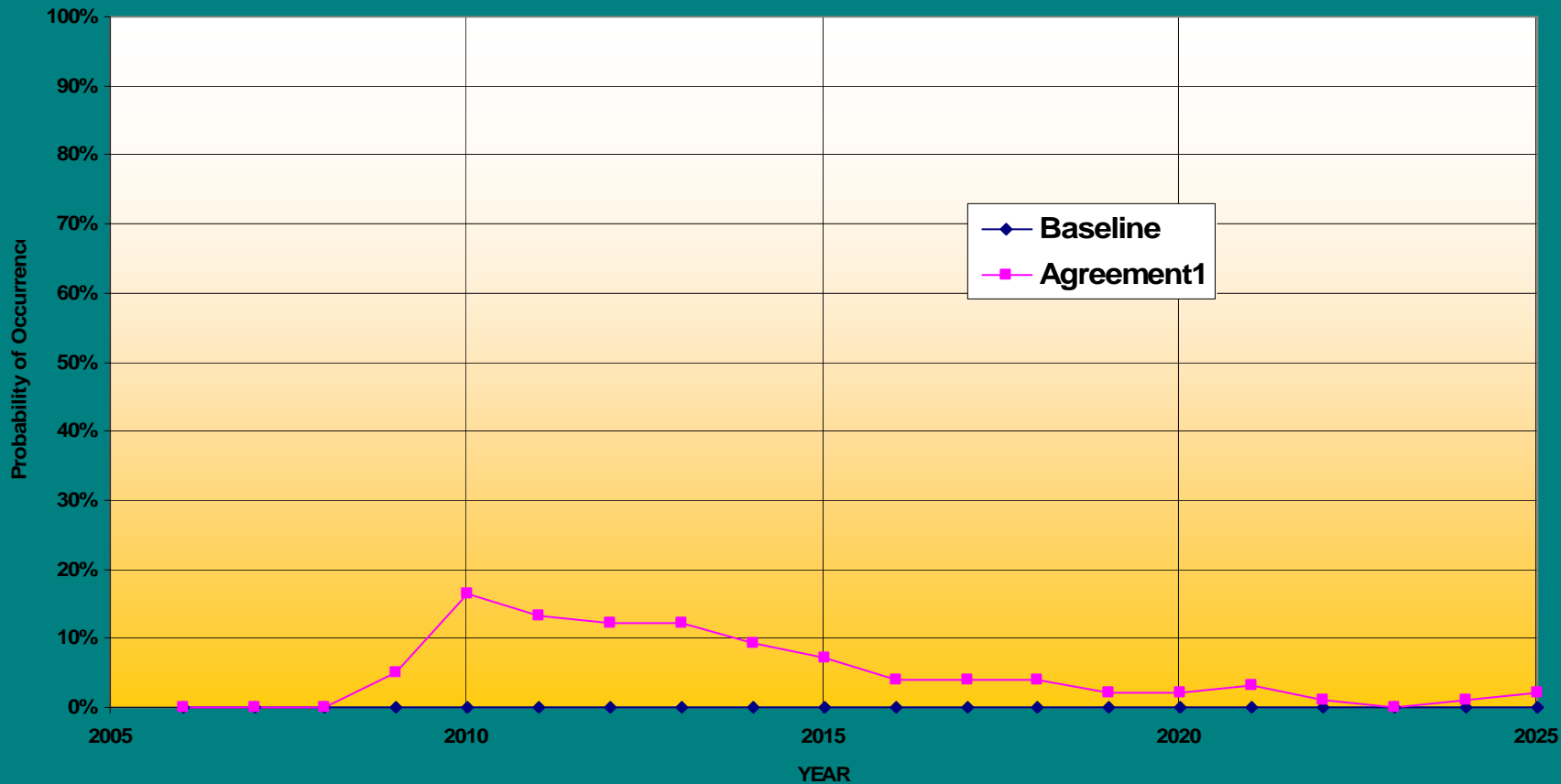
Powell Pool Elevation - Run 90



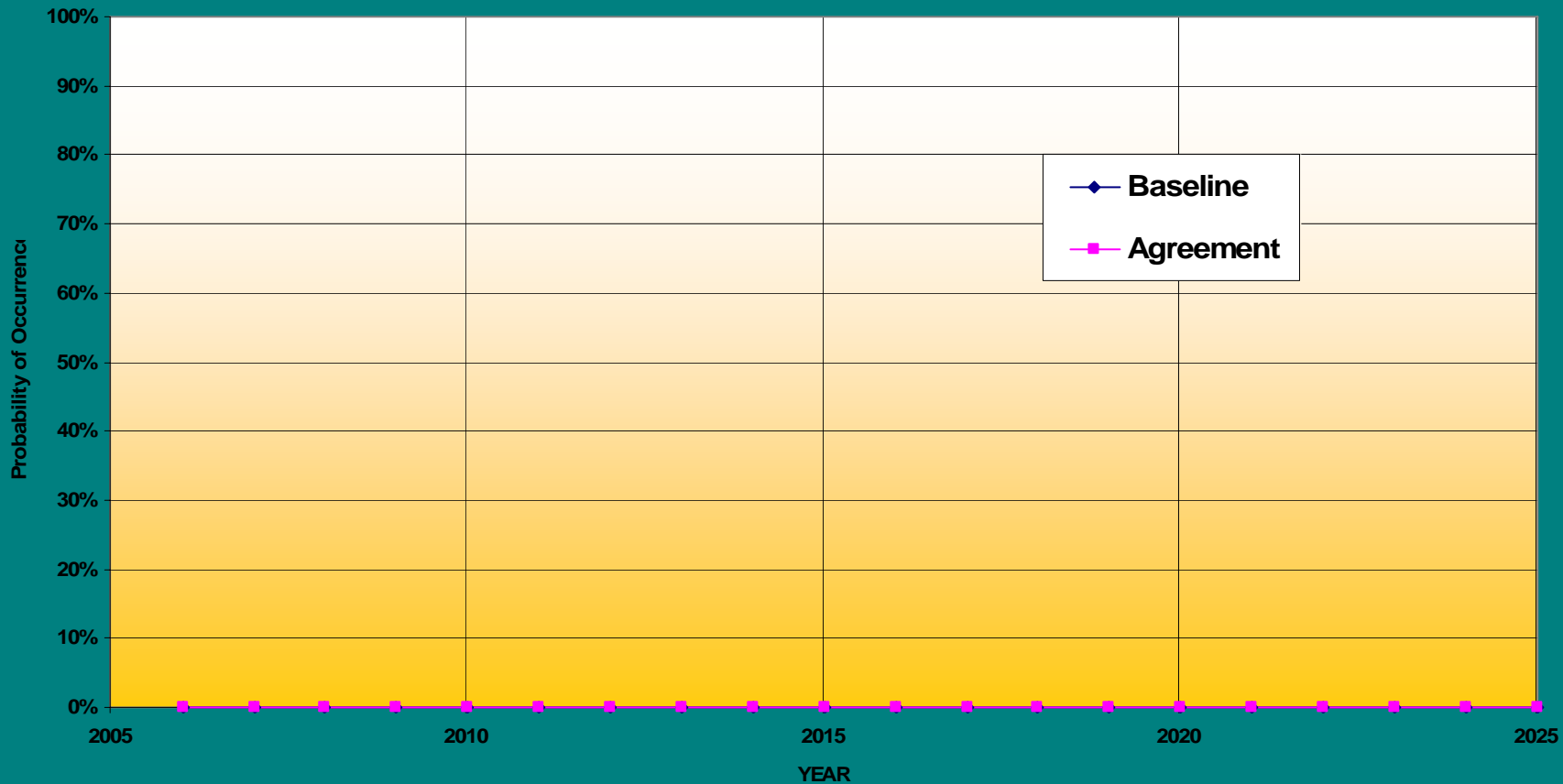
Mead Pool Elevation - Run 90



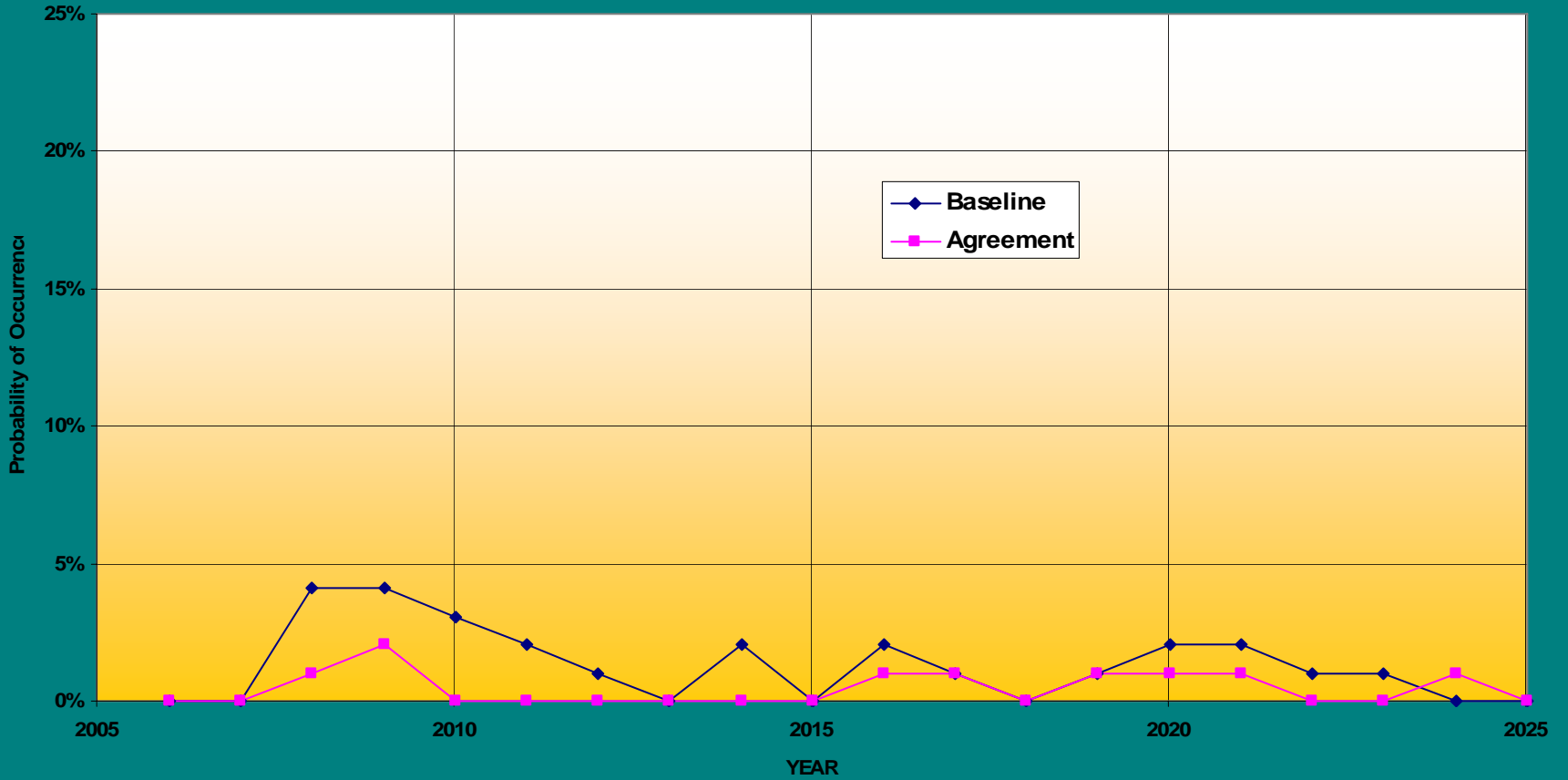
10-Year Powell Release
Probability of NOT Exceeding (<) 82,300,000 acre-ft



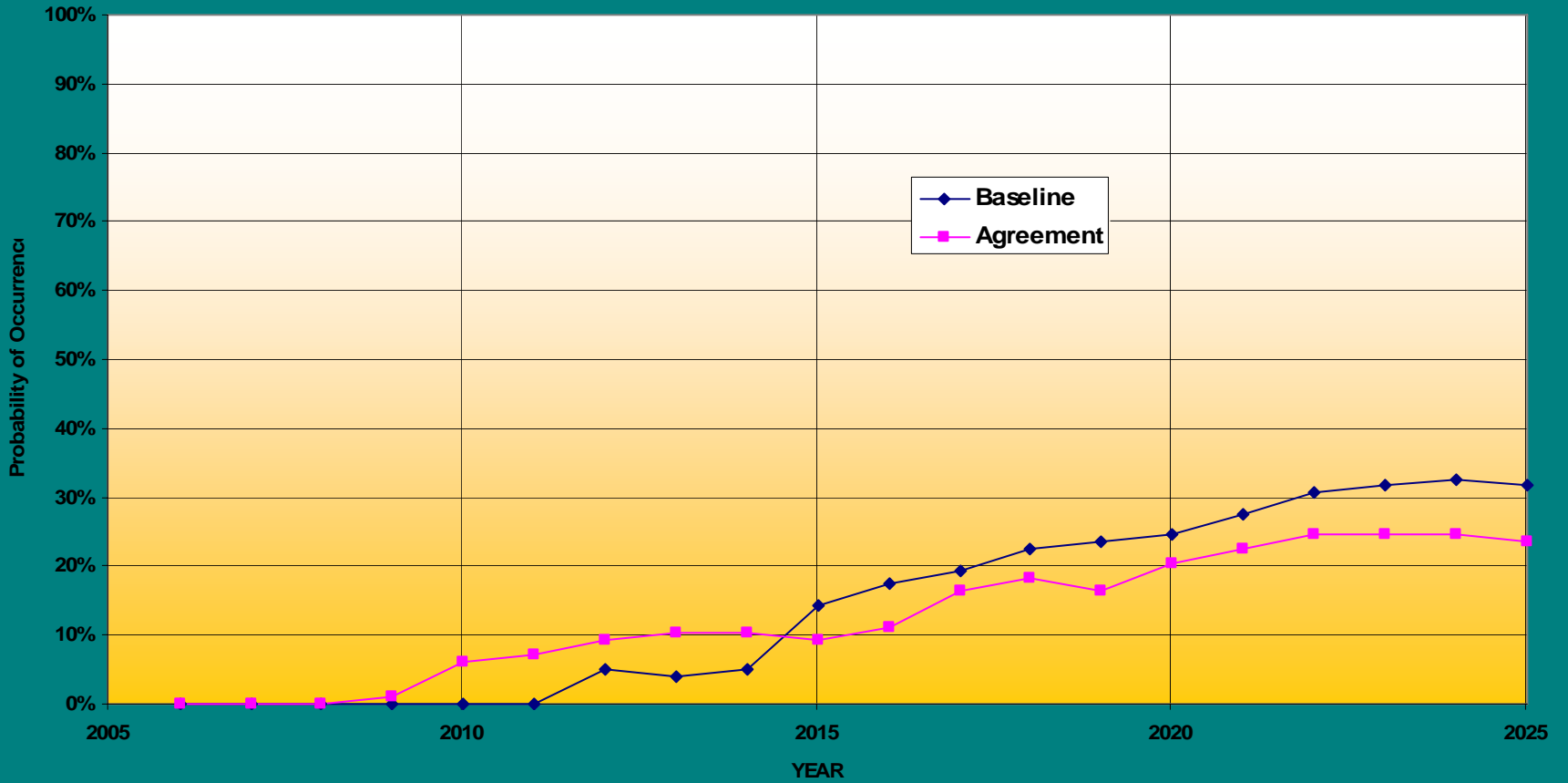
10-Year Powell Release
Probability of NOT Exceeding (<) 74,800,000 acre-ft



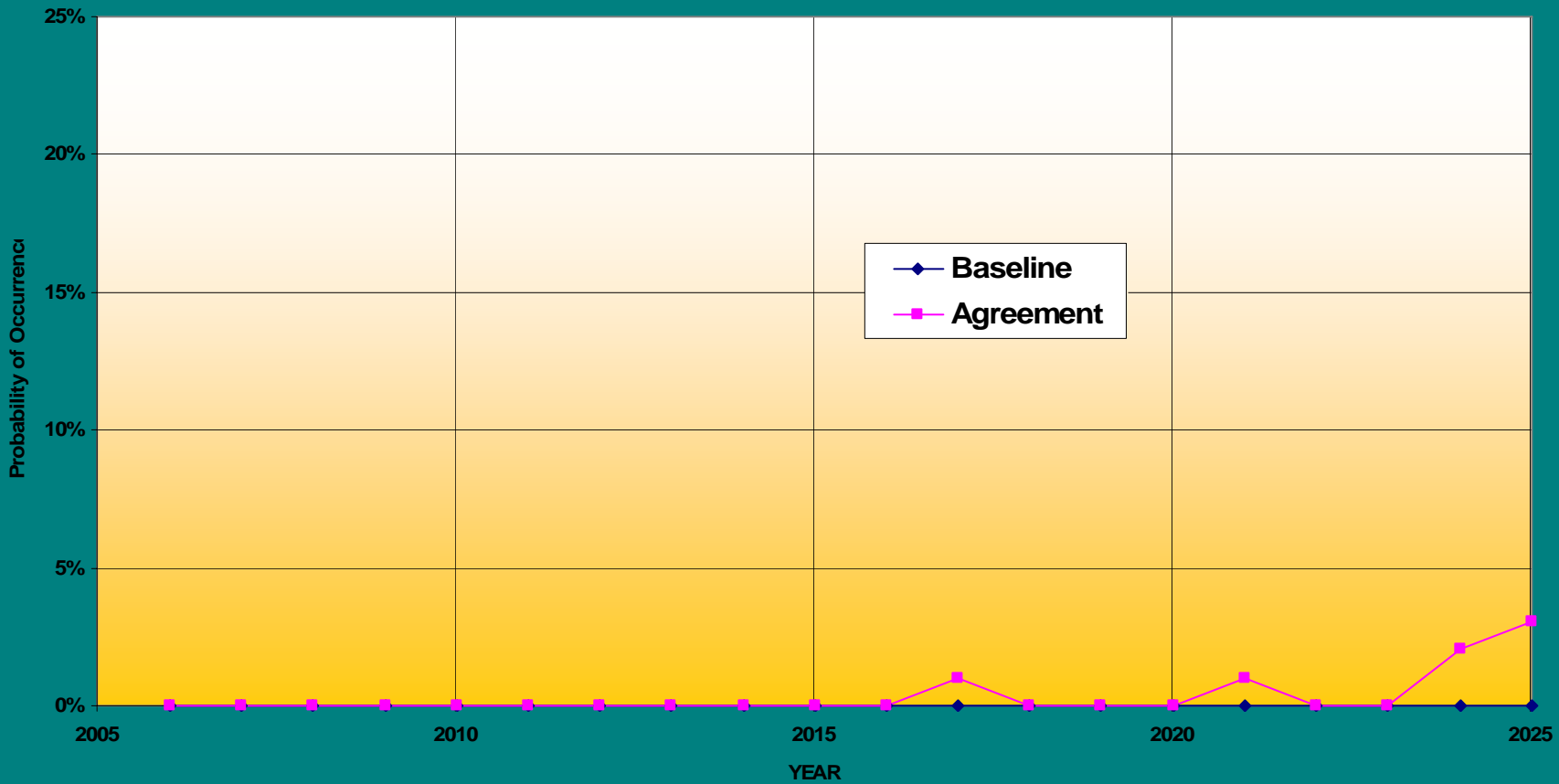
Probability of Powell Pool Elevation NOT Exceeding (<) 3490 ft



Probability of Mead Pool Elevation
NOT Exceeding (<) 1050 ft



Probability of Mead Pool Elevation
NOT Exceeding (<) 1000 ft



Conclusions

- Models can't provide "the answer"
- The utility of models is limited by their assumptions and data
- However, if the assumptions and limitations of the modeling are clearly understood, they can serve as the foundation for informed negotiation