

# 10-year Average Recharge Forecast

HCP Implementing Committee  
June 19, 2014

Jim Winterle

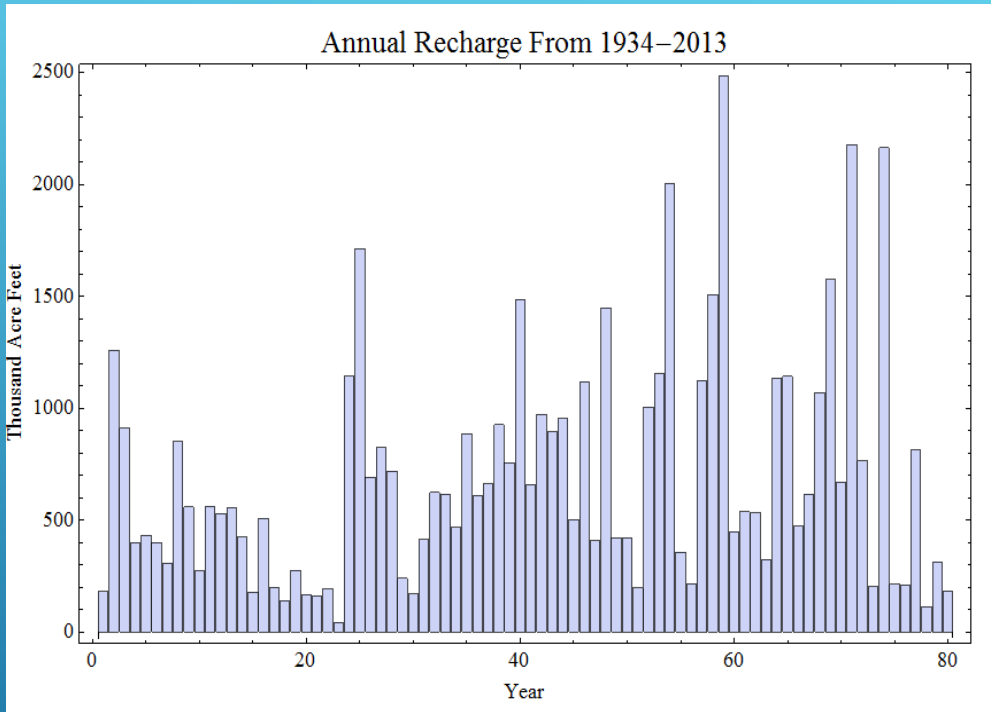
Modeling Supervisor

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# Goal: Calculate Probabilities of Hitting ASR Trigger Levels Based on 10-year average recharge estimates

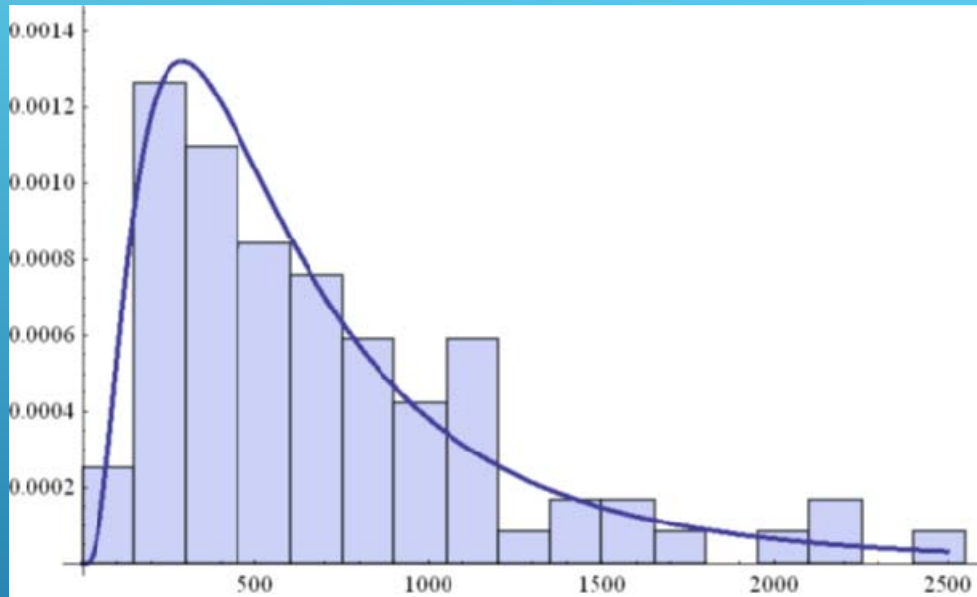
- ▶ 572,000 acre-feet: Tier 1 Leases (16,667 acre-feet)
- ▶ 500,000 acre-feet: ASR Implementation Trigger
  - ▶ also requires J-17 monthly average < 630 feet
- ▶ 472,000 acre-feet: Tier 2 Leases (16,667 acre-feet)



▶ Long Term Average =  
700,000 acre-feet/yr

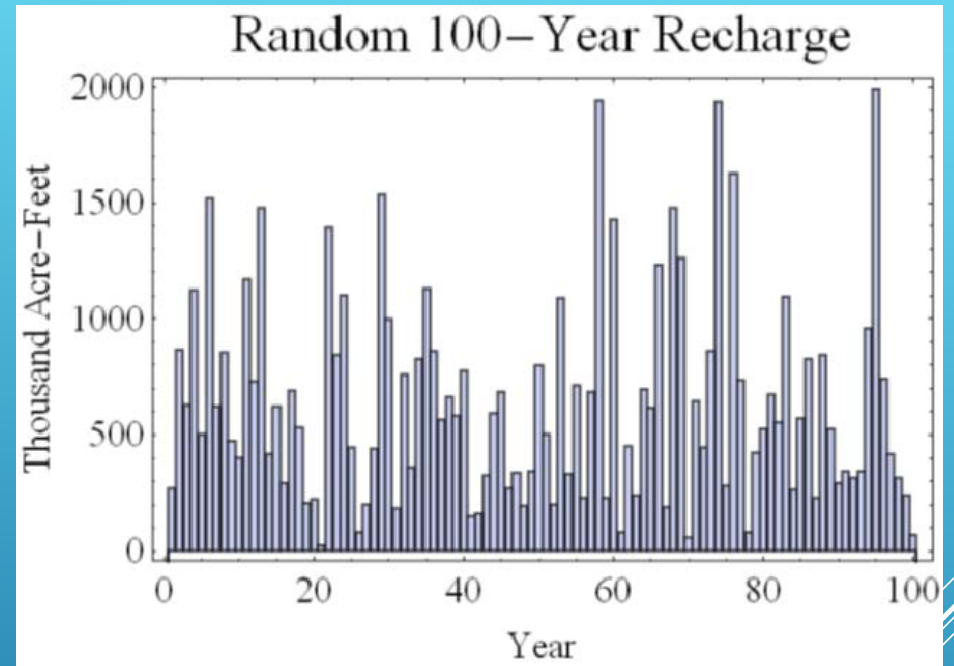
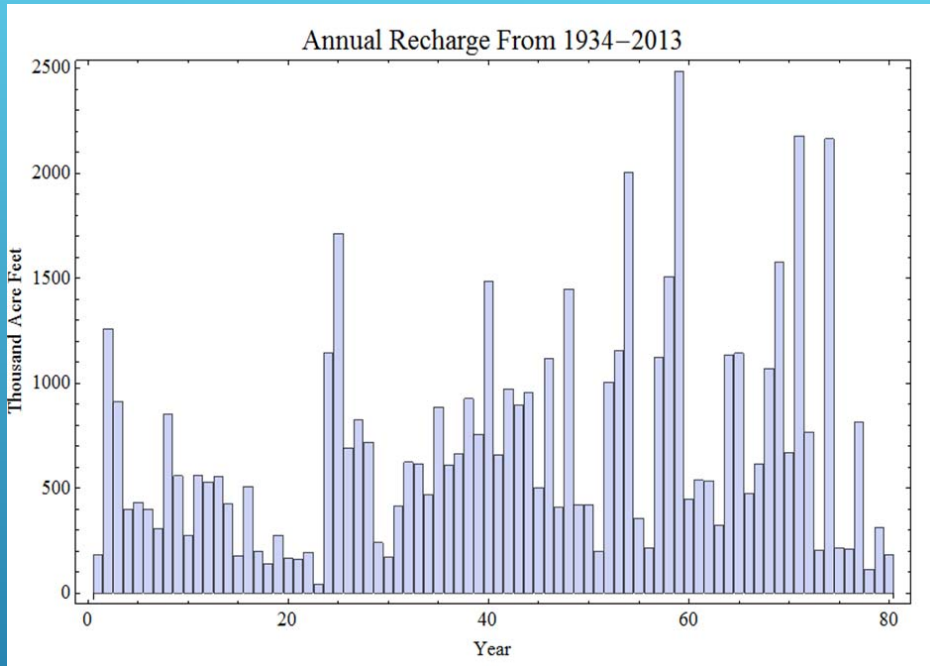
▶ Current 10-year Average =  
715,000 acre-feet/yr

Historical USGS recharge estimates  
using Puente (1978) method

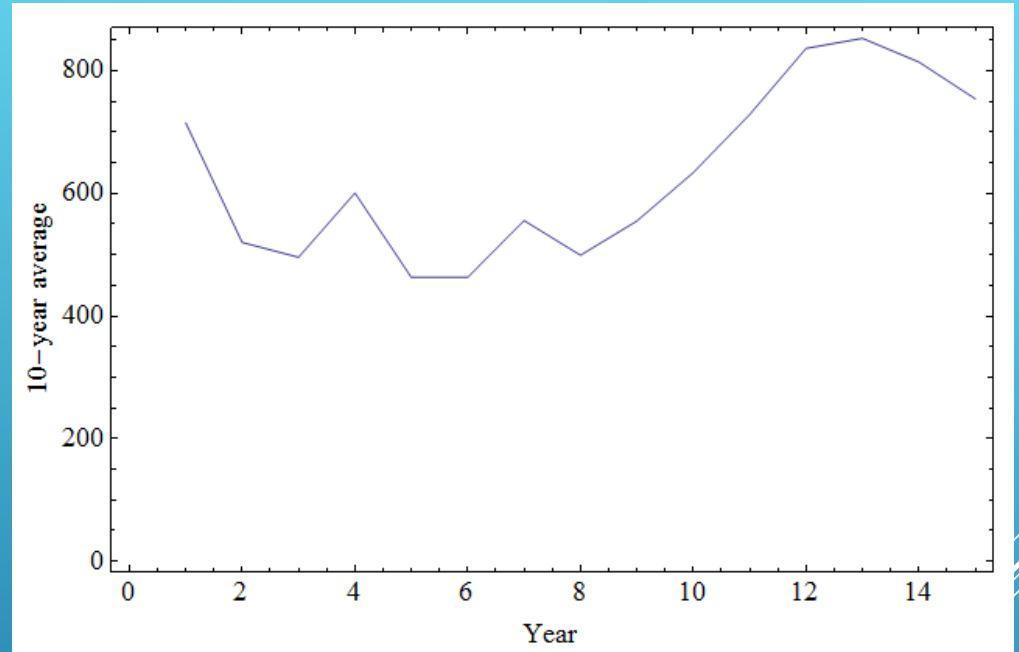
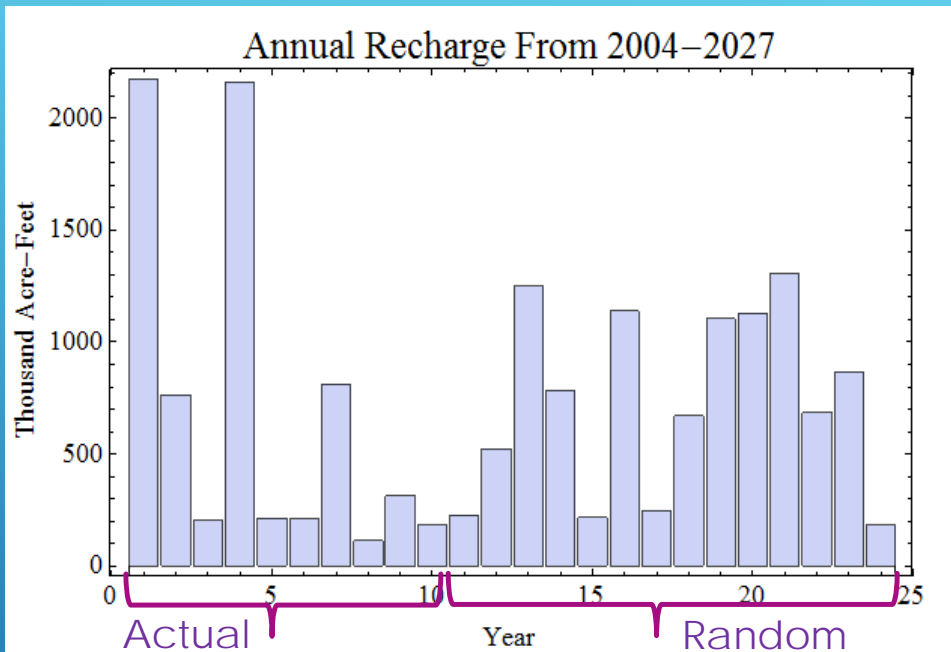


- ▶ Historical Data Fits Well to a Truncated Log-normal Distribution
- ▶ Can be used to randomly generate potential future recharge

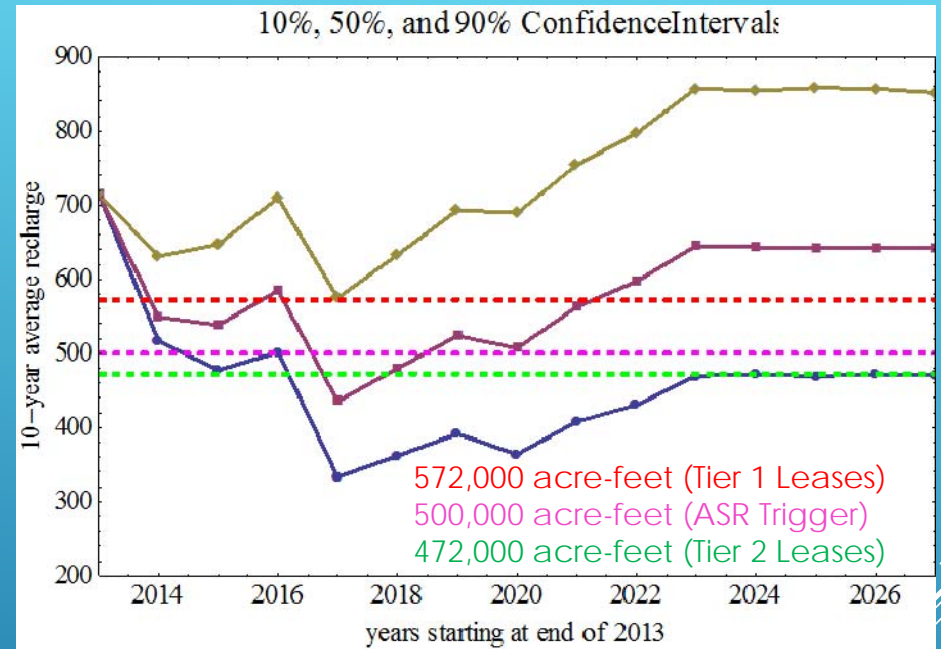
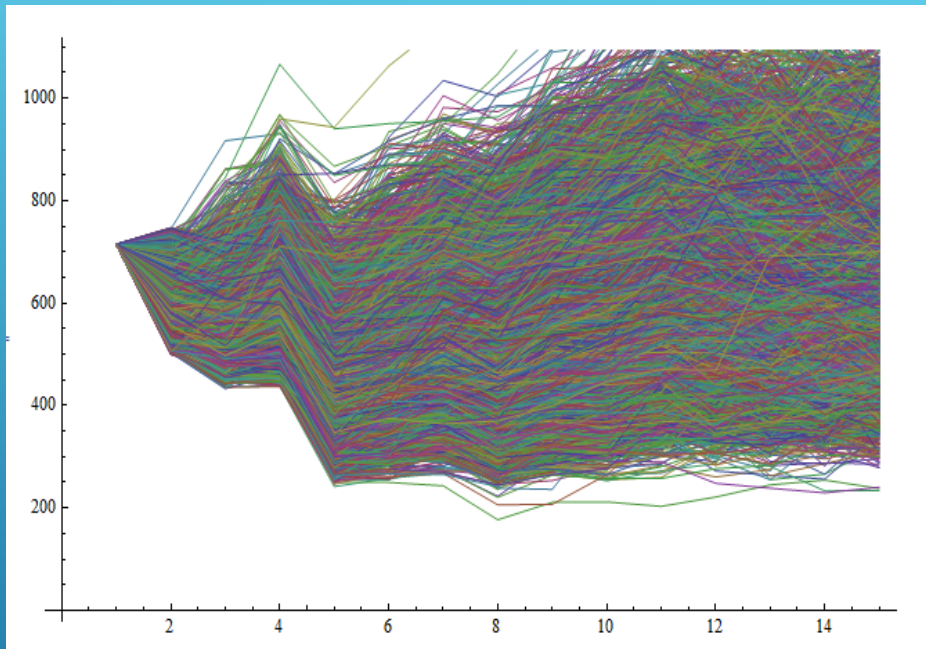
Historical USGS recharge estimates using Puente (1978) method



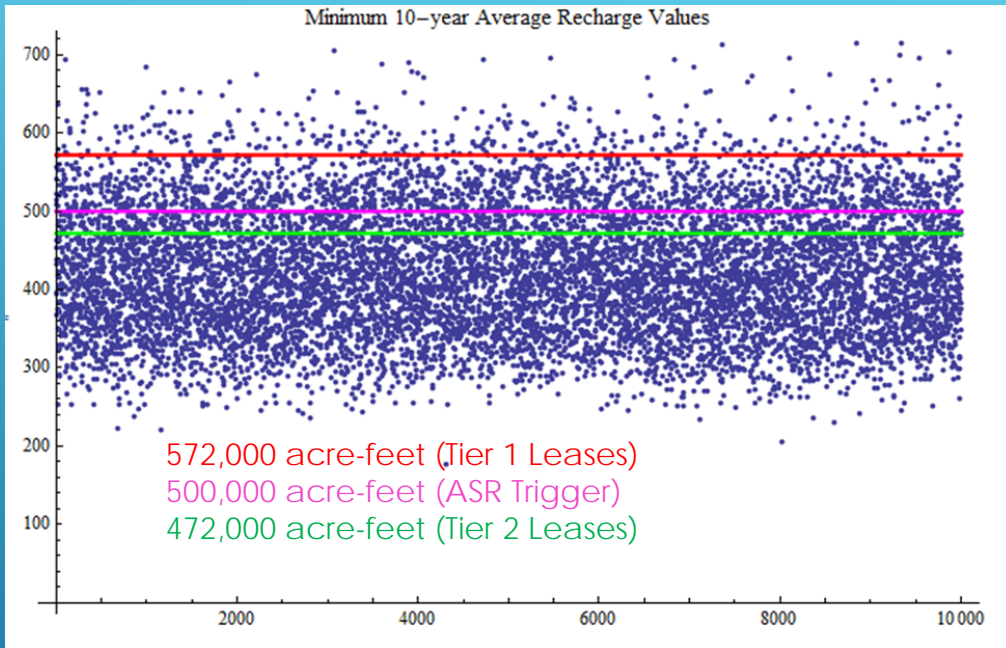
## Comparison of Historical to Randomly Generated Recharge



Start with actual recharge for past 10 years and run forward with randomly generated recharge for 14 years remaining in HCP period



Now do that 10,000 times



- ▶ Percentage of points that fall below the various trigger levels reflects the probability of occurring in one or more years during the 14-year period

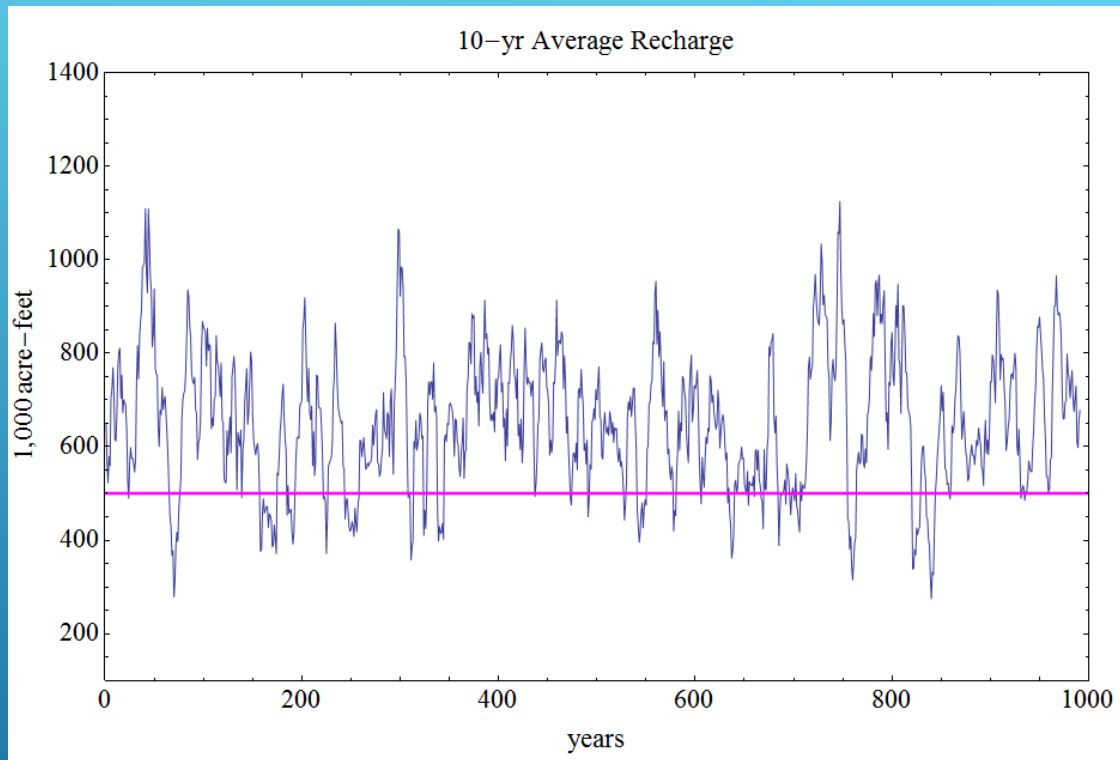
Minimum 10-year average values for  
10,000 randomly generated futures



	14-year ITP Period	Next year	Next two years
Prob. (R<572k)	96%	69%	80%
Prob. (R<500k)	81%	0	24%
Prob. (R<472k)	71%	0	7%

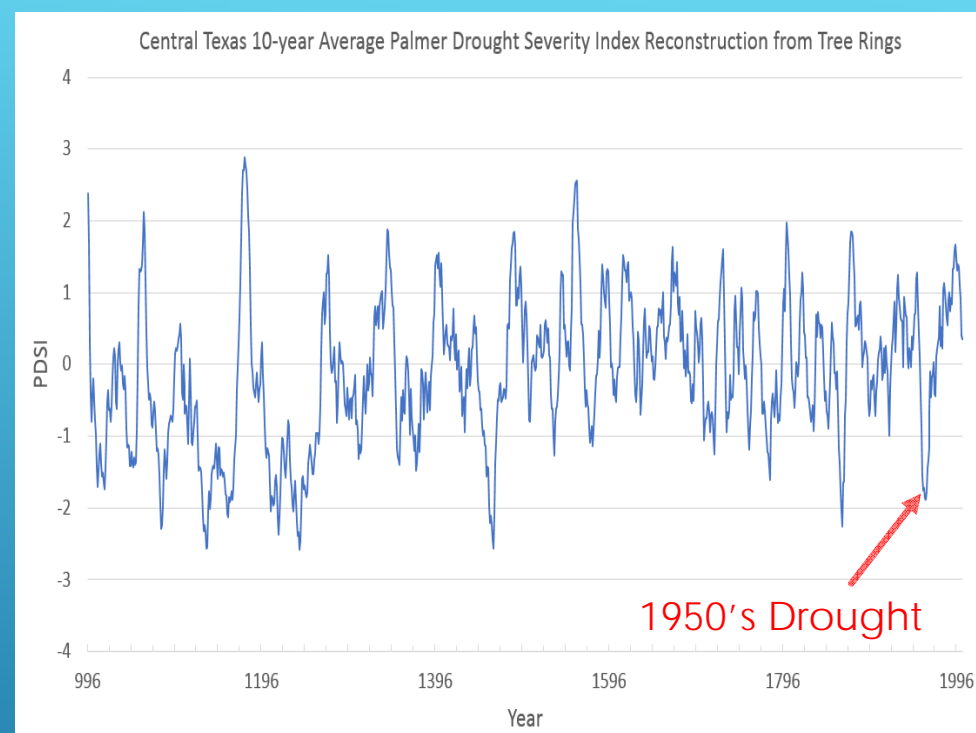
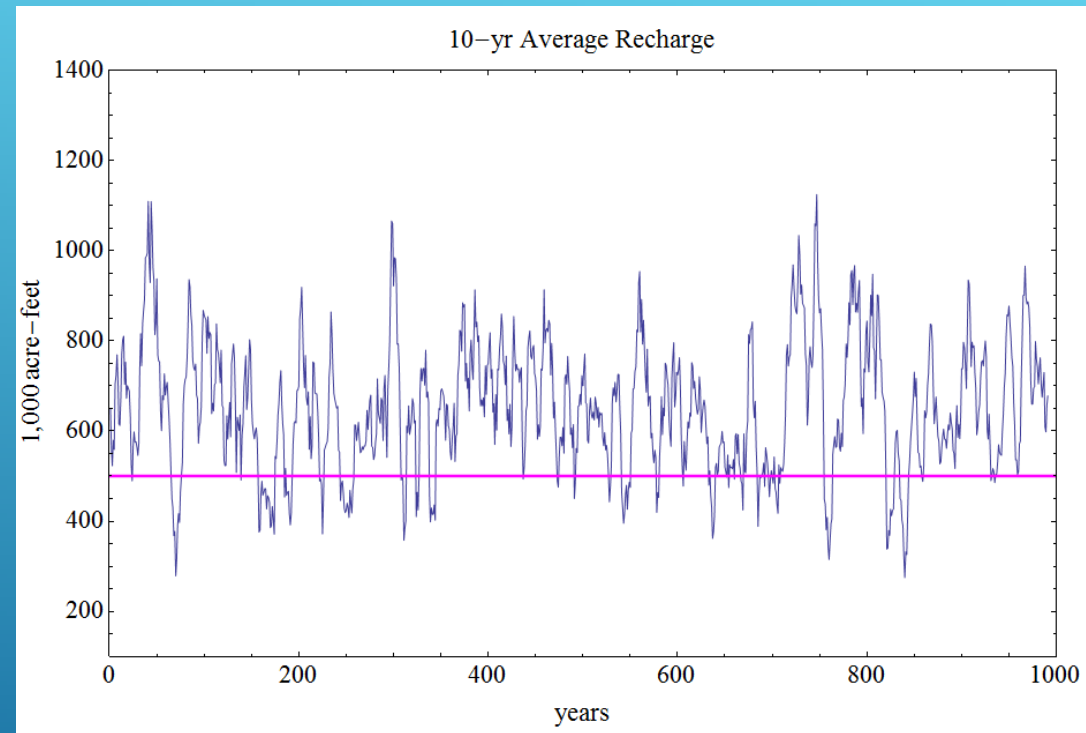
Probabilities of hitting ASR trigger points:

- during remaining 14 years of ITP
- next year
- in the next two years



- ▶ Statistically, we can expect to be in the  $R < 500,000$  acre-feet condition about 15% of the time over the long term
- ▶ Droughts lasting several years typically separated by several decades to over a century

Recurrence interval of 500,000 acre-foot drought trigger



Qualitative Comparison of Recharge Statistics to Historical Drought Severity Index Reconstructed from Tree Rings

# Bottom Line

- ▶ There is a good chance of hitting all three of the ASR trigger levels at least once during the remaining 14 years of the ITP
- ▶ Probabilities of all three triggers hitting become better than even in 2018 after the wet year 2007 falls out of the 10-year average
- ▶ In the next year (2015) only the Tier 1 Trigger Lease is likely
- ▶ Small chance of Tier 2 and ASR Implementation triggers hitting in two years (2016)
- ▶ A good recharge year this year would change the outlook