Notes from August 25th, 2021 to September 1st, 2021

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Notes from Sankar Meeting

- Proposal defense document (powerpoint)
  - coregs, predict release, nwm, res opt
  - 10 days ahead give draft
    * ETD document
- If we are in 1 bin, what is the probability of being in another bin in the next time step
  - Break it down into sub-bins for important leafs
  - Look at last 0.05 percentiles in each group, what is probability of jumping to the next

My Questions

- EDT document
  - Chapter 1
    * COREGS
  - Chapter 2
    * Predict Release
  - Chapter 3
    * Generalized Release Curves for CONUS
  - Chapter 4
    * Reservoir Optimization Algorithms
  - General Question
    * Am I condensing the journal articles into these chapters?
      · e.g., Take the coregs document and condense/synthesize it into a tangible story line for chapter 1
- Bin probabilities
  - I looked at this several different ways
    * First is simply the probability of being in a different leaf tomorrow given I am in a current leaf today
      · e.g., $P(L5_{t+1}|L4_t)$
      · Takeaway from this is pretty much what we would expect:
        · You are most likely to be in the same bin tomorrow than any single bin
        · Only Leaf 4 has a less than 50 % chance of being a leaf 4 again tomorrow
        · If you do change leafs, you are most likely going to move to an adjacent leaf rather than a large jump
    * Second I looked at the probability of transitioning if you are in the upper and lower 1/3s of the leaf
      · Again, takeaways here are expected:
        · Reasonable chance of moving up or down a leaf if you are in the upper or lower 1/3, respectively
        · No 1/3 has a more than 25% chance of transitioning up or down
      · One interesting observation is that the probabilty of moving to the next leaf follows a pretty nice pattern with it peaking near the middle leafs and being the lowest on the end (for both the upper and lower 1/3)
        · The t prob of moving to a lower leaf does not follow a nice pattern

* Third, I looked at the combination of the two plots above
  - The t prob of each third within a leaf to every other leaf.
  - This plot is a bit harder to dig into than the other two, but it shows a lot of information
    - EXPLANTION:
      - rows are the next leaf and columns are the start leaf
      - So when the label is “Next Leaf = 3 | Start Leaf = 2”, the plot shows the probability of each third within leaf 2 of transitioning to leaf 3
    - Immediately noticed is the patterns along each row.

– X metrics for each transition

Transition	$S_{t-1} - \bar{S}_7$	$S_{t-1} \times I_t$	R_{t-1}	$\bar{R}_7$	I_t	$\bar{I}_7$	S_{t-1}
Down	-0.030 ± 0.078	-0.026 ± 1.008	0.456 ± 0.860	0.256 ± 0.919	-0.011 ± 1.043	-0.039 ± 0.863	-0.042 ± 1.013
Same	0.005 ± 0.089	-0.031 ± 0.909	-0.060 ± 1.069	-0.080 ± 1.070	-0.034 ± 0.912	-0.009 ± 1.011	0.000 ± 0.992
Up	0.017 ± 0.106	0.122 ± 1.223	-0.283 ± 0.721	-0.013 ± 0.791	0.114 ± 1.188	0.066 ± 1.080	0.043 ± 1.009

– Overall, there are not distinct relationships. When storage is high (either absolutely or relatively) it becomes more likely that we transition to a higher leaf (higher release bracket). This is logical

– There is an interesting relationship between transition and Release
  * When we transition to a lower node, yesterdays release is higher on average.
  * The same can be said for rolling release.