Initial Approved Topics for the AMT 2022-2026	
Topic	Description
CROP	
Crop nutrient application	Simplifying the algorithm for assigning nutrients to each crop type. Currently, the algorithm is designed to follow the way a farm is managed and account for all the variables each individual farm does. However, this has led to unexpected results. The model is not sensitive to all the variables modeled.
Agricultural plant categories	The crop to land use relationship is established. The term crop is a general term and includes items that are not agronomically considered a crop, like hay, pasture, and turfgrass in urban areas. All but the urban turfgrass are items from the NASS census. Questions have arisen over "wild hay." It is currently mapped to Ag Open Space but the presentation by Mr. Leon Tillman of NRCS given to the Watershed Technical Workgroup suggests that it is better mapped to the land use Other Hay. Wild hay is neither wild, nor unmanaged.
Legume nitrogen fixation	The amount of nitrogen fixed by leguminous crops has been debated because the jurisdictions perceive this as an input that is not controllable. It is based on acres of leguminous crops and a nitrogen fixation rate per leguminous crop type. The amount fixed is reduced if manure or inorganic fertilizer is applied.
Timing of crop nutrient applications	The nutrient application timing is based on agronomic practices of split application. However, CAST functions on an average annual basis. Inputs to the time-variable Watershed Model do not use the different nutrient application timing. Loads are difficult to understand, predict, and explain because there are multiple application timings with different nutrient sources for each, depending on the crop and state. Elimination of the crop nutrient application timing is recommended. However, process modelers note that farms do not function on an annual basis and there are multiple nutrient applications. Farms are not modeled on an individual basis; we model segments and the agricultural input data is county scale. There is a BMP for nutrient

	management application timing that reduces the load.
Double cropping	Update major field crops acceptable for double cropping and the acreage areas for double cropping
Climate change effects on crop types	Incorporate climate change estimates into agricultural forecasting in order to incorporate changes to crop types.
Crop uptake vs removal	There is a desire to reevaluate the current crop removal values associated with different types of crops within CAST.
ANIMAL	
Reevaluate animal types	The list of animal types may no longer align with those used by the National Agricultural Statistical Service. The list is long and most CAST users are not interested in two types of bovine, for example.
Feeding operations	The acres and locations of production area (afo/cafo) could be determined using the land cover data. This was not practical or possible in earlier versions of the model.
Size	Current data regarding animal size utilizes data that is potentially outdated, this could be updated.
MANURE	
Dissolved Air Flocculants (DAF).	This is the material captured from poultry houses' air emission systems and then washed into wastewater. There are methods for addressing these, and I suspect that BMPs will be proposed in the future.
Manure Storage	Evaluate ammonia volatilization during manure storage as well as address nutrient species composition over time during manure storage.
Nitrogen mineralization	Examine N mineralization from the previous year as a credited reduction. Keep in mind that the model stands alone for each year.

Transport	Current accounting for manure transport is not comprehensive and requires better data to be accurately represented.
Storage and handling losses	Calculate handling and storage losses of manure before ammonia losses.
INORGANIC FERTILIZER	
Soil and Water Extractable Phosphorus	The use of the water extractable phosphorus (WEP) and soil phosphorus inputs are not well understood. The modeled phosphorus loads are difficult to predict without running the model, unlike the nitrogen loads. Additional data soruces should be explored.
Fertilizer breakdown	Change the prepared inorganic fertilizer data so that it is an amount for each state, rather than an amount that is watershed wide. The current method generates situations where the amount of fertilizer applied to a crop can be 800% of the recommended amount. A cap could be considered. The 800% is usually (always) caused by manure so if the state addresses manure, then we meet the 800% with inorganic nutrients. A cap of something like 200% should be explored. That would make the manure transport BMP meaningful.
Revisit AAPFCO NH4 to NO3	Compare association of American plant food control officials fertilizer species to calculate the actual ratio of ammonium to nitrate (Compare to 75/25 split assumed)
Biologicals	We will examine the pontetial use of biological fertilizers, pesticides, stimulants amongst others as agricultural suppliments.
MODELING	
Nutrient Application	In phase 6 the nutrient application model became very complex decreasing transparency. There is widespread desire to find a simplified nutrient application model.
Land Use	Utilize updated high resolution land satellite imagery in order to simplify and accurately represent land uses.
Cover factors	Reexamine land cover factors for sediment erosion model. Determining if additional soil data sources are available and/or utilized by other groups that could cover the entire watershed to calculate cover factors. See if we need to adjust the RUSLE land group mappings

	to CAST land group mappings. Examine if Crop Managmnet Zones (CMZs) should remain the same or if they are changing.
Alternative agricultural data sources	We are always stiving to incorporate the best available data into model calculations. This topic refers to any and all applicable data investigations that can improve upon existing agricultural data or topics.
Model Structure	We would like to ensure that the model processes are transparent, a large part of this relies on a broad audience being able to understand what the model is doing. We examine the potential for different ways to ensure this is the case. We will also need to remain cognizant of any changes from the modeling WG to the model and how this alters data input needs.