Summary Goals for March Meeting- internal slide

- Re-emphasize what has been done- especially document 2 Data Input QAPP for QA/QC
- **Track 1**: Ask for input
  - Do we want to pursue this track?
  - Is what we have enough? If not- what else do we need to address this part of the charge?
- **Track 2:** Reframe to add clarity, then ask for input
  - **Present scenarios where we would have to apply these protocols**
    - **Ex. WV fertilizer – applied the agreed upon CBP protocols and got a result that was problematic (data is used and applied the way we agree to apply it and got an unreasonable result)**
    - **Ex. 2 Farm fertilizer- omission of 2013-14 data for VA**
  - Types of situations we are trying to be ready for by **developing terminology** and process to deal with these issues- what process would we follow if we could do it again to make it go better and what time frame
  - Terminology- what do we need to define to obtain objective criteria for gauging model output/results
  - Process- to determine if errors in inputs or model processes have produced faulty results
  - **Model results don't "reflect on the ground conditions"- we don't or shouldn't engage in this if no errors or evidence beyond anecdotal evidence can be produced**
- **Input:**
  - Agreement of steps? Feedback?
  - Settle on keys terms we need to define?

August 29 PSC Action & Decision #3: Narrative Overview & Purpose

- **Decision**: The partnership will **update the process for incorporating data into CAST to include additional safeguards to prevent data analysis errors** and **to assess reasonability of modeling results after CBP protocols are applied. [underline added]**

- **Action**: The Management Board will determine the appropriate existing GIT and/or workgroup, to develop proposed solutions including additional safeguards to prevent data analysis errors and to assess reasonability of modeling results after CBP protocols are applied **WQGIT → WTWG, STAR, STAC and other WG's as needed**

RECAP from February Meeting:

- Divide the PSC Decision 3 Charge into 2 main objectives- Track 1 and Track 2
- Timeline for Completion: WTWG- June 2023 → WQGIT→MB September 2023

Track 1	Track 2
Inventory of CBP QA/QC documentation	Identify and define key evaluative terms
Identify areas of weakness in documentation for key inputs	Identify appropriate groups to develop parameters
Identify appropriate groups to address weaknesses	Develop parameters for determining validity of results
Develop additional QA/QC protocols	
Approval by WTWG- June 23→ WQGIT	Approval by WTWG- June 23→ WQGIT

- **Feedback: Process, Timeline and Steps- requested additional member input via email by Feb. 16th**
- Presented a quick summary of existing CBP QA/QC materials- made available on the calendar page for review

Step 1 of Track 1: Data Input Quality Control Quality Assurance Inventory- (posted on the calendar page)

1. **CBPO Quality Assurance Manual Final 4-8-20:** https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/CBPO_Quality_Manual_Final_08April2020.pdf
   - **Describes general quality assurance requirements for all data collection within Bay Program Framework**

2. **Nonpoint Source Data Analysis Quality Assurance Program Plan- revised 11-22**
   - **Intended for CBP grantees who receive, process, and enter data into CAST**

3. **Phase 6 Model Documentation- Part 3 Terrestrial Inputs:** https://cast.chesapeakebay.net/Documentation/ModelDocumentation
   - **Describes in detail the methodology and processes for applying data inputs in the model**
   - **Key Terrestrial inputs** – atmospheric deposition, legume fixation, fertilizer, manure, biosolids, and residual soil nutrients

4. **Additional QA/QC Documents that deal specifically with the submission and verification of BMP data to the CBP for annual progress**

Document 2: *Nonpoint Source Data Analysis Quality Assurance Program Plan- revised 11-22*

Intended for CBP grantees who receive, process, and enter model (CAST) data

- Procedures apply to key project staff responsible for project management, investigations, data processing and verification, and overall QA/QC of data.

QAPP Areas of Focus:

- **Project Management**: Staff, Organization, Objectives/Background, Description, and Schedule
- **Data Acquisition and Management**: Non-Direct Measurements (Data Acquisition Requirements), Crop Yields, Nutrient Inputs, Land Uses, High Resolution Land Cover & Land Use, Mapped Land Use Classes, Estimating & Forecasting Agricultural Acres, Non-Point Source Data Quality Checks, Combining Agricultural Land Uses with Mapped Land Uses (True Up Procedure & Post True Up Processes),
- **BMP's**: Types of BMPs, Protocol for Adding or Modifying, Application Methods, Spatial Distribution, Land-Use Groups, Order of Land-Use Change BMPs
- **Model Outputs** (CAST Report availability information)

Recently Revised: Table 3: Data Updates Frequency (includes column on Data Quality Checks)

Non-Point Source Data Quality Checks: Missing Data Check, Outliers

Follow-up:

Action: Please provide any additional feedback on the Management Board (MB) Decision 3 Charge timeline and proposed path forward to WTWG leadership (rcassilly@chesapeakebay.net; cassandra.davis@dec.ny.gov; pickford.jacqueline@epa.gov) **by Thursday, February 16th.**

Additional note: As per the charge from the MB, the WTWG will **not** be focusing on changing or reevaluating data sources or inputs to the model for this task, but rather, focusing on the QA/QC processes and protocols in place after we acquire such data. Please provide feedback accordingly

Feedback:

-We did not receive any **jurisdictional feedback** on the proposed tracks for PSC Decision 3 via post meeting email input

- We did receive input on both Tracks during the February meeting

February Meeting Input Summary:

Track 1:

- Every model input should be held to the same standard for QA and documentation (QAPP for BMP reporting is the standard).
- Part of the JamBoard seemed like there wasn't a good understanding of what QAPP and QA/QC documents were available. Part of track 1 would be reviewing them and making them readily available on the CAST website or something so everyone is aware and can access these protocols.
- I thought Decision 3 only focused on Track 2.
- Don't think technical WGs should be reviewing this. Do we have the authority to change any of this?
- WTWG won't have an active oversight role on these things. Track 1 is more about documenting where these QA/QC efforts already exist - for example, there have already been efforts to improve these processes since November of 2021. Going through this with the WG will improve our transparency and accountability. And will clear things up so partners know where to go if they have questions.
- Will land use and land cover updates be part of the items that would be inventoried? Review process for LUWG is so extensive. Time commitment of workgroup members should be considered.

Track 2:

- Suggestion to include a reconsideration of the timeline for CAST updates… we need a time period to incorporate the step of seeing if model results make sense.

February Meeting Input Summary:

Additional Post meeting input from Jeff Sweeney:

QA/QC is done by EPA and EPA contractors + partners, stakeholders, etc.

- It is done by both in-house staff and, more importantly, review of inputs, outputs, findings, etc. by stakeholders-typically through asks for review at the workgroup level.

  For example: the AgWG is asked to review all findings from analyses of the data from the Census of Agriculture. CBP office provides data from the Census of Agriculture to any stakeholder who asks – from raw data to processed data.

- In addition, there are formal reviews of all model data for each Phase of the model + formal reviews by STAC or other independent groups.

Track 1 Questions for consideration:

- Do we want to pursue Track 1?
- Is existing QA/QC framework adequate for Phase 6?
- If not- how should this be addressed and by whom?

****Mentimeter exercise**

Track 2: Taking a step back to define possible scenarios

Scenario 1: Adopted methods produce unexpected "illogical" results

- Example: non-farm phosphorus in WV, CAST-21 update
- Synopsis: Adopted methods and data were shown to be susceptible to a large shift (outlier)
- Prior solve: [in process] adjusting technical methods at the relevant workgroup in a timely manner
- Needed now: standardized sense of how to incorporate this process within CAST review timeline

Scenario 2: An error is found to have impacted model results in draft and/or previous CAST version

- Example: 2016 farm fertilizer data from CAST-19→CAST-21 update
- **Synopsis:** Error correction and additional data years show more drastic increasing fertilizer use trend
- **Errors** in 2015-2016 data reporting and processing methods not produced
- Prior solve: [in process] AMT/FT
- Needed now: standardized sense of how to address this in a reasonable timeframe

Scenario 3: Disagreement with [x]

- Example: Disagreement with [x]
- Synopsis: Various instances where results are questioned or certain aspects/inputs/methods are questioned, usually based on anecdotal information
- Prior solve: We have previously identified methods or datasets that could be improved and formulate plans to address in future versions of CAST
- Needed now: general parameters to distinguish from other scenarios(?), particularly scenario 1 : when is something unexpected and illogical vs reasonably expected imperfect model results for [x]

Track 2: Taking a step back to define possible output scenarios

Scenario 1: Adopted methods produce unexpected “illogical” results

- **Example**: urban phosphorus fertilizer tonnage in WV, CAST-21 update
- **Synopsis**: Adopted methods and data were shown to allow large shifts (outliers)
- **Review of 2016 input data** for WV CBW counties revealed errors in data reported to AAPFCO (several times larger than statewide average)
- **Review of process-** revealed data was being skewed by outliers, adjustment of technical methods at relevant workgroup in a timely manner to better address outliers in data for all jurisdictions
- **Needed now**: standardized sense of how to incorporate this process within CAST review timeline

Track 2: Taking a step back to define possible scenarios

Scenario 2: An error is found to have impacted model results in draft and/or previous CAST version (increased trend in fertilizer use artificially low), error correction and additional years of data show continuing trend of increased fertilizer use

- **Example:** 2016 farm fertilizer data from CAST-19→CAST-21 update
- **Synopsis:** Jurisdictions contend that modelled ag fertilizer applications are inaccurately representing "real world conditions"
- **Errors** in 2015-2016 data reporting and processing methods not produced
  - Farm fertilizer data: there's no evidence that there are errors in the 2015-2016 data reported to AAPFCO
  - Short-term Process: Jurisdictions did not substantiate their claims that results using partnership-approved methods did not accurately represent "real world conditions"
  - Long-term Process: Ag Modeling Team/Fertilizer Team investigate existence of better data sources and processing methods
- **Needed now**: standardized sense of how to address this in a reasonable timeframe

Track 2: Taking a step back to define possible scenarios

Scenario 3: Disagreement with [x]

- **Example**: Contention of unreasonable outputs during draft Model review
- **Synopsis**: Various instances where **results** are questioned or certain aspects/inputs/methods are questioned, usually based on anecdotal information
- **Prior solve**: We have previously identified methods or datasets that could be improved and formulate plans to address in future versions of CAST
- **Needed now**: general parameters: when is something unexpected and illogical vs reasonably expected imperfect model results
- To allow updated Model version to proceed concurrent with agreed upon future collaborative investigations for [x]

Track 2 Purpose:

- **Terminology-** what do we need to define to obtain objective criteria for gauging model output/results (ex. “unreasonable, illogical, real world, on the ground, unexpected” conditions)
- **Process-** to determine if errors in inputs or model processes have produced faulty results (how will we evaluate if the observation/contention has scientific merit)

- **Model results should be evaluated scientifically and in a timely manner for errors beyond the use of anecdotal evidence**

WTWG Input:

- Agreement of steps? Feedback?
- Settle on keys terms we need to define?

Track 2
Identify and define key evaluative terms
Identify appropriate groups to develop parameters
Develop parameters for determining validity of results
Approval by WTWG- June 23→ WQGIT

STOP

**The CBP office did provide other lines of evidence that trends in AAPFCO 2012-2016 fertilizer use could be accurate- CEAP survey, Ag Census