MINUTES
Data Integrity Workgroup (DI)

Chesapeake Biological Laboratory
Bernie Fowler Lab Bldg, Room 1101
Solomons, MD

Thursday, June 21, 2018
10:00 - 3:00

Conference Line: 410-326-7410

Adobe Connect: http://epawebconferencing.acms.com/diworkgroup/

Announcements, Meetings, Conferences:

- National Conference on Ecosystem Restoration. August 26-30, 2018. New Orleans, LA
- Maryland Water Monitoring Council (MWMC) Annual Meeting – December 7, 2018

Rich Batiuk will be retiring in July.

Data Censoring and Intervention Analyses Methods — **Elgin Perry, Rebecca Murphy**

- Overview of BayTrends, a CBP software package for Water Quality Trend Detection- Elgin Perry and Rebecca Murpey
- Elgin discussed BayTrends, the handling of censored data, as well as modeling of laboratory methods changes.
- The key features of BayTrends includes an extensive use of Generalized Additive Models, and flow adjusted results.
- With new technology, graphs and charts can be integrated into one output file. This allows for determination of significant players in the data.
- This model allows for identification of trends.
- Bruce asked where this data come from. Elgin responded that the BayTrends package includes all of the data from Chesapeake Bay's database CEDER. In addition to generating a wordfile, the program generates a csv file which can be imported to software.
- This BayTrends package has a lot of tables, including for information regarding parameters, MDL, percent change, etc.
- These graphs are not really for the public, but rather the scientists, since they're so technical and information-heavy.
- Jay asked how this type of work will adjust to changing sampling and scientific methods in labs with newer technology (bias, etc)? Looking at a 1996 vertical

dashed line illustrates a laboratory change. The model is allowed to make a "jump" at a specific point in time. This allows for the changes in technology or bias. It's normalizing backwards.

- This model allows for seasonality to change over time.
- The flow model includes graphs that show salinity change over time, which can also represent flow. High salinity = low flow, low salinity = high flow.
- One problem with this technique is having this intervention confounded with another phenomenon. In reality, the methods change identified- after flow adjustment- does not produce that large of a change.
- Bruce added that when MDDNR presents to the legislature, they must identify new statistical techniques, including these GAMS results, both flow-adjusted and non-flow adjusted.

- Censored Data Handling- Expectation Maximization Algorithm (EM algorithm)
- This includes anything that is estimated, such as less than reporting. This data is mostly MDLs.
- Previously some sort of substitution methodology would be used for censored data. But now log normal graphs are used to estimate for expected values. Elgin believes this methodology is working well.
- Step Trends Models (Intervention Models) and Methods Changes
- Elgin compared the old method with the new. The old method included a split sample study with multiple stations and dates. The date was assessed with paired comparison test, the Wilson signed rank test, the paired t-test. The inherent assumption with this method includes the idea that the step change would be uniform across all stations.
- There was a discussion of TSS. Rebecca is continually asked for TSS trends from 1985. Trends for TSS however, only go from 1999 currently. Jay added that TSS is totally analyst technique driven, making it very prone to human and filtration apparatus error.
- Issues encountered with the intervention approach
- Generally it's best to have five years of data pre and post, as well as using interventions close together can cause problems. A skip in the data with an intervention can lead to erroneous results. There are also interventions that are confounded with natural events such as flow change.
- Bruce added that this group would be helpful in identifying specific issues without documentation. Elgin continued that unexplained patterns may show up with their continued analysis of step trends, so this engagement will probably occur in the future.
- Jay added that change in instruments and methodologies are usually documented. This does not account for changes in personnel, which can definitely affect the data. All records of personnel changes are now kept for five years at least, but this was not the case in the 90s.

2018 Summer Hypoxia **Michael**

- Forecast

- Data Reporting
- The forecast came out this past Monday. Because of the high flows and wet spring, the flows between January and May have had above average flows, predicting a slightly worse than average hypoxia zone. Both Maryland and VA went out June 4,5,6 to collect. This report will officially be out by the end of today. In the past, only Maryland data has been reported. But VIMs is creating a daily hypoxia volume that Maryland is participating in. Maryland and VA will probably compare their numbers much more in the future.
- Elgin asked if there was any continuous salinity or DO data? Bruce added that Virginia has some continuous data, as well as several upstream and downstream monitors in Maryland. There are proposals for more WQ profilers. Elgin continued that salinity is used as a surrogate for flow, so having a good continuous salinity record would be very helpful with the modeling.
- The phase III watershed implementation plans (WIPs) have new load draft targets for the states. The phase 6 model is currently being tweaked. Maryland has been shown to need a lot more implementation because the efficiencies for Maryland's actions have decreased, requiring more effort. These decreases in efficiencies come from climate change as well as other factors in the model. Maryland has put together five meetings for disseminating this information to the local jurisdictions. Draft WIPs are now due by June 2019. These plans must be approved by summer of 2019. Monitoring is key to see progress. Virginia monitoring efforts will hopefully be supported with the current administration. Maryland's monitoring efforts are not as supported. Much of their money is for restoration projects, but not for the monitoring programs. Maryland is hoping to get an increase in funding with their next five year grant. Level-funding will require cuts to the program.

Phase III Watershed Implementation Plans (WIPS) **Michael**

Lunch

New MDL Process Discussion **Armstrong**

- To read the whole procedure: 40 CFR 136 Appendix B revision 2
- TL:DR: MDLs were determined based on seven or more replicates on a standard 5-10x the noise level. Now the MDL procedure is more convoluted, with this calc but also blanks used in the calculation. MDL is determined based on the blanks calculation and the standard deviation of the seven samples calculation, with the greater of the two becoming the MDL. All labs are implementing these calculations using historical data. This procedure encourages historical data usage up to two years.
- The group was asked for thoughts on this new process- if its being used, if its similar to the old MDLs.
- Suzanne said that ODU's MDLs didn't really change. However, they met criteria to only need the past nine months of data, not two years.
- Jerry from CBL said that their MDLs weren't greatly changed either.

- Jay added that a spreadsheet is being developed to handle the decision tree for these measurements.
- Shahla from DHMH discussed that the lab has not started this process yet. If one lab could send a copy of procedures and calculations of their MDLs, it would be helpful. The directions from EPA are not clear to understand. Jay added there's three options in this EPA procedure: previous 2 years' worth of blanks to do MDL, or use the last six months as long as there are more than fifty points, and the third option is 50 points minimum. It's up to the labs. Durga added that there are not clear cut method blanks at DHMH, so in the future it would be better to install a process for pulling blanks from the data in the past.
- Jay continued that all data from the runs for MDL data must be pulled.
- Durga discussed the spreadsheet she has previously sent out to the group that allow for tracking of methods. This spreadsheet will be sent out again.
- PA lab implemented the procedure last Sept. A spreadsheet of this data can be shared with the group. Bruce asked if there have been any significant changes noted? PA responded that no strong change was noted since implementing the new procedure.
- Elgin asked about the options to calculate the MDLs. The option that uses the most samples seems the most accurate for such a calculation. There should be confidence intervals on these options. Jay responded that once you get above 100 samples, the number doesn't change.

Citizen Monitoring – Updates on Tier III Field Audits **All**

- Kristin and Durga went to do Tier 3 Audits for nontraditional partners, at the South River Federation, and shellfish monitoring groups
- Caroline added that she can keep in touch with these groups to make sure that their next year's data can be used and classified as Tier 3 as soon as possible. Several other groups have been trained by the Alliance of the Chesapeake Bay, and hopefully they can be classified to the highest Tier as possible soon.

Coordinated Split Sample Program

- February and May 2018 Mainstem Results **Mallonee**
- March 2018 Tributary Results **Mallonee**
- Chlorophyll a- algal blooms have been observed in Maryland due to the runoff from the wet season. Mike emailed Tammy for Anne Arundel, but there's still issues with the South River chlorophyll sampling from salinity interference.
- It was noted that there was low chlorophyll in the tributaries. Many of the samples were taken after storms.
- There are only three labs doing TP direct measurement.
- Elgin's thoughts: Do we ever compare calculated TPs with that labs that directly measure? Jay responded about twenty years ago. Bruce added that CBP wanted directly measured parameters displayed. Eglin continued that as long as the lines have the same slopes.
- Jay added about chlorophyll, if there were any sources of QC and standards? Options included spinach to determine the true value.

USGS Reference Samples

- Jay added to see labs below 2 as a Z score, it's not very concerning. Elgin agreed to see an occasional 2 Z score isn't very alarming. Usually anything greater than 2 warrant investigation, but the rating we have on this spreadsheet might be a bit strong. Usually a z score higher than 3 is unsatisfactory, but on our excel sheet it's 2.
- Durga and Melissa will review these spreadsheets over time to compare several seasons' worth of z scores.

The Future of Shallow Water Monitoring **All**

- CB5 was started this year. CBP and MD and VA are trying to figure out how to go forward. All segments will have been completed at least with one round. Some segments have passed their water clarity criteria, so we'd like to develop a workgroup to determine whether now it should be more of a targeting methodology to focus on areas where we're closing to meeting WQ and clarity criteria. There must be sound reason for these decisions. If CBP provides funding for this program, MD and VA will be recipients of this funding.
- Bruce continued that maybe some of this funding should be put into deep water areas for dissolved oxygen to help with hypoxia forecasting, etc.
- The shallow water quality monitoring data has been incorporated into the phase 6 model, which attests to the importance of this program. If anyone would like to participate in this workgroup to develop the shallow water monitoring strategies, get in contact with Bruce Michael. Dave Parrish with VIMs asked to be involved.
- Ken Moore added that we need to address where we are and how we're making progress and improvements- diagnostics and how to read the data.

Topics for Next DI Meeting **All**

- Jerry added that the Blind audit report will be released later this summer.

Participants

Pam Higgins, Bruce, Mike, Durga Ghosh, Suzanne Doughton, Cindy Johnson, Jay Armstrong, Elgin Perry, Rebecca Murphy, Nancy Kolmepher, Jerry, Kristin, Laura Phabian, Martina McGarvey, Shala, Laurel Philips, Cynthia Stevens, Jaclyn Mantell, Dave Parrish, Caroline Donovan, Ken Moore, Luisa Lassova, Meg Maddox