Progress and Milestone Load Changes Due to New Data

Background:

- Milestone Workgroup requested model runs of their 2015 plans with new data that became available after 2015 Milestones were developed.
- The new data includes landuse acres and animal populations from the 2012 Agricultural Census and, for the urban sector, population projections and a 2011 National Land Cover Dataset which, combined, change growth from what had been projected.
- 2015 Milestones and 2013 Progress scenarios were run with the new data for informational purposes and information was provided to jurisdictions through their individual ftp sites.
- Update Water Quality GIT about results of investigation and how it impacts model assessment of loading gaps with 2025 TMDL-tracking goals.

Impacts of the new data:

- Results of the 2015 scenario with the new data show that Nitrogen loads increase significantly in several jurisdictions (PA, MD, WV, NY) while Phosphorus loads decrease in all states.
- This same pattern is seen with a 2013 scenario with the new data when compared to 2013 Progress.

	Change in 2013 N loads (percent change)	Change in 2013 P loads (percent change)
PA	4.8 million lbs (4.3%)	-0.06 million lbs (-1.3%)
MD	1.8 million lbs (3.8%)	-0.07 million lbs (-2.2%)
VA	-1.2 million lbs (-2.0%)	-0.87 million lbs (-11.4%)
WV	0.1 million lbs (1.8%)	-0.01 million lbs (-0.9%)
DE	-0.4 million lbs (-8.0%)	-0.06 million lbs (-17.8%)
NY	0.4 million lbs (3.6%)	0.01 million lbs (1.3%)
DC	-0.005 million lbs (-0.3%)	-0.0002 million lbs (-0.3%)
CBW	5.5 million lbs (2.3%)	-1.06 million lbs (-6.1%)

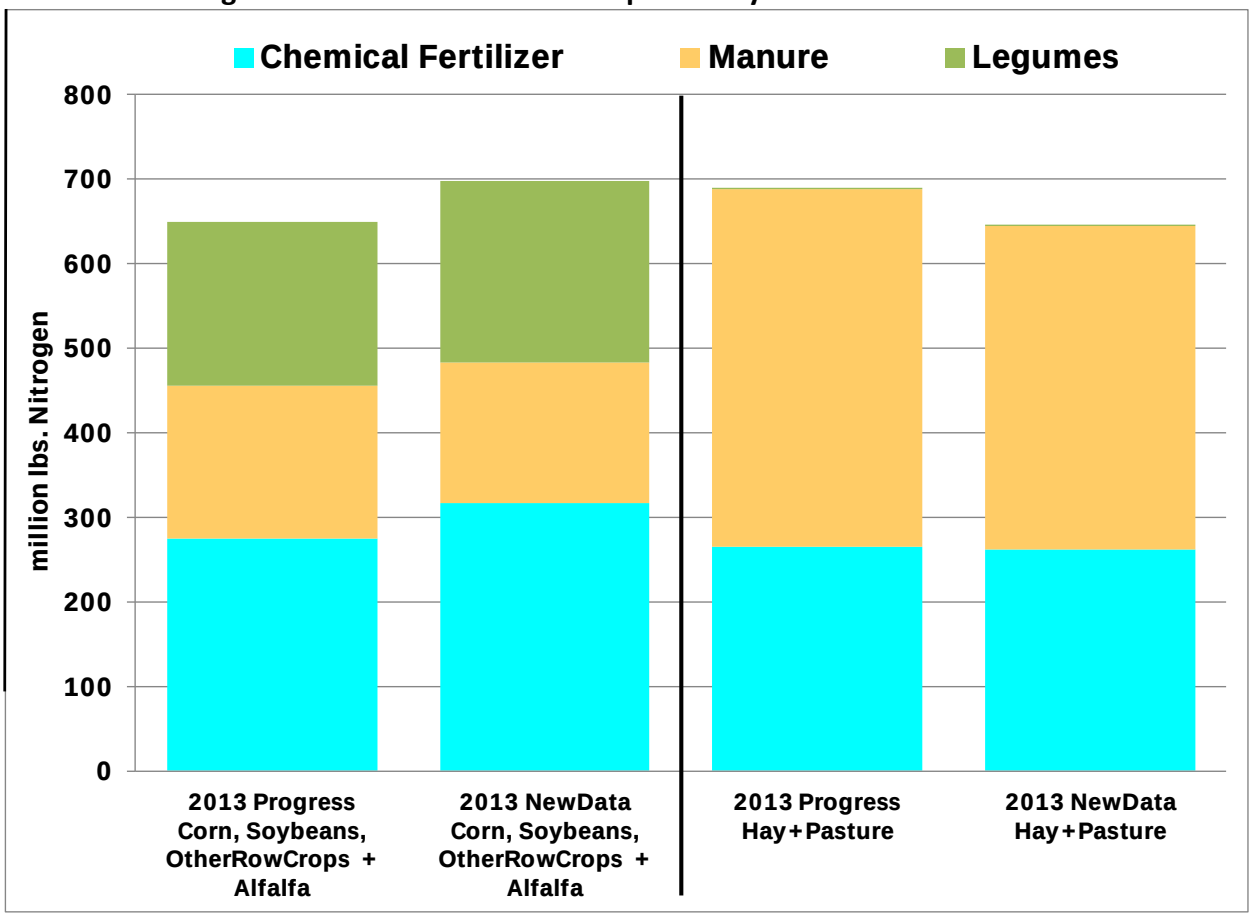
CBW	Change in 2013 N loads (percent change)	Change in 2013 P loads (percent change)
Agriculture	5.3 million lbs (4.9%)	-1.11 million lbs (-11.3%)
Urban	0.6 million lbs (1.5%)	0.06 million lbs (2.3%)
Septic	-0.4 million lbs (-5.0%)	N/A
All Sources	5.5 million lbs (2.3%)	-1.06 million lbs (-6.1%)

- Among jurisdictions and sources, some model loads will change significantly for Progress and would have changed for Milestones, not because of changes in implementation.
- Greatest changes in absolute loads by sector are agriculture Nitrogen (load increases) and agriculture Phosphorus (load decreases).

- For urban nutrients, the impact of new urban data is positive (decrease in acres from the original projection) in VA, DE and DC; negative (increase in acres from the original projections in PA, MD, WV and NY.

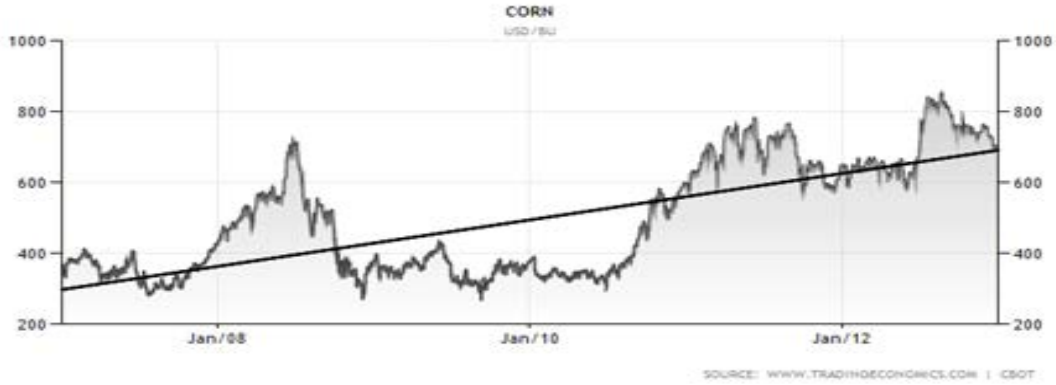
- Changes in agriculture are mostly attributable to increases in fertilizer N applications because of greater acres of corn and soybeans – than was originally projected – while there are losses of crops that are low loaders, e.g., hay, alfalfa, pasture.
- P loads are decreasing because the change in animal populations is less than originally projected ⇒ less manure P on crops than originally projected. Farmers are typically fertilizing for N because there's a need while the P need is not as prevalent.

Comparison of Nitrogen applications (in millions of lbs/year) between 2013 Progress and 2013 with new Agriculture Census data – Chesapeake Bay watershed:

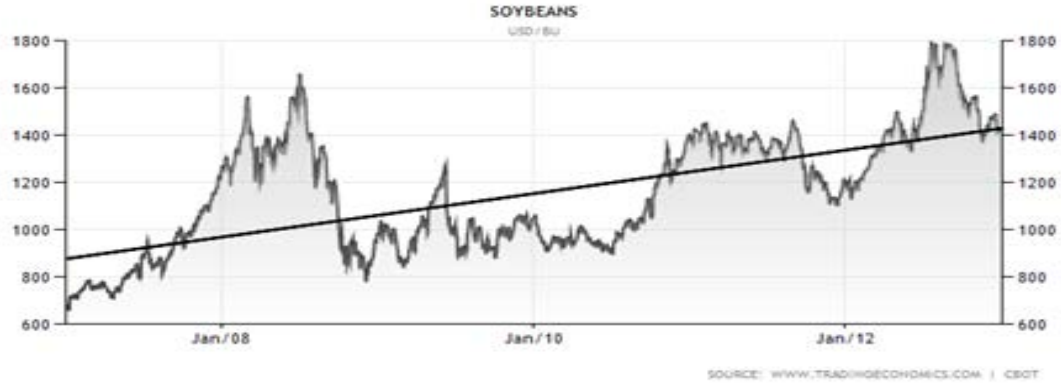


- More commodity crops are being grown throughout the watershed and that requires more nutrients. The 2012 Agriculture Census shows that agricultural production took off after the recession. This assumption is supported by grain price trends.

Change in corn prices 2007 – 2012 (USD/BU)



Change in soybean prices 2007 – 2012 (USD/BU)



- Original 2007–2012 projection had commodity crops (e.g., corn, soybeans) decreasing. New data shows increases in these crops 2007–2012. Historic Agriculture Census data gave us no reason to expect this kind of increase of productivity.

- Increase in fertilizer use can be substantiated. According to AAPFCO (Association of American Plant Food Control Officials), between 2007 and 2012 in for all counties in the CB watershed as a whole, there's been a 16.8% increase in fertilizer mass of Nitrogen sold.

- Bay Journal articles going back to 2007 explain well the consequences of increased corn production: "The figures show that this year's plantings alone could have the potential to largely offset other Bay-related cleanup efforts."
  - Census: Farmland growing in Bay states, by Karl Blankenship and Whitney Pipkin on July 20, 2014 – Increase in acreage has implications for Bay restoration strategies.
  - Nation's new thirst for ethanol could leave Bay with hangover, by Karl Blankenship on April 01, 2007 – Increase in corn production would likely lead to more nutrients entering the Chesapeake.
  - Increase in watershed's corn acres could offset Bay cleanup efforts, by Karl Blankenship on September 01, 2007 – Nitrogen loss from corn is greater than any other crop

- States urged to boost efforts to curb runoff from cornfields, by Karl Blankenship on July 01, 2007 – Spurred by demand for ethanol, increase in crop acreage could reverse progress in Bay cleanup effort.

Comparison of CB watershed nutrient and sediment loads for 2013 and 2015 scenarios:

		2013 Progress (on 2013) TOTN	2013 Progress (New Data) TOTN	2013 Trajectory TOTN	2015 Milestone TOTN	2015 Milestone (New Data) TOTN	2015 Trajectory TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	107.4	112.6	101.2	99.2	101.2	94.9
AllJurisdictions	Urban	40.8	41.4	36.4	40.5	41.4	34.8
AllJurisdictions	Wastewater	40.9	40.9	47.9	41.3	41.3	45.7
AllJurisdictions	Septic	8.8	8.3	7.8	8.7	8.3	7.5
AllJurisdictions	Forest+	45.8	45.9	46.6	45.9	45.9	46.8
AllJurisdictions	AllSources	243.6	249.1	239.9	235.7	238.1	229.7
		2013 Progress (on 2013) TOTP	2013 Progress (New Data) TOTP	2013 Trajectory TOTP	2015 Milestone TOTP	2015 Milestone (New Data) TOTP	2015 Trajectory TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	9.88	8.77	9.60	9.68	8.29	9.13
AllJurisdictions	Urban	2.81	2.88	2.74	2.67	2.71	2.61
AllJurisdictions	Wastewater	2.81	2.81	3.67	2.81	2.81	3.51
AllJurisdictions	Forest+	1.68	1.68	1.79	1.69	1.68	1.83
AllJurisdictions	AllSources	17.19	16.13	17.80	16.86	15.50	17.08
		2013 Progress (on 2013) TSS	2013 Progress (New Data) TSS	2013 Trajectory TSS	2015 Milestone TSS	2015 Milestone (New Data) TSS	2015 Trajectory TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	4,800	5,166	4,855	4,349	4,643	4,634
AllJurisdictions	Urban	2,034	2,115	1,819	1,873	1,929	1,719
AllJurisdictions	Wastewater	86	86	183	82	82	231
AllJurisdictions	Forest+	1,258	1,250	1,418	1,263	1,250	1,490
AllJurisdictions	AllSources	8,178	8,617	8,275	7,567	7,905	8,075

- For 2014 Progress, gaps with trajectory goals will increase in some cases because of revised background data – that would need to be offset with BMPs to stay on track.