Chesapeake Bay Restoration

CAST-21

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Purpose for Today

- Show the changes between these versions of CAST (2021 Progress)
  - CAST19 in its current state
  - CAST19 with Corrected Fertilizer 2013-2014 Data
  - CAST21 with incorporation of all data and jurisdiction updates

- Talk Through options of how we are moving forward
  - What is happening with fertilizer data in both the Urban and Ag Sectors

Change in Nutrient Loads to the Chesapeake Bay

Differences between CAST versions by source; 2021 Progress scenario

		Nitrogen Loads					
		CAST19 Inaccurate Fertilizer (M lbs)	CAST19 Accurate Fertilizer (2013-2014) (M lbs)	CAST21 Accurate Fertilizer (2015-2016) (M lbs)	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)
CB Watershed	Agriculture	117.059	121.779	122.632	4.721	0.853	5.573
CB Watershed	Developed	40.269	40.269	40.359	0	0.091	0.091
CB Watershed	Wastewater	29.969	29.969	29.969	0	0	0
CB Watershed	Septic	7.845	7.845	7.792	0	-0.053	-0.053
CB Watershed	Natural	45.311	45.558	45.595	0.247	0.036	0.283
CB Watershed	AllSources	240.454	245.421	246.348	4.967	0.927	5.894

		Phosphorus Loads					
		CAST19 Inaccurate Fertilizer (M lbs)	CAST19 Accurate Fertilizer (2013-2014) (M lbs)	CAST21 Accurate Fertilizer (2015-2016) (M lbs)	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)
CB Watershed	Agriculture	4.076	4.190	4.041	0.113	-0.149	-0.035
CB Watershed	Developed	2.648	2.648	2.181	0	-0.467	-0.467
CB Watershed	Wastewater	2.317	2.317	2.317	0	0	0
CB Watershed	Septic	0.004	0.004	0.004	0	0	0
CB Watershed	Natural	5.667	5.701	5.506	0.034	-0.195	-0.161
CB Watershed	AllSources	14.713	14.860	14.050	0.147	-0.810	-0.663

Change in Nutrient Loads to the Chesapeake Bay

Differences between CAST versions by jurisdiction; 2021 Progress scenario

	Nitrogen Loads					
	CAST19 Inaccurate Fertilizer (M lbs)	CAST19 Accurate Fertilizer (2013-2014) (M lbs)	CAST21 Accurate Fertilizer (2015-2016) (M lbs)	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)
New York	12.611	12.889	13.360	0.279	0.471	0.750
Pennsylvania	104.495	106.852	107.393	2.357	0.541	2.898
Maryland	50.740	52.007	51.893	1.267	-0.114	1.153
Virginia	56.642	57.266	57.185	0.624	-0.081	0.543
West Virginia	7.925	8.003	7.753	0.079	-0.250	-0.172
Delaware	6.389	6.752	7.113	0.363	0.362	0.724
District of Columbia	1.652	1.652	1.651	0	-0.002	-0.002
CB Watershed	240.454	245.421	246.348	4.967	0.927	5.894

	Phosphorus Loads					
	CAST19 Inaccurate Fertilizer (M lbs)	CAST19 Accurate Fertilizer (2013-2014) (M lbs)	CAST21 Accurate Fertilizer (2015-2016) (M lbs)	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)
New York	0.539	0.555	0.543	0.016	-0.011	0.005
Pennsylvania	3.715	3.776	3.681	0.061	-0.095	-0.034
Maryland	3.803	3.826	3.344	0.023	-0.482	-0.459
Virginia	6.028	6.068	5.769	0.040	-0.299	-0.259
West Virginia	0.438	0.442	0.503	0.004	0.061	0.065
Delaware	0.120	0.123	0.143	0.003	0.020	0.023
District of Columbia	0.070	0.070	0.067	0	-0.003	-0.003
CB Watershed	14.713	14.860	14.050	0.147	-0.810	-0.663

Change in Nutrient Loads to the Chesapeake Bay

Differences between CAST versions by source; 2021 Progress scenario

Nitrogen Loads

		CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)	CAST19 Inaccurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST19 Accurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST21 Accurate Fertilizer + Other Changes Percent Goal Achieved (>=80% is on track)
CB Watershed	Agriculture	4.721	0.853	5.573	5%	1%	0%
CB Watershed	Developed	0	0.091	0.091	0%	0%	0%
CB Watershed	Wastewater	0	0	0.000	47%	100%	100%
CB Watershed	Septic	0	-0.053	-0.053	0%	0%	0%
CB Watershed	Natural	0.247	0.036	0.283	2%	1%	21%
CB Watershed	AllSources	4.967	0.927	5.894	42%	35%	33%

Phosphorus Loads

		CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)	CAST19 Inaccurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST19 Accurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST21 Accurate Fertilizer + Other Changes Percent Goal Achieved (>=80% is on track)
CB Watershed	Agriculture	0.113	-0.149	-0.035	9%	6%	20%
CB Watershed	Developed	0	-0.467	-0.467	0%	0%	100%
CB Watershed	Wastewater	0	0	0.000	45%	45%	94%
CB Watershed	Septic	0	0	0.000	0%	0%	0%
CB Watershed	Natural	0.034	-0.195	-0.161	5%	5%	55%
CB Watershed	AllSources	0.147	-0.810	-0.663	64%	60%	80%

Change in Nutrient Loads to the Chesapeake Bay

Differences between CAST versions by jurisdiction; 2021 Progress scenario

Nitrogen Loads

	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)	CAST19 Inaccurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST19 Accurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST21 Accurate Fertilizer + Other Changes Percent Goal Achieved (>=80% is on track)
New York	0.279	0.471	0.750	69%	58%	40%
Pennsylvania	2.357	0.541	2.898	22%	16%	13%
Maryland	1.267	-0.114	1.153	58%	48%	46%
Virginia	0.624	-0.081	0.543	75%	71%	72%
West Virginia	0.079	-0.250	-0.172	100%	100%	100%
Delaware	0.363	0.362	0.724	20%	4%	0%
District of Columbia	0	-0.002	-0.002	100%	100%	100%
CB Watershed	4.967	0.927	5.894	42%	35%	33%

Phosphorus Loads

	CAST19 Change w/ Accurate Fertilizer Data (M lbs)	CAST19 to CAST21 Change From Other Data and Method Updates (M lbs)	CAST19 to CAST21 Total Change From Updates (M lbs)	CAST19 Inaccurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST19 Accurate Fertilizer Percent Goal Achieved (>=80% is on track)	CAST21 Accurate Fertilizer + Other Changes Percent Goal Achieved (>=80% is on track)
New York	0.016	-0.011	0.005	76%	70%	74%
Pennsylvania	0.061	-0.095	-0.034	48%	44%	49%
Maryland	0.023	-0.482	-0.459	74%	69%	100%
Virginia	0.040	-0.299	-0.259	68%	65%	87%
West Virginia	0.004	0.061	0.065	97%	95%	64%
Delaware	0.003	0.020	0.023	52%	40%	0%
District of Columbia	0	-0.003	-0.003	100%	100%	100%
CB Watershed	0.147	-0.810	-0.663	64%	60%	80%

Summary of Exclusions if Not Moving Forward With CAST21

- Jurisdictions updated the reported BMP history during Progress assessments - the most recent history will be in CAST-21
- Incorporation of the Very High-Resolution Land Use Data into CAST
- The 2013 – 2025 land use acres, septic systems, and sewer service areas were updated
- The agricultural land use total acres are now determined by change product from 2013 rather than USDA Agricultural Census total acres
- MD biosolids, PA combined sewer overflow reductions, VA non-significant wastewater data for 2014-2020, WV 2020 wastewater data
- VA, WV, and MD harvested forest acres updated multiple years
- Construction acres are updated for most jurisdictions for multiple years
- PA permitted/nonpermitted feeding space split
- BMP updates for urban stream restoration, tree and forest planting, forest buffers, impervious disconnection, agricultural ditch management, water control structures, abandoned mine land reclamation, wetland creation and rehabilitation now available in progress scenarios

Issues Resulting from Updates

- Increased Level of Effort to Reach Planning Targets
  - CAST 19 Correction or CAST21
  - 2025 Climate Change Loads

- Questions about Fertilizer Data
  - Source of Ag Fertilizer Data
  - Model Application Method for Non-Farm Fertilizer Data

- Time Needed to Address the Load Increase
  - From WQGIT Presentation to MB – Would need additional time to address CAST Update Load Increase - Approximately 2 years

Path Forward for Future Updates

- Evaluation of Fertilizer
  - Direct workgroups to provide updates on progress of these activities
  - Ag WG to evaluate data sources to determine if better alternatives to our current data sources and methods
  - Urban Stormwater WG to evaluate model application method and possible solutions
- Money available for new expert panels
  - IIJA funds available for next 5 years
- Consider what additional time would be needed to meet the increased Level of Effort by the Partnership

Decision Points Expected To be Presented To PSC

1) Release CAST21 with full awareness of impact **OR** update the CAST19 Fertilizer Data to correct the error in CAST19.

2) Direct the Ag Workgroup (may be a subset) to work on improving source data, and Urban Stormwater Workgroup to pursue new methods for incorporation of fertilizer data into CAST. Both workgroups will report back to the PSC at the winter 2022 and summer 2023 meetings on their progress.