

Next Version of CAST: Data Updates and Effects on Loads

CAST TEAM

MARCH 10, 2022

Errors and Omissions

- The Chesapeake Bay Program office staff alerted states that the agricultural fertilizer sales data had been erroneous in CAST-19 and was corrected in the review version of CAST-21 prior to the review period.
- When it became evident that there could be data that was not updated, the Bay Program put a hold on releasing CAST-21 until the extent of omissions were identified.
- We now have identified the extent of errors and omissions and are ready to make a new version available for review.
- New procedures are in place to prevent these errors and omissions in the future.

CAST-21 Release

Error identified by the Bay Program Office

- The **missing agricultural fertilizer data** for 2013 and 2014 was corrected.
 - ✓ Data was missing in CAST-19 (current version) and put in for the CAST-21 version that is out for review.

Missing data

- **Broilers and turkeys** from the 2020 NASS Survey
- **Crop yields** from NASS Surveys for post calibration period
 - ✓ Data are not yet in the CAST-21 version available for review

Jurisdictional Comments

- Jurisdictions conducted a thorough review following the timeline and provided well articulated comments, even while staff were focusing on preparing annual progress submissions.

Thank you!

- Most common comment: **Non-farm (urban) fertilizer sales data** corrections adversely shifting loads for some states
- Other comments are state specific or related to functionality in the user interface

➤ Change in Nutrient Loads to the Chesapeake Bay

Differences between CAST versions with each update: 6.2M lbs TN, -0.6M lbs TP

By source sector; 2020 Progress scenario

Nitrogen

		CAST19 - CAST21 (Reviewed)		CAST21 Effect of Broiler Data		CAST21 Effect of Yield Data		CAST19 - CAST21 (All Effects)	
Jurisdiction	Source	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)
CBW	Agriculture	4.056	3.4%	0.024	0.02%	1.863	1.5%	5.943	5.0%
CBW	Developed	0.177	0.4%	0	0	0	0	0.177	0.4%
CBW	Wastewater	0	0	0	0	0	0	0	0
CBW	Septic	-0.080	-1.0%	0	0	0	0	-0.080	-1.0%
CBW	Natural	0.120	0.3%	0.001	0.00%	0.094	0.2%	0.215	0.5%
CBW	All Sources	4.273	1.8%	0.025	0.01%	1.957	0.8%	6.255	2.6%

Phosphorus

		CAST19 - CAST21 (Reviewed)		CAST21 Effect of Broiler Data		CAST21 Effect of Yield Data		CAST19 - CAST21 (All Effects)	
Jurisdiction	Source	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)
CBW	Agriculture	0.086	2.1%	0.001	0.03%	-0.029	-0.7%	0.058	1.4%
CBW	Developed	-0.454	-17.4%	0	0	0	0	-0.454	-17.4%
CBW	Wastewater	0	0	0	0	0	0	0	0
CBW	Septic	-0.003	-60.6%	0	0	0	0	-0.003	-60.6%
CBW	Natural	-0.127	-2.2%	0.000	-0.01%	-0.006	-0.1%	-0.134	-2.4%
CBW	All Sources	-0.498	-3.7%	0.001	0.01%	-0.036	-0.3%	-0.533	-4.0%

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Nitrogen

		CAST19 - CAST21 (Reviewed)		CAST21 Effect of Broiler Data		CAST21 Effect of Yield Data		CAST19 - CAST21 (All Effects)	
Jurisdiction	Source	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)
NY	All Sources	0.697	5.3%	0.000	0.00%	-0.042	-0.3%	0.655	4.9%
PA	All Sources	1.772	1.6%	0.124	0.11%	0.868	0.8%	2.764	2.6%
MD	All Sources	1.017	2.1%	-0.016	-0.03%	0.482	1.0%	1.483	3.1%
VA	All Sources	0.566	1.0%	-0.015	-0.03%	0.434	0.7%	0.985	1.7%
WV	All Sources	-0.153	-1.4%	-0.016	-0.20%	-0.005	-0.1%	-0.173	-1.7%
DE	All Sources	0.374	5.4%	-0.052	-0.71%	0.220	3.0%	0.542	7.9%
DC	All Sources	-0.002	-0.1%	0	0	0	0	-0.002	-0.1%
CBW	All Sources	4.273	1.8%	0.025	0.01%	1.957	0.8%	6.255	2.6%

Phosphorus

		CAST19 - CAST21 (Reviewed)		CAST21 Effect of Broiler Data		CAST21 Effect of Yield Data		CAST19 - CAST21 (All Effects)	
Jurisdiction	Source	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)	(M lbs)	(%)
NY	All Sources	0.004	0.7%	0.000	0.02%	-0.002	-0.4%	0.002	0.3%
PA	All Sources	-0.027	-0.8%	0.004	0.11%	-0.014	-0.4%	-0.036	-1.0%
MD	All Sources	-0.392	-10.6%	0.000	0.00%	-0.014	-0.4%	-0.406	-11.0%
VA	All Sources	-0.159	-3.5%	0.001	0.01%	-0.004	-0.1%	-0.163	-3.5%
WV	All Sources	0.067	15.6%	0.000	-0.04%	0.000	-0.1%	0.067	15.4%
DE	All Sources	0.013	10.7%	-0.004	-2.86%	-0.001	-1.0%	0.008	6.5%
DC	All Sources	-0.003	-5.4%	0	0	0	0	-0.003	-5.4%
CBW	All Sources	-0.498	-3.7%	0.001	0.01%	-0.036	-0.3%	-0.533	-4.0%

USDA NASS Corn for Grain Yields (2010-2021)

← → ↺ 🏠 <https://quickstats.nass.usda.gov/results/22518199-8A05-3923-9006-7BC375910F78>

USDA United States Department of Agriculture
National Agricultural Statistics Service

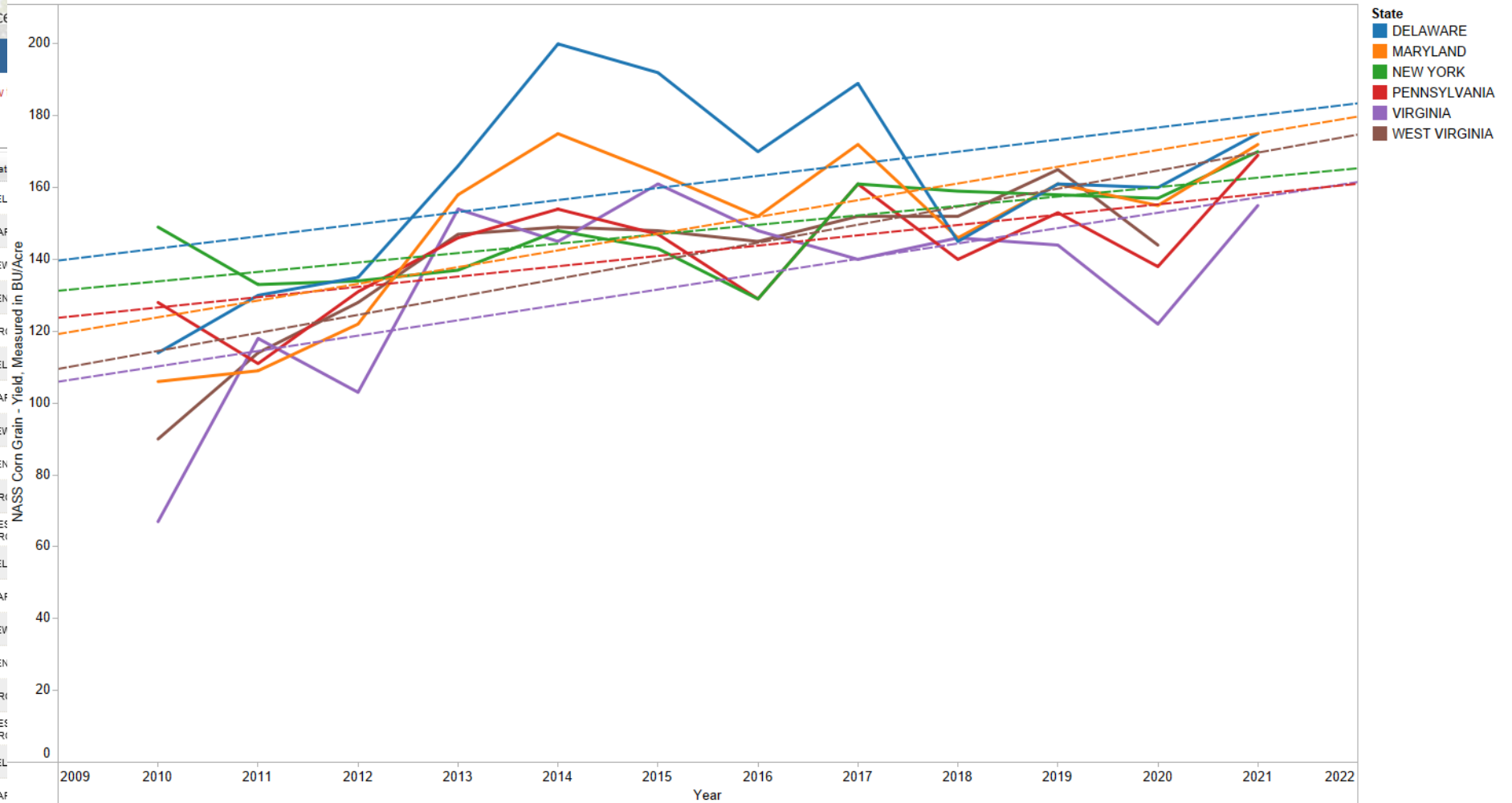
Quick Stats

Navigation History: [Data](#)

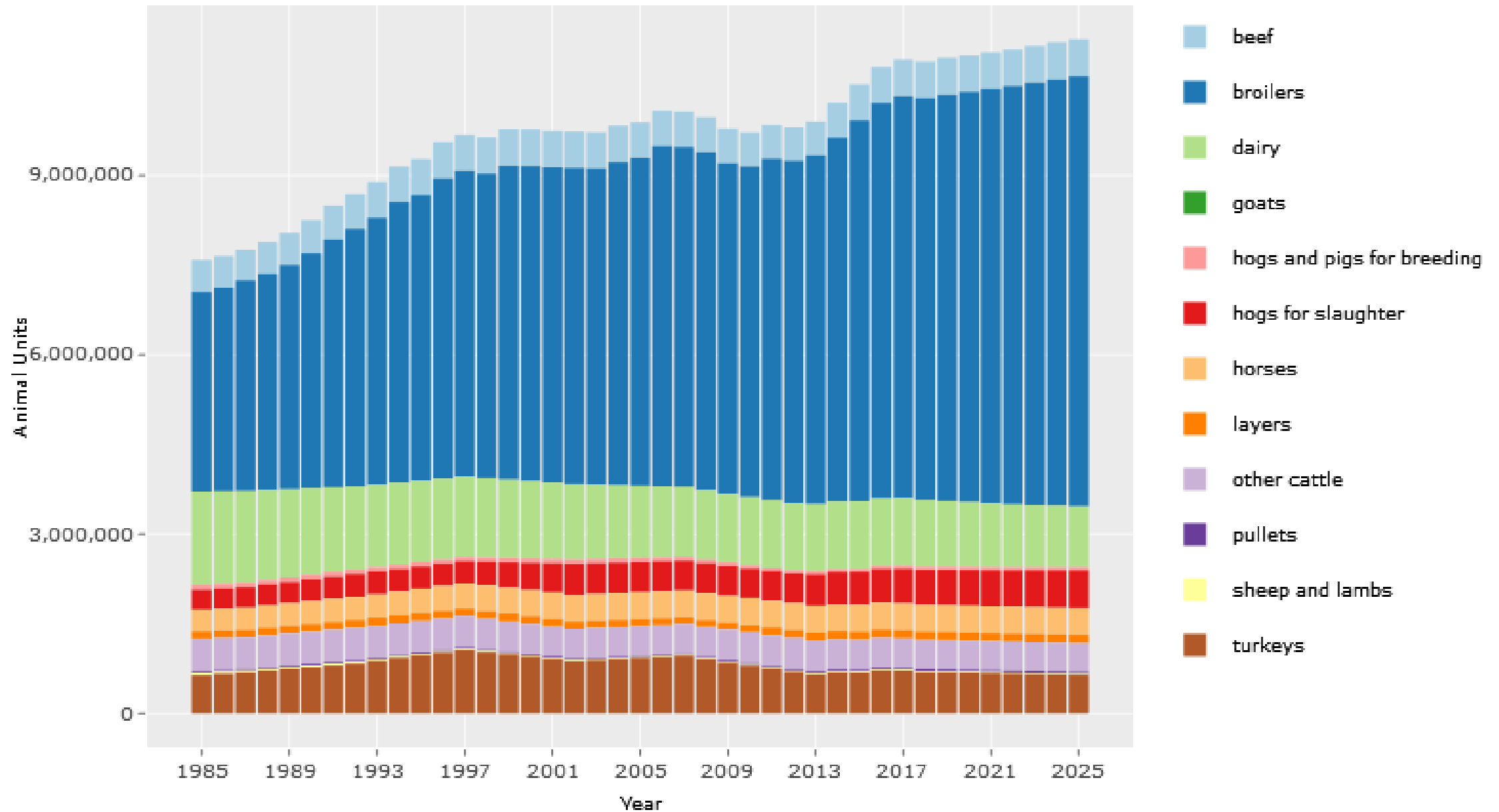
Double click any cell below!

Program	Year	Period	Geo Level	State
SURVEY	2021	YEAR	STATE	DEL
SURVEY	2021	YEAR	STATE	MAR
SURVEY	2021	YEAR	STATE	NEV
SURVEY	2021	YEAR	STATE	PEN
SURVEY	2021	YEAR	STATE	VIR
SURVEY	2020	YEAR	STATE	DEL
SURVEY	2020	YEAR	STATE	MAR
SURVEY	2020	YEAR	STATE	NEV
SURVEY	2020	YEAR	STATE	PEN
SURVEY	2020	YEAR	STATE	VIR
SURVEY	2020	YEAR	STATE	WES VIR
SURVEY	2019	YEAR	STATE	DEL
SURVEY	2019	YEAR	STATE	MAR
SURVEY	2019	YEAR	STATE	NEV
SURVEY	2019	YEAR	STATE	PEN
SURVEY	2019	YEAR	STATE	VIR
SURVEY	2019	YEAR	STATE	WES VIR
SURVEY	2018	YEAR	STATE	DEL
SURVEY	2018	YEAR	STATE	MAR
SURVEY	2018	YEAR	STATE	NEV
SURVEY	2018	YEAR	STATE	PEN

NASS Trends



Animal Units by Year and Animal



➤ CBW Change in Nutrient Applications to the Land

(2012 – 2016)

Nitrogen							
	Manure Applied	Biosolids Applied	Fertilizer Applied	Legume Fixed	Pasture Manure	Total Agriculture Applied/Fixed	Urban Fertilizer
2012-2016 Change (lbs)	14,460,000	-3,389,000	64,886,000	29,263,000	1,449,000	106,668,000	4,086,000
2012-2016 Change (%)	7%	-17%	16%	7%	1%	9%	6%
Phosphorus							
	Manure Applied	Biosolids Applied	Fertilizer Applied		Pasture Manure	Total Agriculture Applied	Urban Fertilizer
2012-2016 Change (lbs)	5,453,000	-1,616,000	5,581,000		681,000	10,098,000	6,643,000
2012-2016 Change (%)	9%	-15%	9%		2%	6%	62%

Friday, 2/18 - Release of revised CAST-21 with updated poultry, crop yields



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graph TD; A[Friday, 2/18 - Release of revised CAST-21 with updated poultry, crop yields] --> B[Wednesday, 4/20 - Comments due from states]; B --> C[Monday, 5/9 - Response to comments, both those provided in November and those provided most recently.]; C --> D[Release of CAST-21 to occur after response to comments];
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Wednesday, 4/20 - Comments due from states

Monday, 5/9 - Response to comments, both those provided in November and those provided most recently.

Release of CAST-21 to occur after response to comments

Draft Schedule for Deliberative Purposes

CAST Communications Documents

Currently on CAST website under About, Model Documentation
(<https://cast.chesapeakebay.net/Documentation/ModelDocumentation>)

- [Fact Sheet](#) – General 2 page overview of CAST – Remains as is
- [Understanding Chesapeake Bay Modeling Tools](#) – A history of updates, governance, policy and procedures – Update to take out page 5-6 specifics related to CAST19 – then remains constant
- [Comparison of Loads and Inputs Between CAST-17d and CAST-19--Data Visualization Tool](#) – Visual aid to assist in comparing CAST versions as they change – New version for CAST19 to CAST21 Change
- [Technical Documentation of the Change Between CAST-17d and CAST-19](#) – Description of data/methods updated from one CAST version to the next – New Version for CAST19 to CAST21 Change
- [Comments from the Jurisdictions and the Chesapeake Bay Program Responses](#) – Comment and response document for the version of the model – New Version for CAST21
- New Document – Assistance to explain changes from CAST19 to CAST21 to partners and stakeholders (those not experienced with CAST and its use)

Questions?