



- **Lower Eastern Shore Ambient Air Quality Monitoring Program**
 - Taking measurements for
 - NH_3 (ammonia) and
 - PM 2.5 and PM 10 (particulate matter)
 - Two ambient air monitoring stations on the Eastern Shore
 - Data collected and tabulated by the Maryland Department of the Environment (MDE)



Clean Air Act



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- EPA is required to regulate any airborne pollutant which may reasonably be anticipated to endanger public health or welfare. [42 U.S.C.S. § 7408\(a\)\(1\)\(A\)](#).
- Enacted 1970



Clean Air Act – Basic Crash Course



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Nat'l Ambient Air Quality Standards (NAAQS)

- Six criteria pollutants
 - Pb, O₃, CO, PM, NO_x, SO_x
- Diverse, numerous sources
- Regional average concentrations
- EPA must review standards every 5 years. [42 U.S.C.S. § 7409\(a\)\(1\)\(A\)](#).

Emissions Standards

- Hazardous Air Pollutants (HAPs) (187)
- Stationary and mobile sources
- Technology



NAAQs



- Two levels of standards:
 - **"Primary"** NAAQs must be set at a level to protect the public health. [42 U.S.C.S. § 7409\(b\)\(1\)](#).
 - **"Secondary"** NAAQs must be set at a level to protect the public welfare. [42 U.S.C.S. § 7409\(b\)\(2\)](#).
 - "includes, but is not limited to, effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, and climate. [42 U.S.C.S. § 7602\(h\)](#)).
- State Designations:
 - Attainment
 - Non-attainment, and Maintenance ->State Implementation Plan required



Maryland PM-2.5 (1997) Areas

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Click on the Area name to view SIP Required Elements											
Area	Status	Designation Date	Classification	2010 Population (state portion)	Meets NAAQS Basis	Design Value Annual ($\mu\text{g}/\text{m}^3$) (entire area)	Meets NAAQS	SIP Requirements Original/ Approved	Clean Air Determination Citation Effective Date Click to view FR notice	Redesignation Request Date	Redesignation Citation Effective Date Click to view FR notice
Baltimore	Maintenance (NAAQS revoked)	04/05/2005	Moderate	2,662,691	2017-2019	8.4	Yes	6 / 1	06/21/2012 77 FR 30208	12/23/2013	12/16/2014 79 FR 75031
Martinsburg-Hagerstown	Maintenance (NAAQS revoked)	04/05/2005	Moderate	147,430	2017-2019	8.5	Yes	6 / 1	02/09/2012 77 FR 1411	12/23/2013	12/16/2014 79 FR 75035
Washington	Maintenance (NAAQS revoked)	04/05/2005	Moderate	2,215,133	2017-2019	9.5	Yes	6 / 1	02/09/2012 77 FR 1411	07/17/2013	11/05/2014 79 FR 60081

Maryland PM-2.5 (2006) Areas

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No designated areas for this pollutant.

Maryland PM-2.5 (2012) Areas

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No designated areas for this pollutant.

Particulate Matter



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Particle pollution includes:

- **PM₁₀** : inhalable particles, with diameters that are generally 10 micrometers and smaller; and
- **PM_{2.5}** : fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

<https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>



Size comparisons for PM particles

How small is 2.5 micrometers? Think about a single hair from your head. The average human hair is about 70 micrometers in diameter – making it 30 times larger than the largest fine particle.

PM NAAQs



Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Particle Pollution (PM)	PM _{2.5}	primary	1 year	12.0 µg/m ³	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m ³	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years

Ammonia



- **Ammonia** - Colorless gas with a distinct odor. It is produced naturally in the human body and in nature—in water, soil and air.
 - Excess NH_3 is toxic, harmful to health.

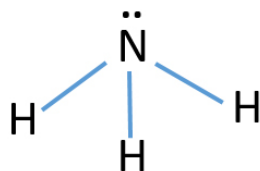
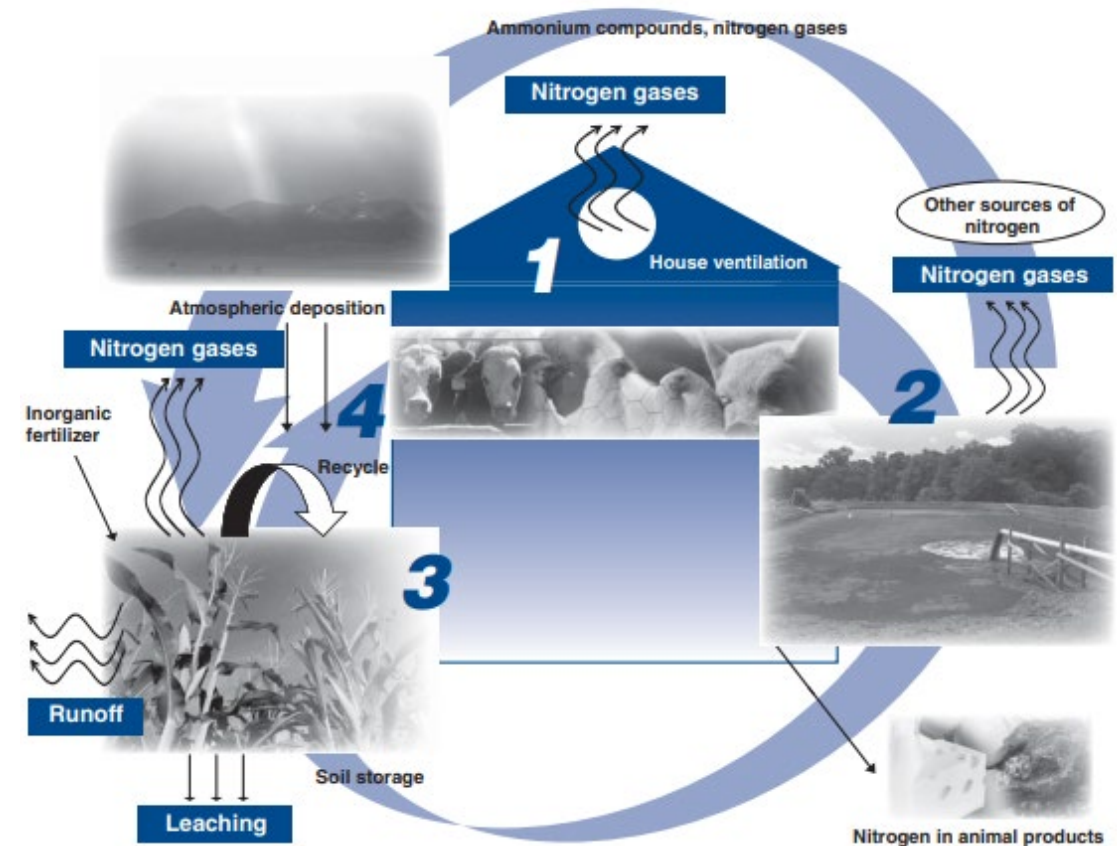


Figure 2-1

Nitrogen follows many pathways in a livestock operation



The nitrogen cycle is a complex one, without a beginning, middle, or end. The principle of mass-balance ensures that the amount of nitrogen in a closed system is constant. Thus, any action to divert it from one pathway must necessarily transfer it into another. In this stylized figure:

How is ammonia regulated?



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- **Clean Air Act** – n/a
- **CERCLA/EPCRA** - “air emissions from animal waste at a farm” are exempt from reporting
- **Clean Water Act** - recommended ambient water quality criteria for the protection of aquatic life from effects of ammonia in freshwater





Maryland Ammonia Regulations

- Ammonia listed as a Class II toxic air pollutant (TAP)
- Acceptable Ambient Levels used to evaluate the air quality impacts of all premises within a 5-kilometer (3.1-mile) radius. [COMAR 26.11.16.09.](#)

.09 Levels Used to Review Ambient Impacts.

A. Special Screening Levels (SSL) and Acceptable Ambient Levels (AAL).

	CAS Number	Substance	Concentration (micrograms/ cubic meter)	Averaging Time	Type of Level
(1)	7664-41-7	Ammonia			
		(a)	300.	8 hours	AAL
		(b)	450.	1 hour	AAL