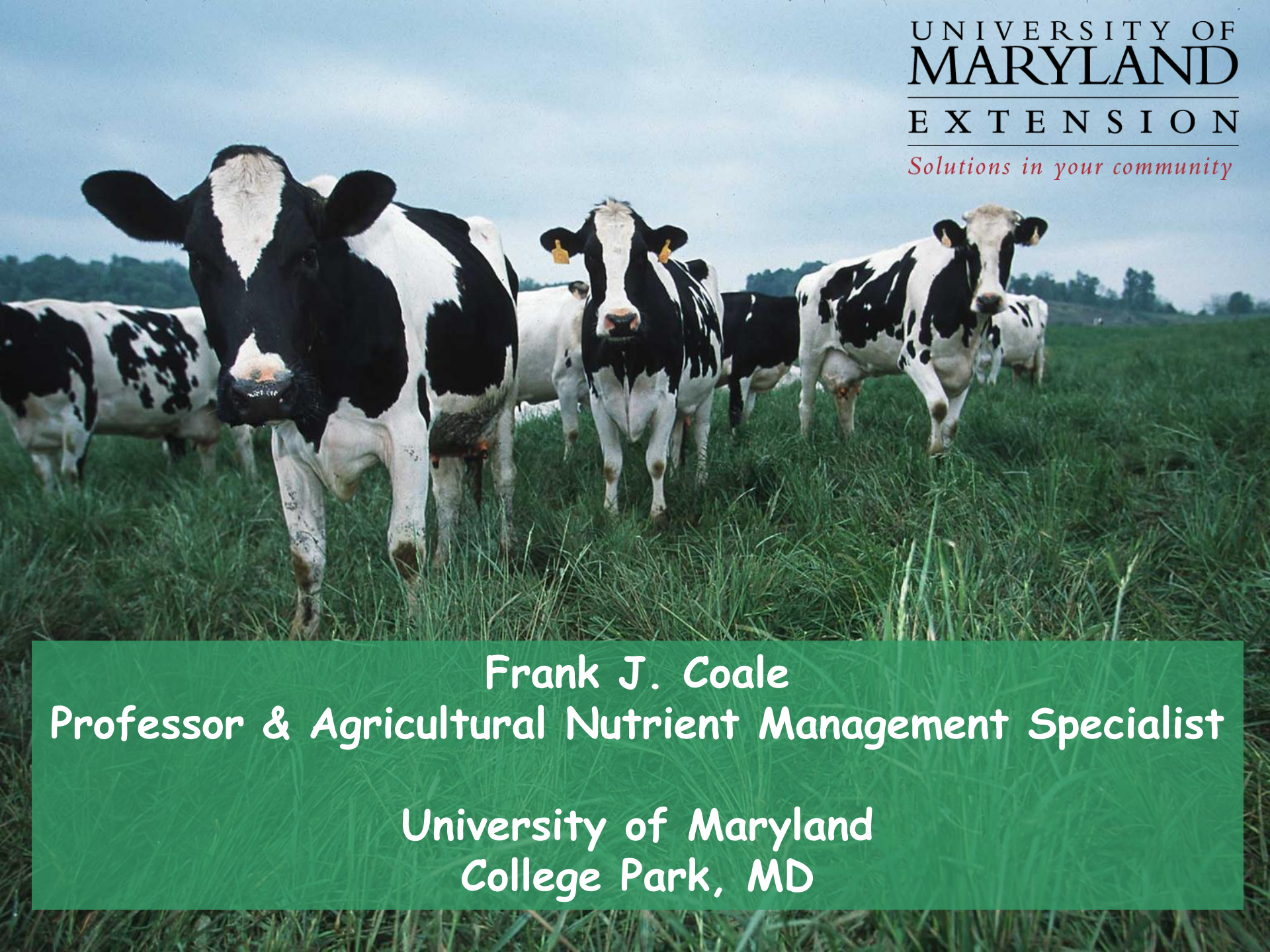
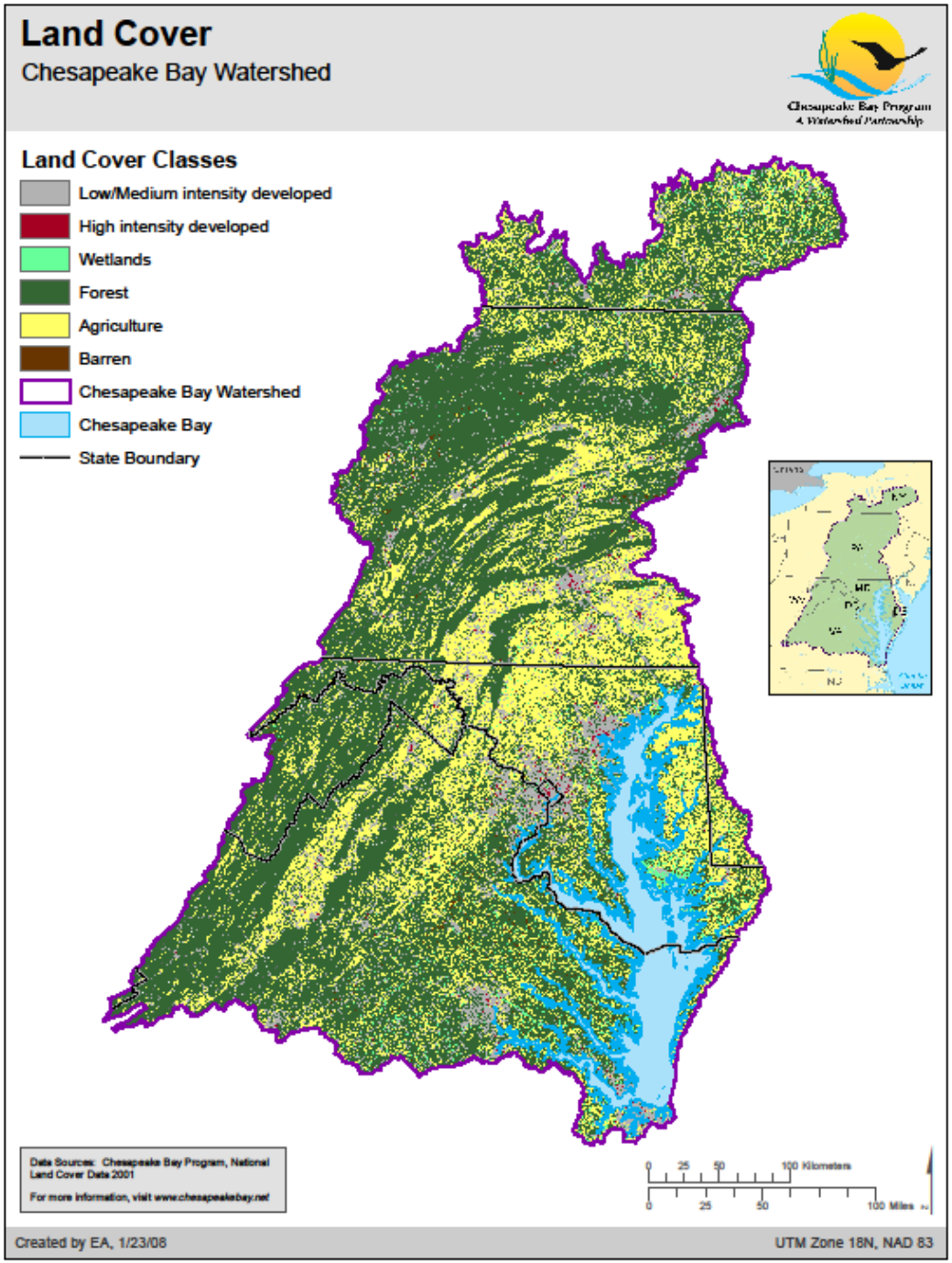


Frank J. Coale
Professor & Agricultural Nutrient Management Specialist

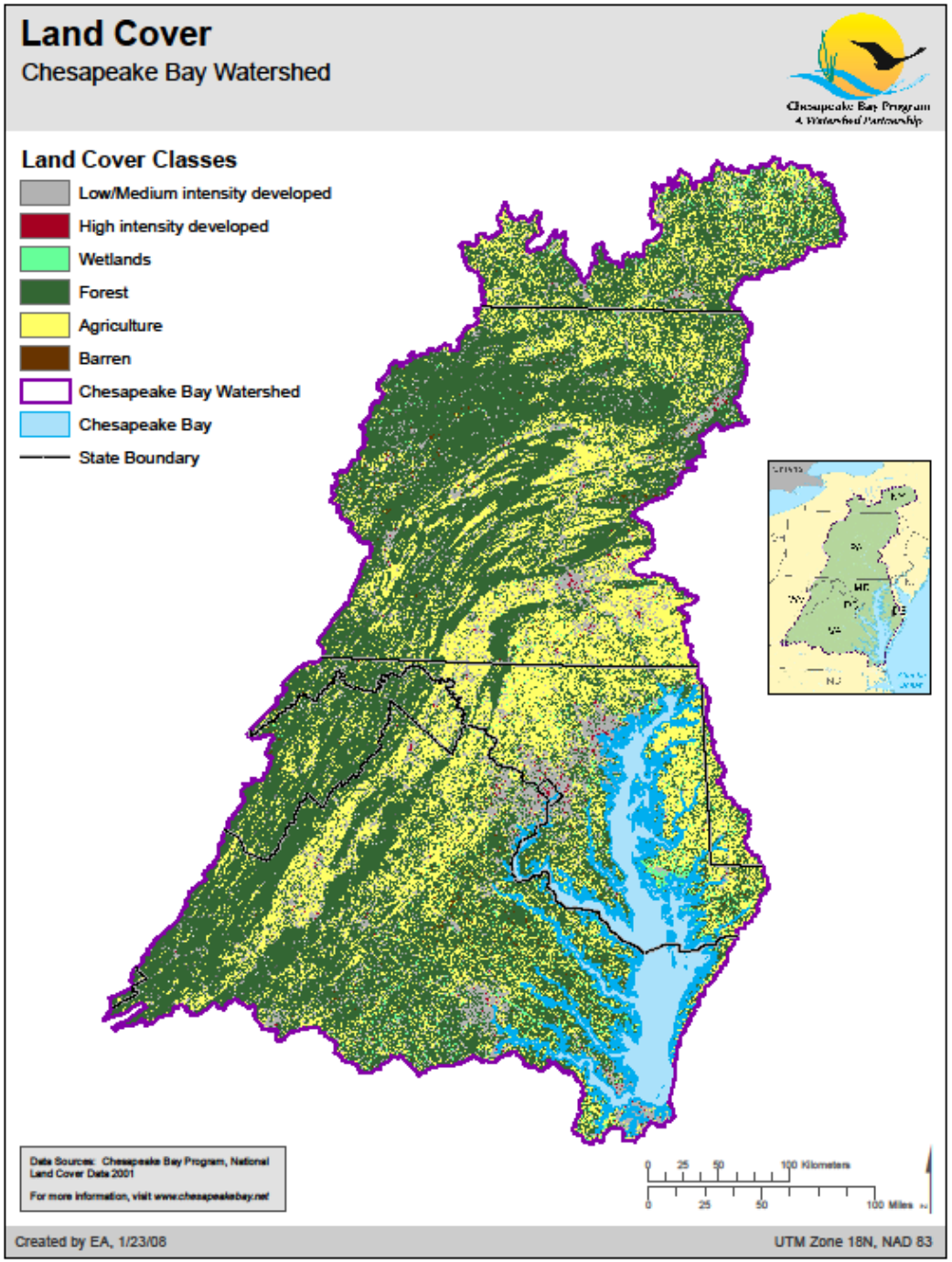
University of Maryland
College Park, MD



Farming in the Chesapeake Bay Watershed

The Game is the Same,
But the Rules are Changing

What should MN be concerned about?



Farming in the Chesapeake Bay Watershed

The Game is the Same,
But the Rules are Changing

Question:
Will the new rules spread to the Mississippi River Watershed and elsewhere?

State of Minnesota

- 87,000 square miles
- 81,000 farms
- 26,900,000 farm acres
- 332 acres per farm
- 5,345,000 people
- 61 people per sq. mile

Chesapeake Bay Watershed

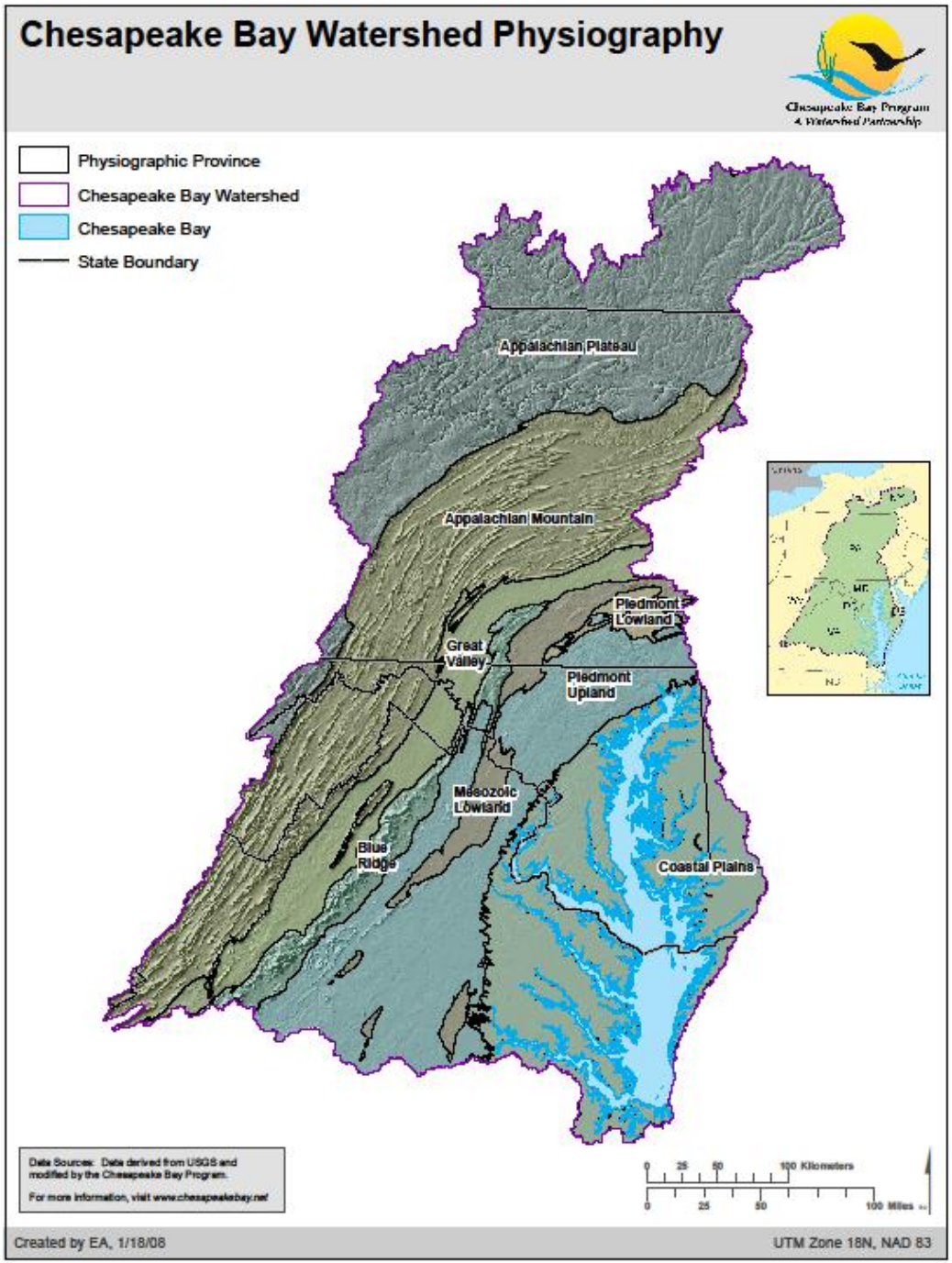
- 64,000 square miles
- 87,000 farms
- 6,500,000 farm acres
- 75 acres per farm
- 17,000,000 people
- 266 people per sq. mile

Chesapeake Bay Watershed

North America's largest estuary (#3 worldwide)

150 major rivers & 100,000 streams and creeks

11,600 miles of shoreline (longer than west coast of US)
Average depth = 21 feet (very shallow)
14:1 land:water ratio (largest, coastal watershed, worldwide)



Physiographic Regions within the Chesapeake Bay watershed

Atlantic Coastal Plain

Piedmont Upland

Piedmont Lowland

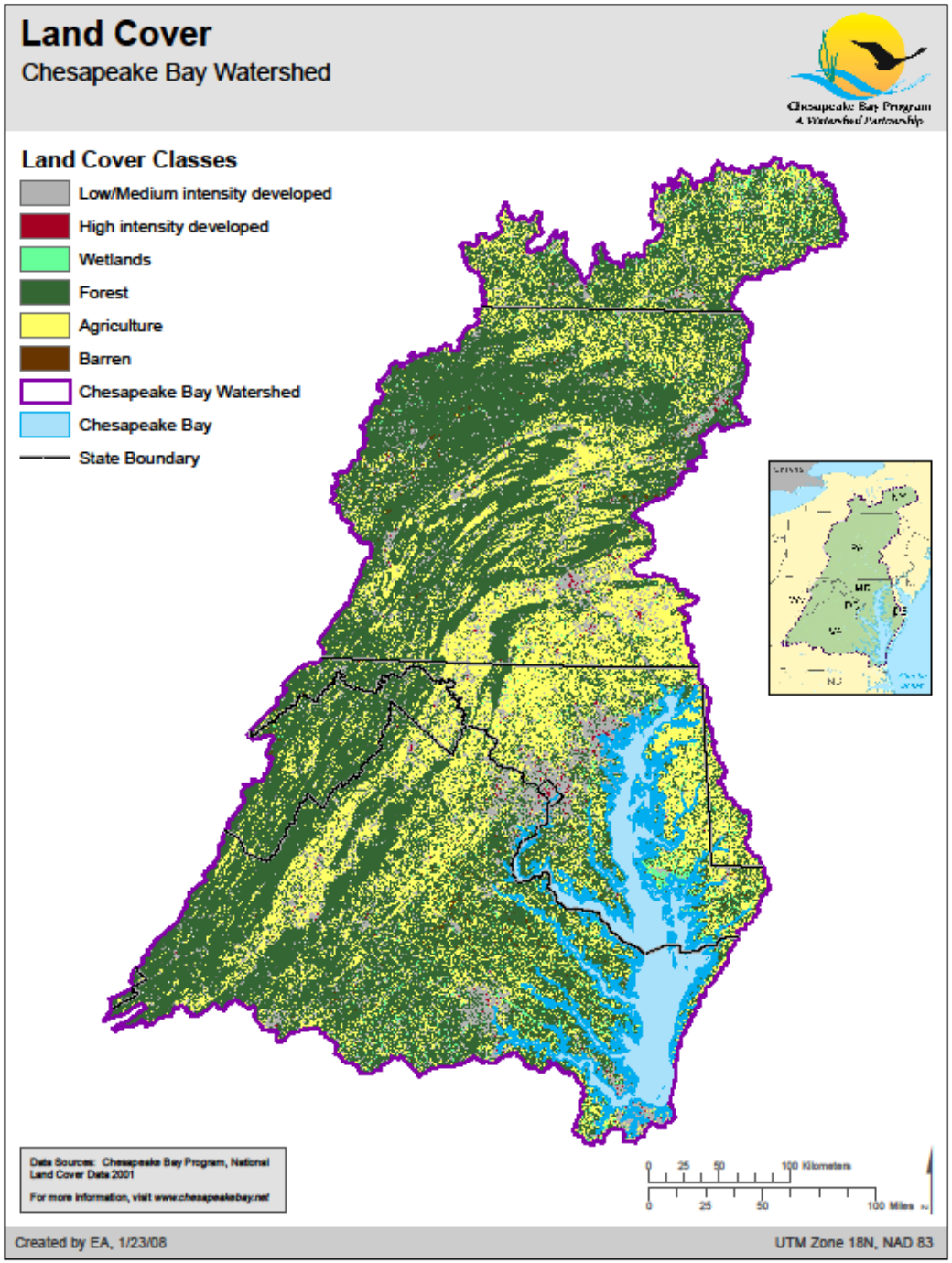
Mesozoic Lowland

Blue Ridge Mountains

Great Valley (limestone)

Appalachian Mountains

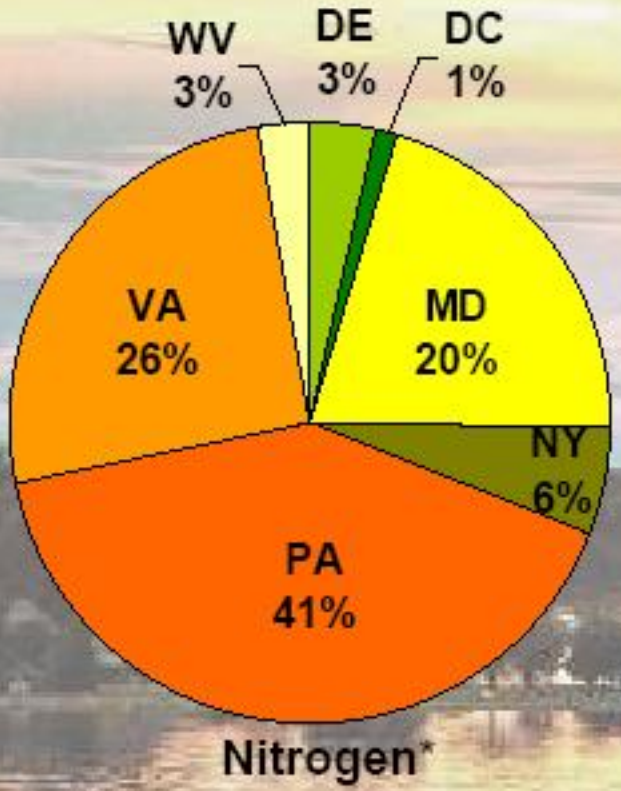
Appalachian Plateau



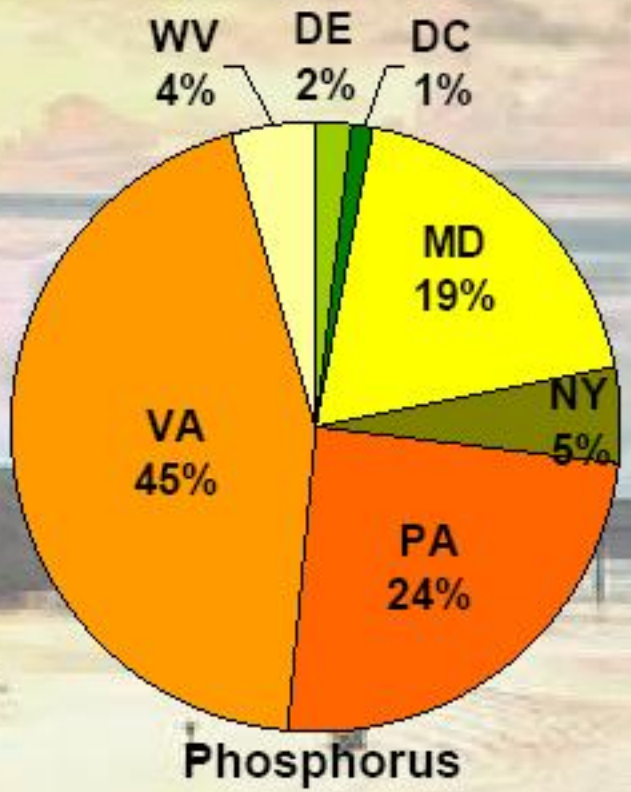
Land cover in the Chesapeake Bay watershed

Forest	57%
Turf/lawn	16%
Pasture/hay	13%
Tilled land	11%
Urban	3%
Water	1%

Nutrient Loads by State



Nitrogen*



Phosphorus

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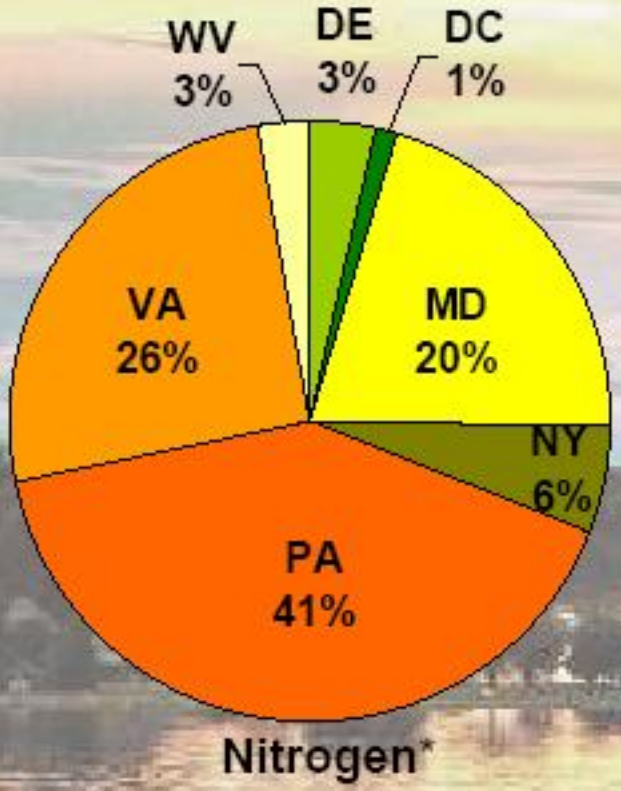
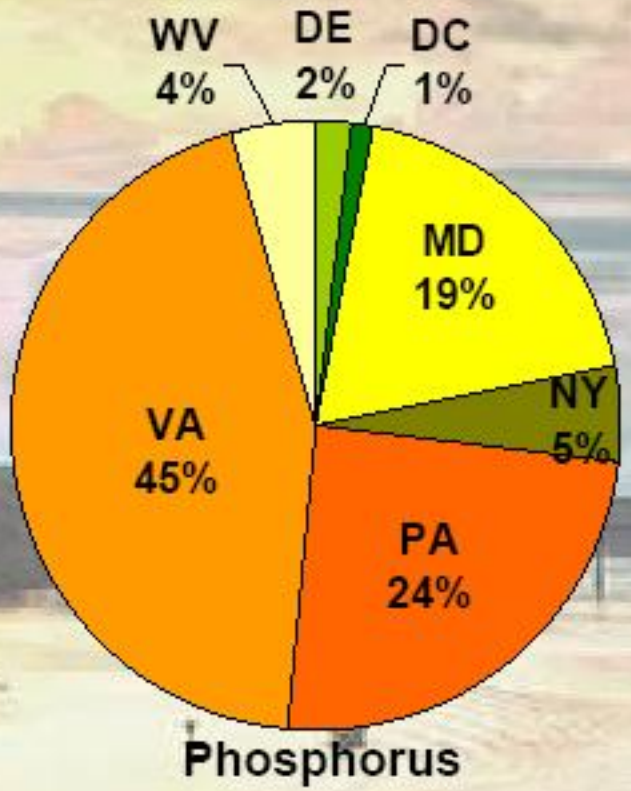
Nutrient Loads by State



Nitrogen*



Phosphorus

So, why are some states setting policy and regulations more aggressively than other states?

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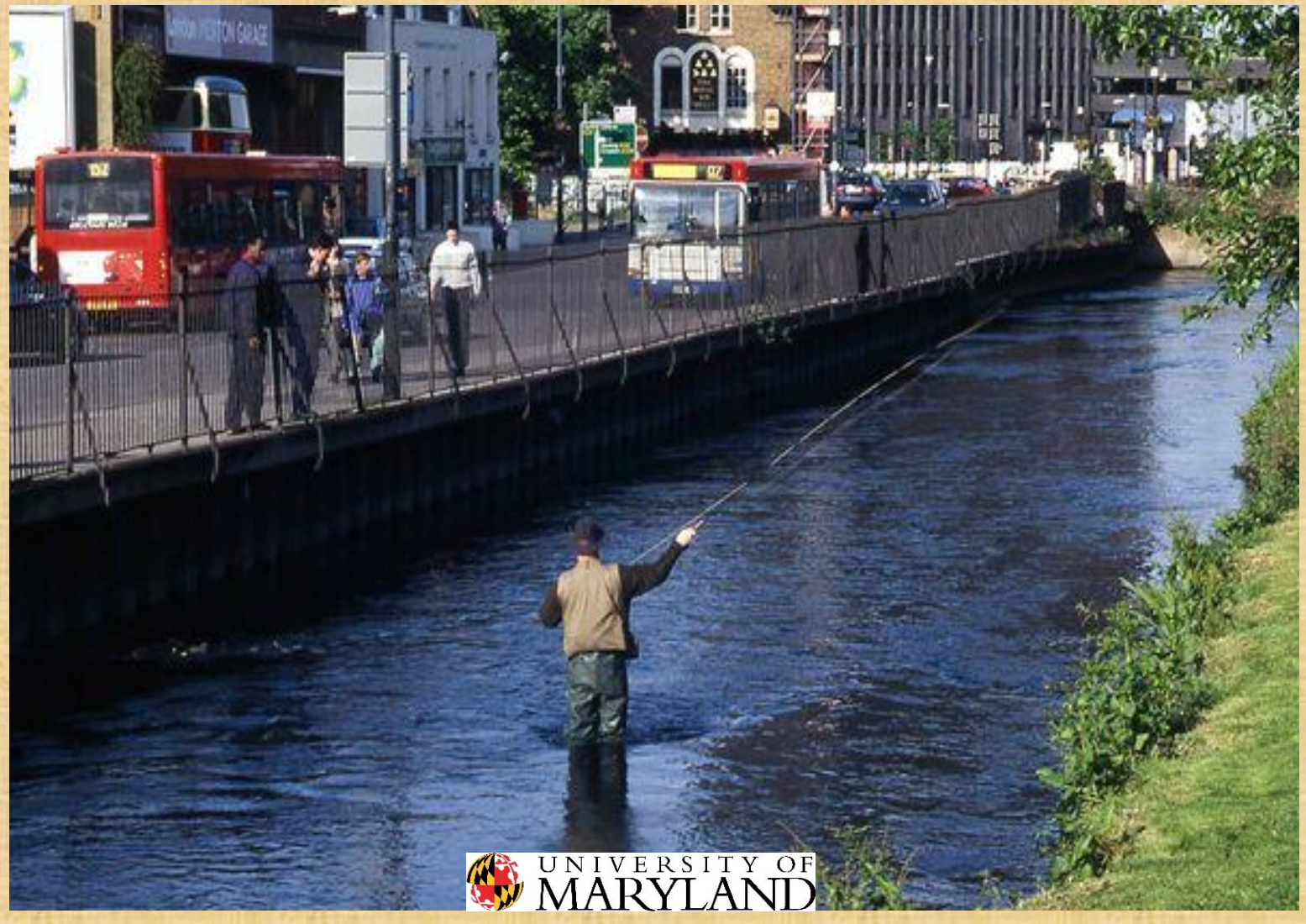
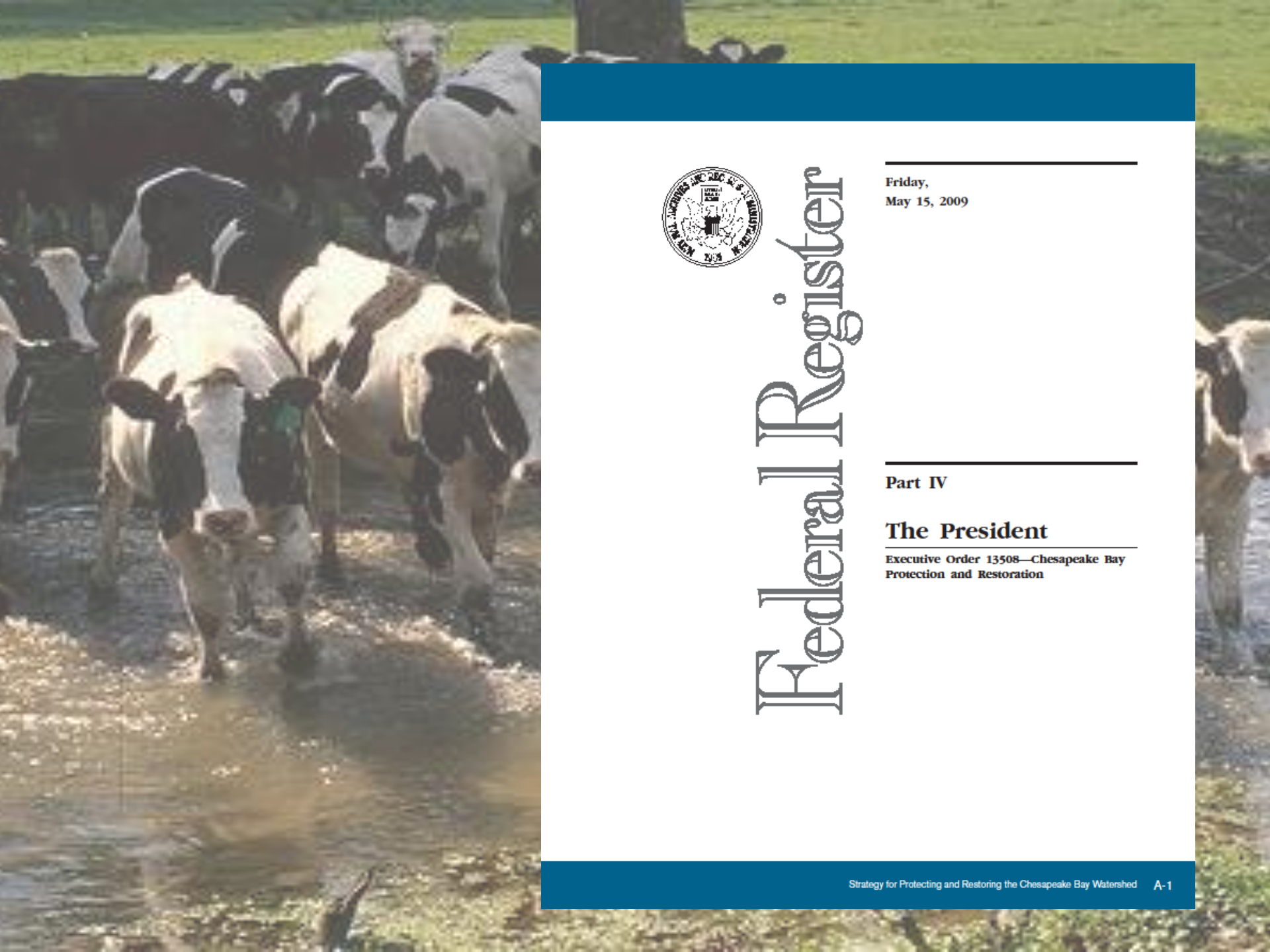
Federal Clean Water Act (1972)
Requires TMDL for waters that don't meet state standards

TMDL = Total Maximum Daily Load
Defines amount of pollution a water body can handle and still be healthy





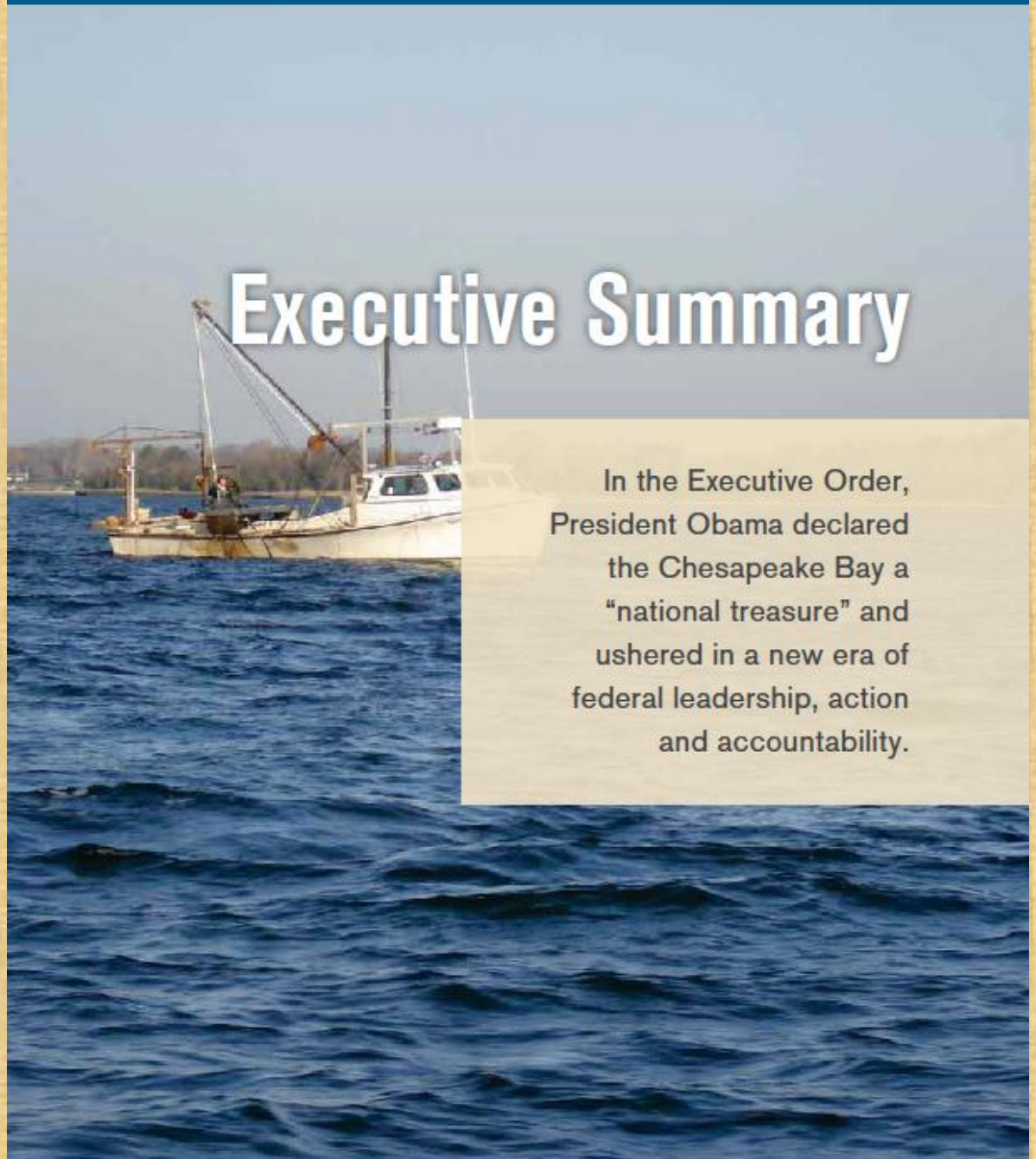
Federal Register

Friday,
May 15, 2009

Part IV

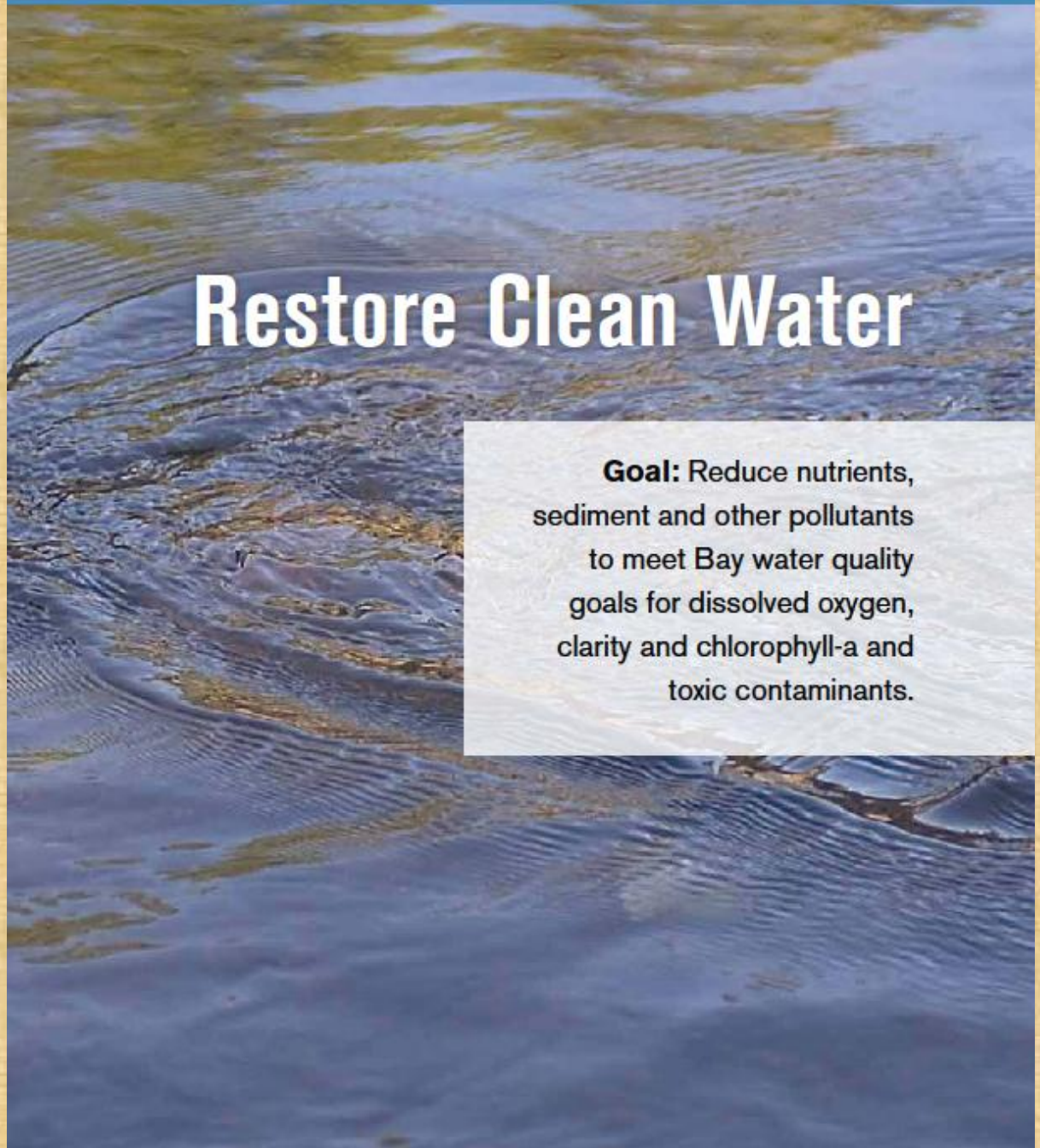
The President

Executive Order 13508—Chesapeake Bay Protection and Restoration



Executive Summary

In the Executive Order, President Obama declared the Chesapeake Bay a "national treasure" and ushered in a new era of federal leadership, action and accountability.



Restore Clean Water

Goal: Reduce nutrients, sediment and other pollutants to meet Bay water quality goals for dissolved oxygen, clarity and chlorophyll-a and toxic contaminants.

The Chesapeake Bay TMDL

- EPA sets pollution diet to meet states' Bay clean water standards
- Caps on nitrogen, phosphorus and sediment loads for all 6 Bay watershed states and DC
- States set load caps for point and non-point sources

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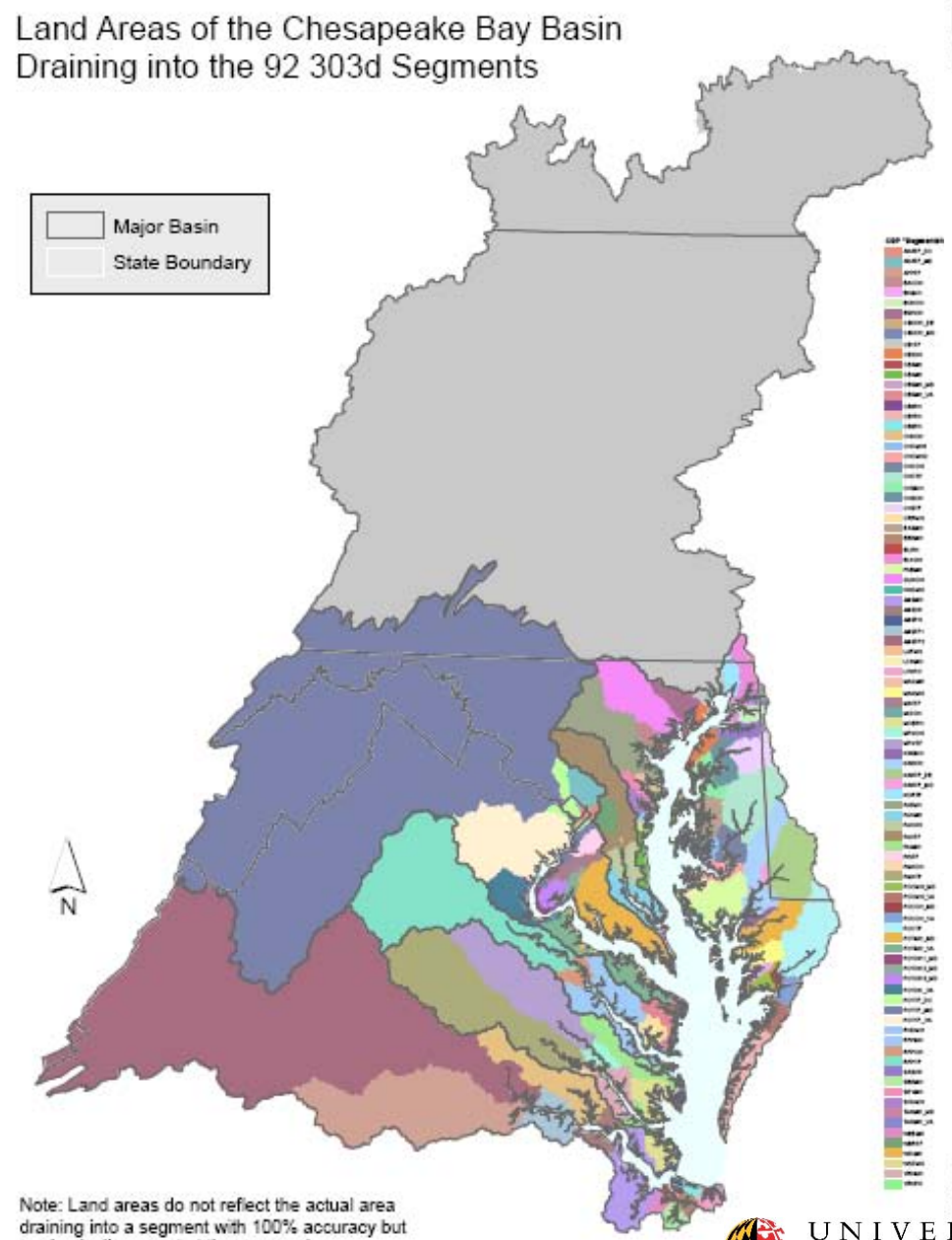
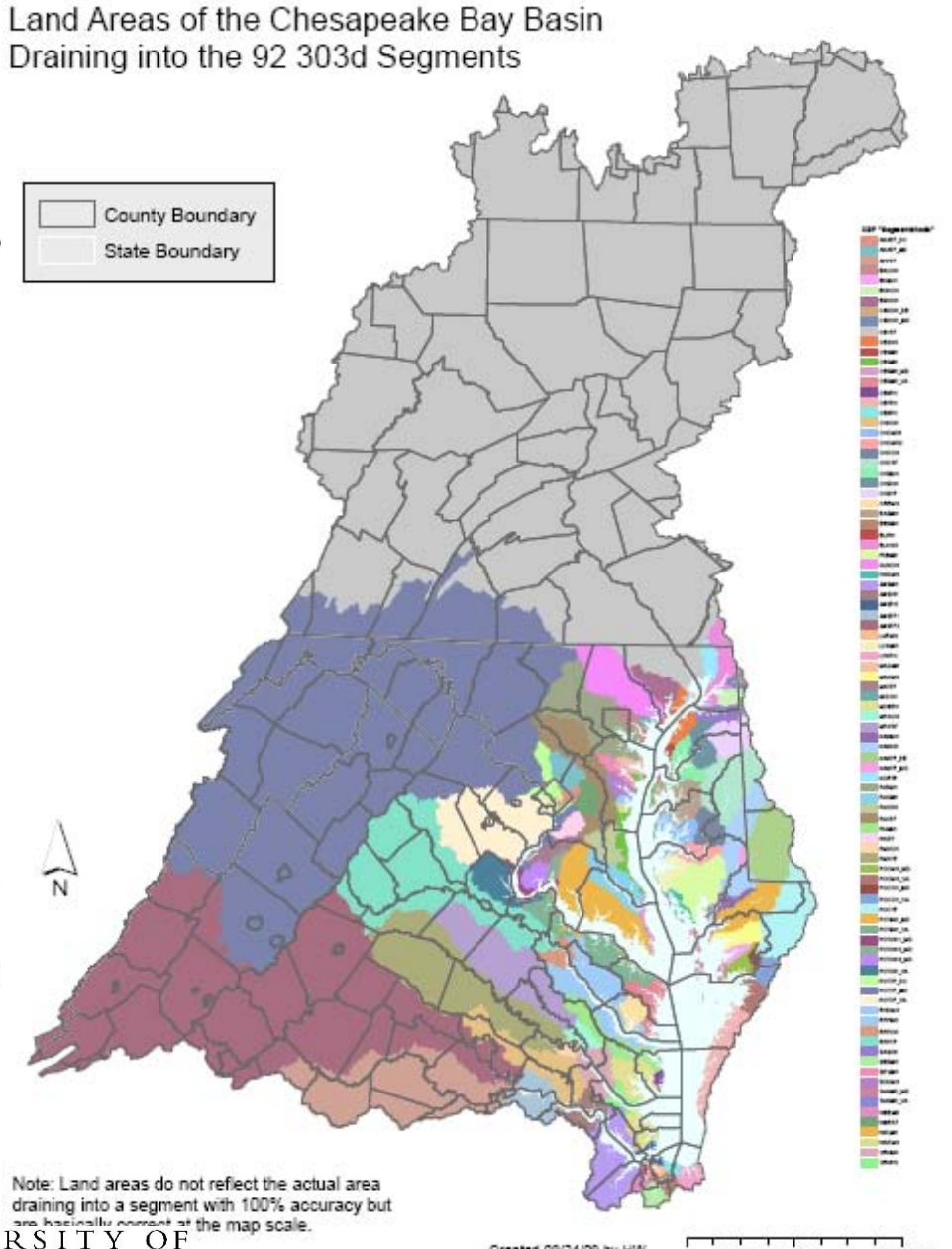
Chesapeake Bay Watershed
Total Annual N & P Nutrient Loading Targets

State	Nitrogen Target Load	Phosphorus Target Load
Pennsylvania	73.6 million lbs N/yr	3.2 million lbs P/yr
Virginia	59.2	7.1
Maryland	41.0	3.0
New York	10.5	0.6
West Virginia	5.7	0.6
Delaware	5.3	0.3
Washington, DC	2.4	0.1
Total	197.7 million lbs N/yr	14.9 million lbs P/yr

Phase I WIP



Phase II WIP



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MDE

EXAMPLE:

Patuxent Tidal Fresh (PAXTF) Segment Drainage Area with counties delineated

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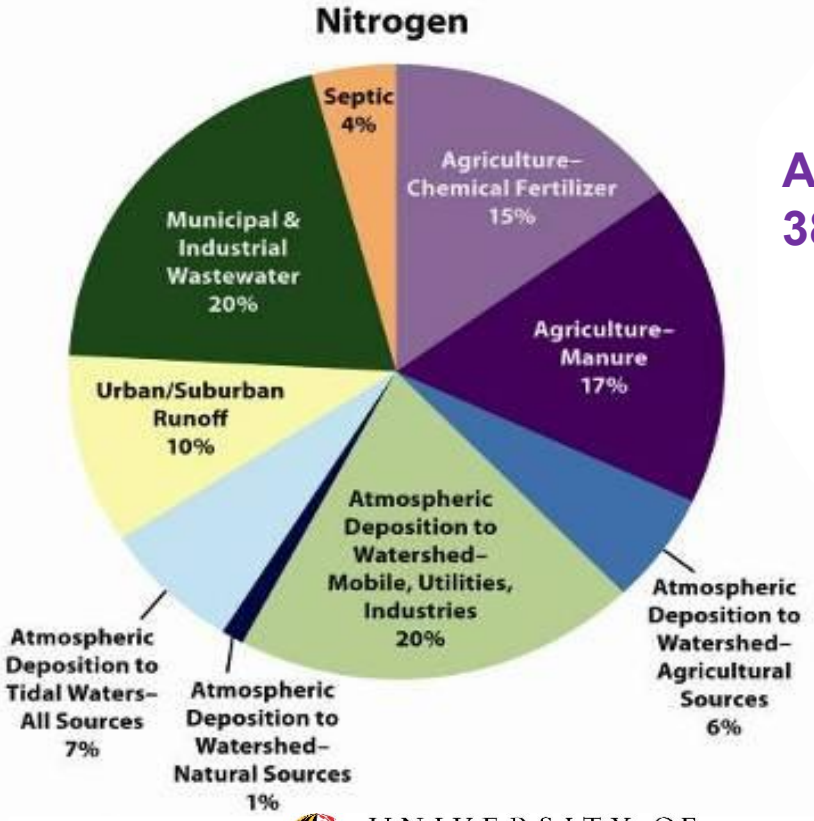
Main Sources of N Loading to Chesapeake Bay

- Agriculture – animal manure, commercial fertilizer
- Urban/suburban runoff – a growing problem
- Air pollution – tailpipes, power plants
- Wastewater – sewage treatment plants



Ag N 38%

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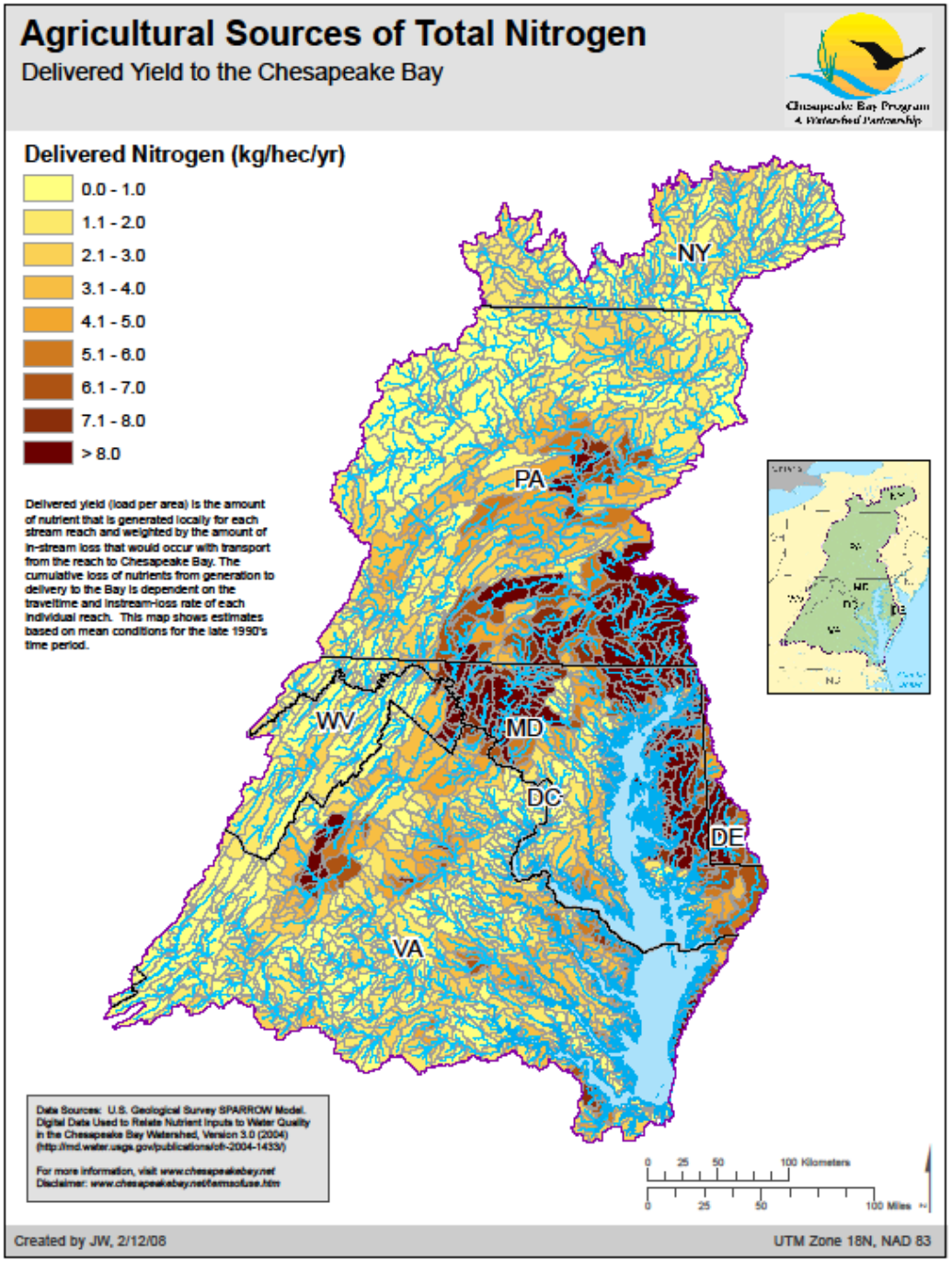
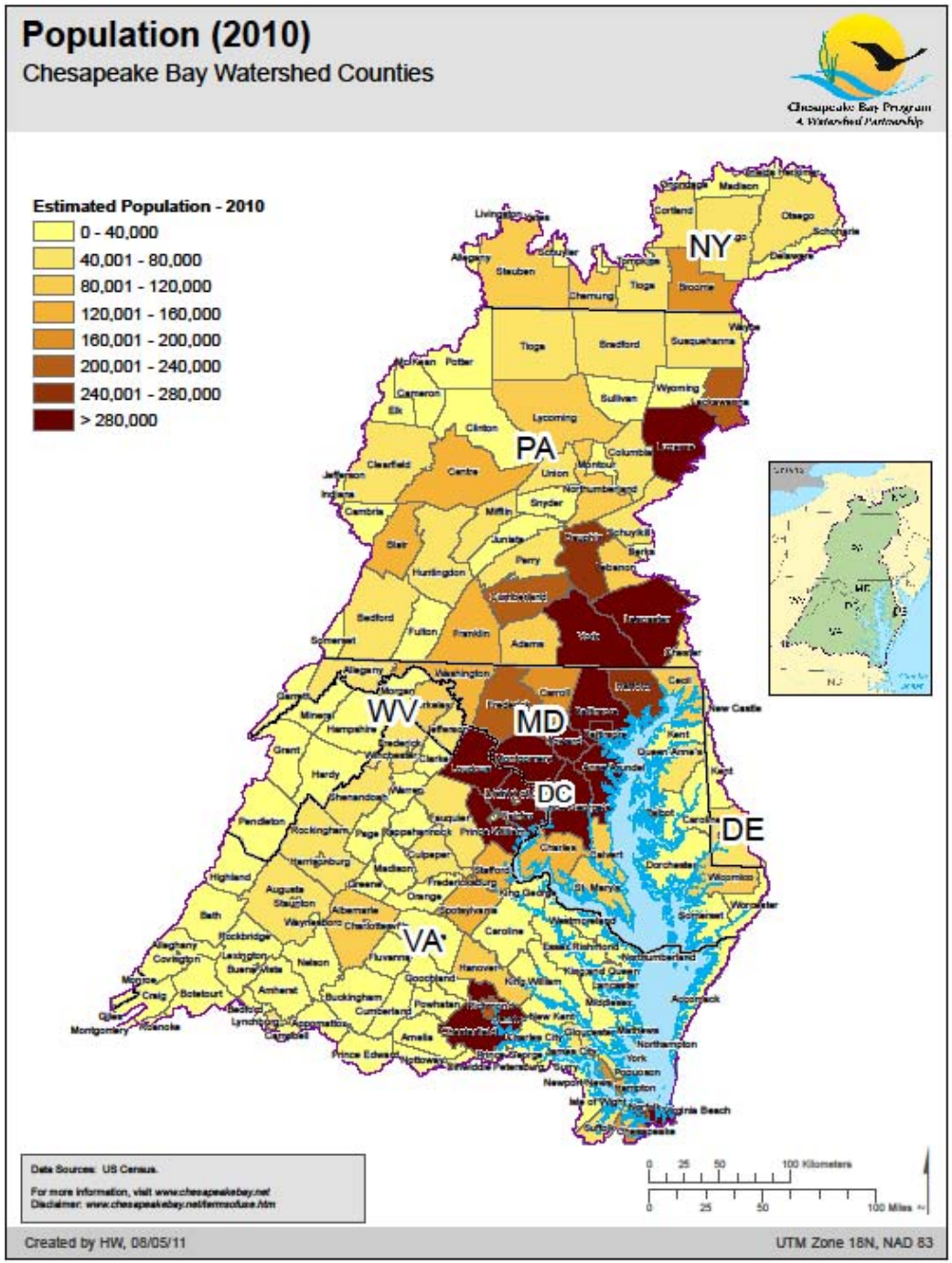


Agricultural Nitrogen Delivered to Chesapeake Bay

0 to >7 lbs N/acre/year

Delivered to the Bay

- Not edge of field
- Not retained in soil
- Not lost to atmosphere
- Not plant uptake



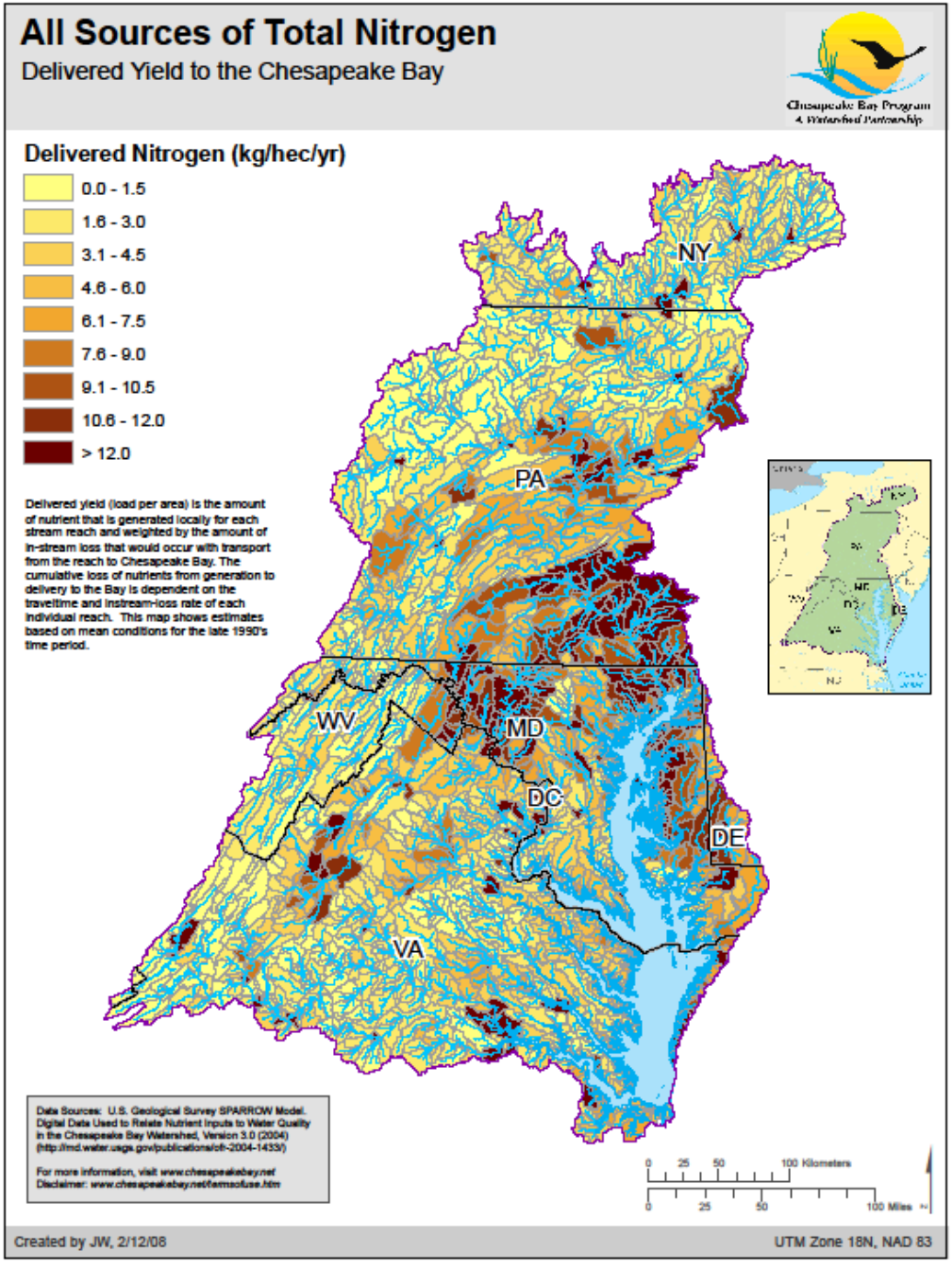
Population Centers in the Chesapeake Bay watershed

People generate nutrients

17,000,000 people

266 people per square mile

Washington, DC is home to the world's largest waste water (sewage) treatment plant (Blue Plains WWTP)

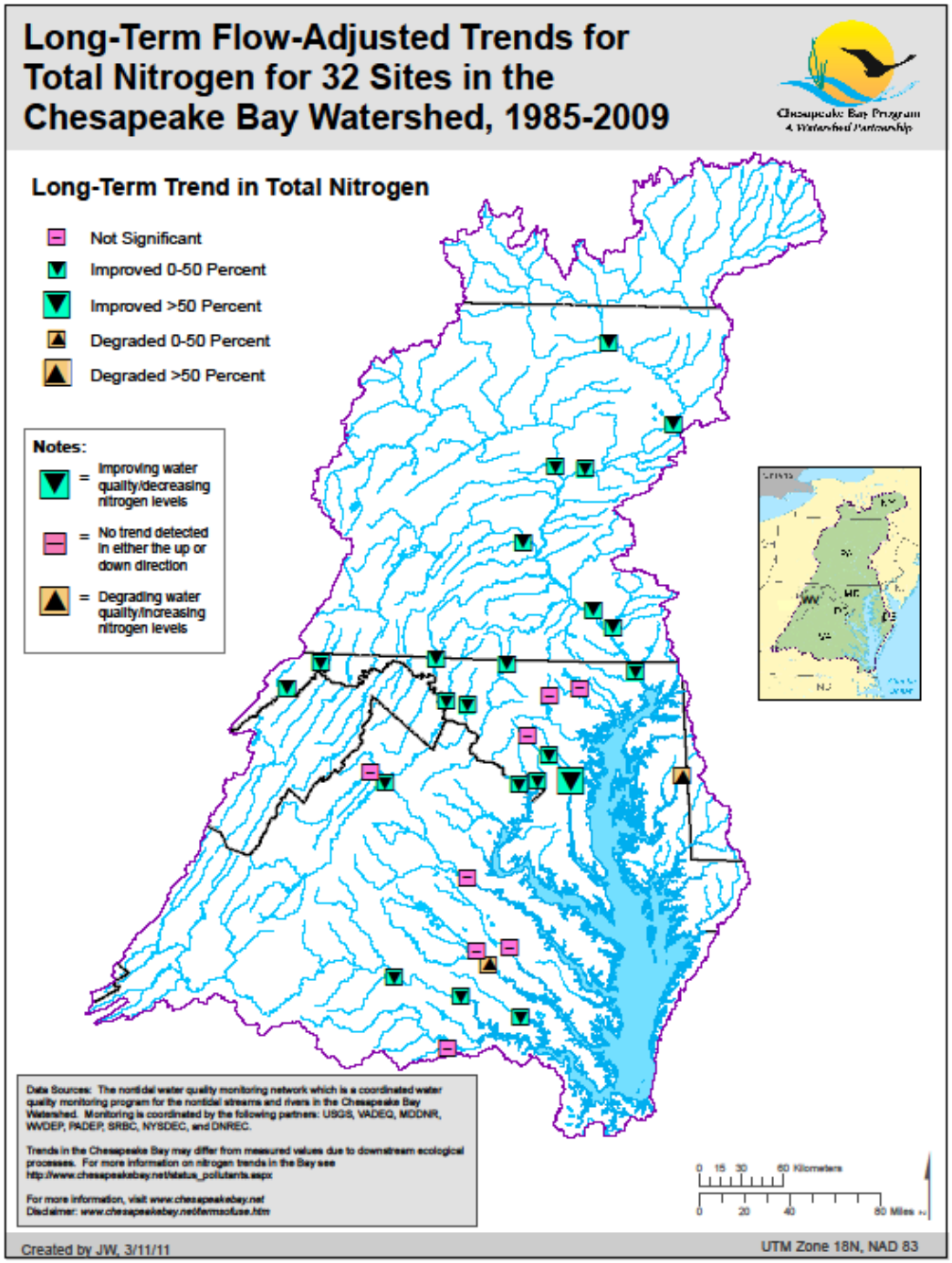


Total Nitrogen Delivered to Chesapeake Bay

0 to >11 lbs N/acre/year

Delivered to the Bay

- Not edge of field
- Not retained in soil
- Not lost to atmosphere
- Not plant uptake

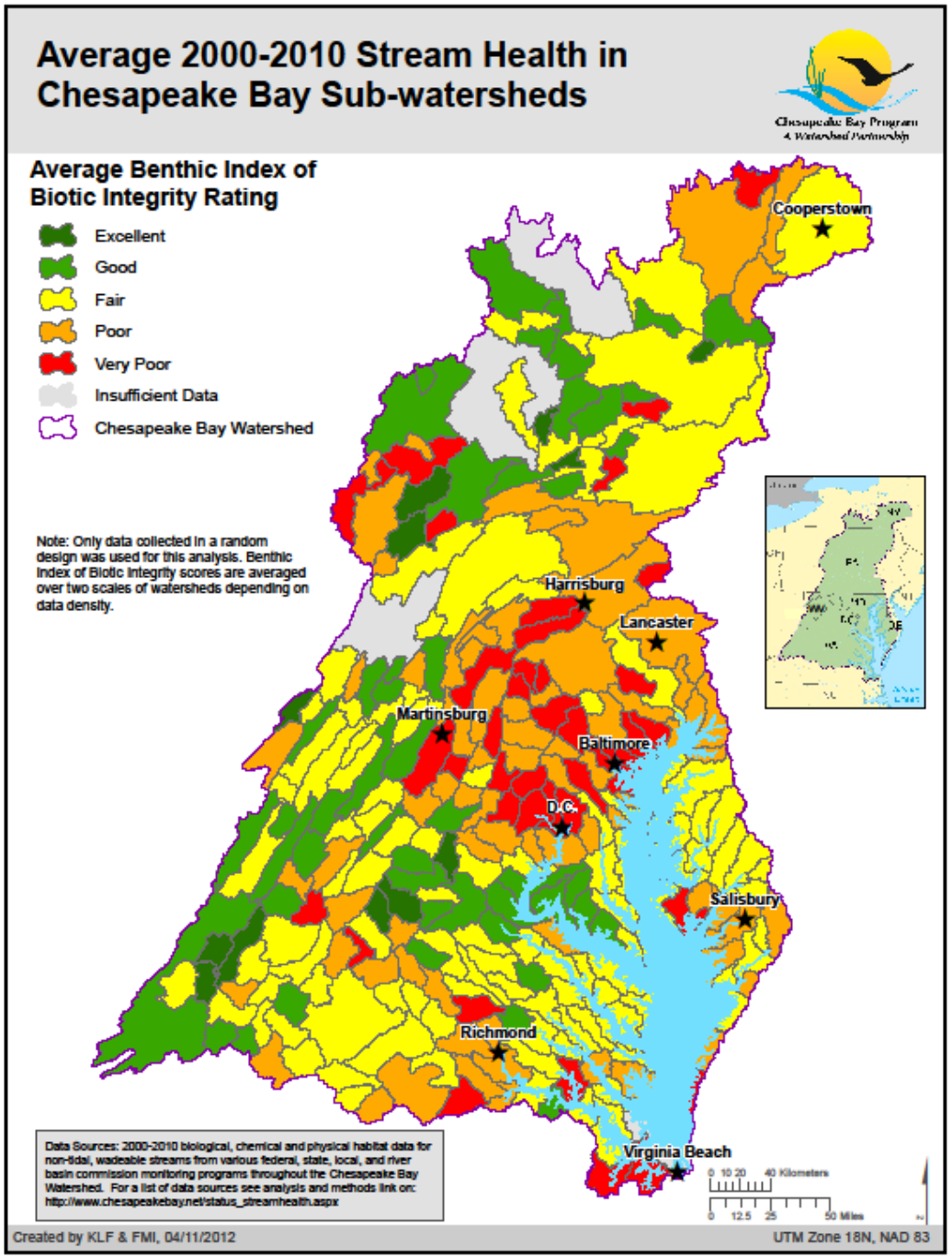


24 Years of Progress

Flow-adjusted N loads declined in most agriculture dominated areas

No significant change in N loads from more urbanized areas

N loads increased on the Delmarva Peninsula and south-central Virginia



Steam Health in the Chesapeake Bay watershed

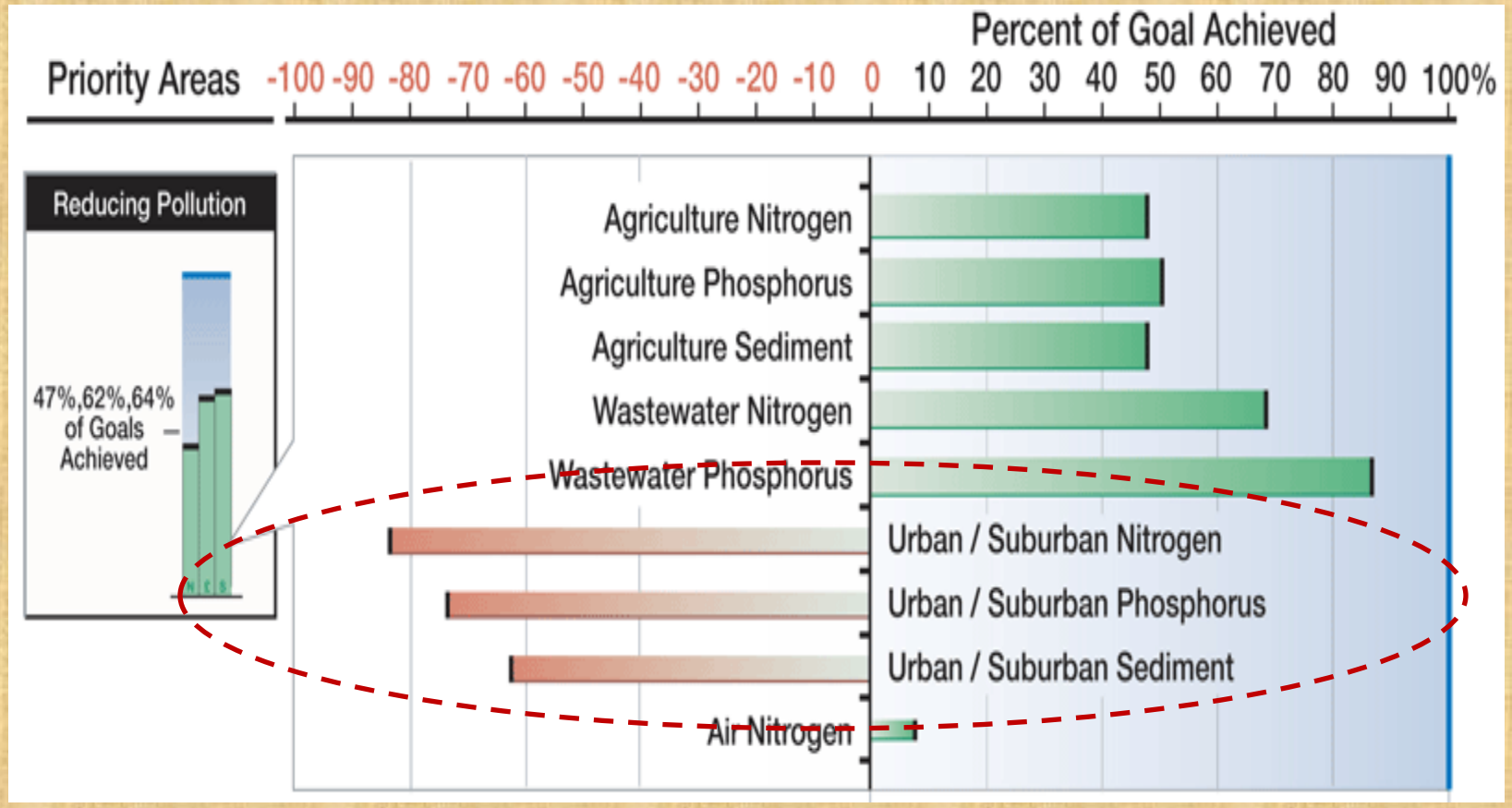
Scattered good and poor

Local conditions impact local streams

Local management changes condition of local streams

Health of the Chesapeake Bay

Urban/Suburban stormwater is the only pollution source* sector in the Bay watershed that is still growing



Source: Chesapeake Bay 2007 Health and Restoration Assessment (March 2008)

Some jurisdictions may be under reporting existing stormwater management practices

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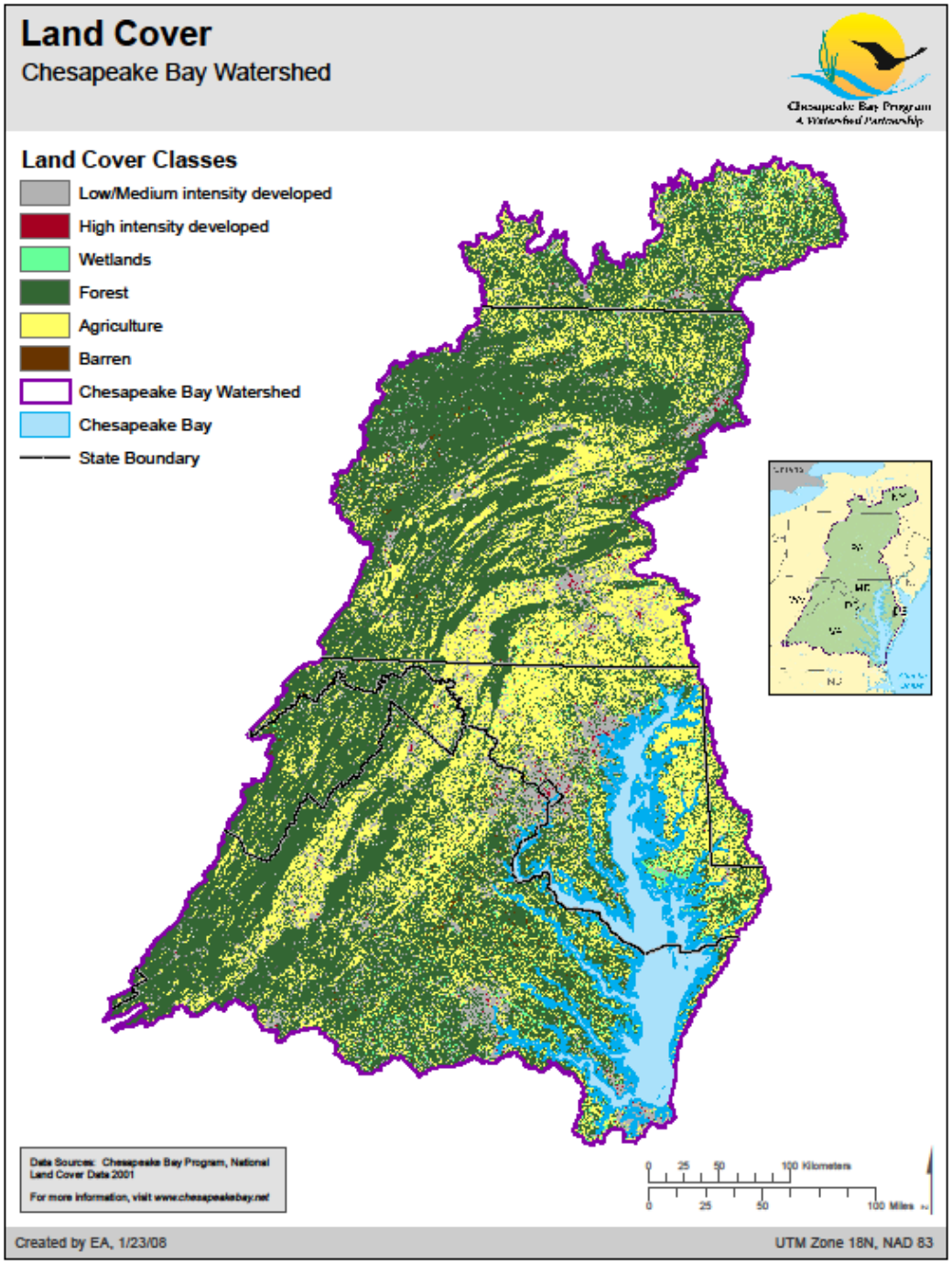


Farming in the Chesapeake Bay Watershed

The Game is the Same,
But the Rules are Changing

New Rules for Farming in the Chesapeake Bay Watershed

Rules and/or regulations that were put in place somewhere in the Chesapeake Bay Watershed since 1998

- Nearly all farms must have a nutrient management plan written by a certified plan writer or certified consultant
- All sources of N & P are regulated
  - Fertilizer
  - Manures
  - Sewage sludge
  - Composts
  - Processing wastes
- Nutrient management plan implementation subject to inspection (~ 10% per year) with penalties and fines

New Rules for Farming in the Chesapeake Bay Watershed

- **Nutrient Management Plans**
  - **Soil testing at least every 3 years**
  - **Manure testing every year**
  - **Manure tracking if moved off generating farm**
  - **Multi-year rotational and organic source mineralization credits**
  - **Plans updated every 3 years or significant operational changes**

New Rules for Farming in the Chesapeake Bay Watershed

Specific N Fertilizer Management Requirements include:

- N fertilization rate must not exceed Extension recommendations
  - Based on calculated plant available N credits in the system
  - Legume credits, past manure mineralization credits, etc.
- N applied as close as possible to crop need
  - No fall N application for spring-planted crops
  - No fall N application to winter wheat if soil NO_3-N > 10 ppm
  - No spring N applications to winter wheat until after March 1
  - Require split applications of N to corn (future rule?)
    - Use PSNT to determine side-dress N rate (future rule?)
  - Require subsurface injection of all N (future rule?)

New Rules for Farming in the Chesapeake Bay Watershed

- No manure application after November 1 or before March 1
- No manure application on soybeans
- All organic nutrient sources (manures, biosolids, soil amendments, etc.) must be injected or incorporated into the soil within 48 hours after application.

  Exceptions:

  Manure directly deposited by animals

  Pastures and hayland

  Highly erodible soils (HEL)

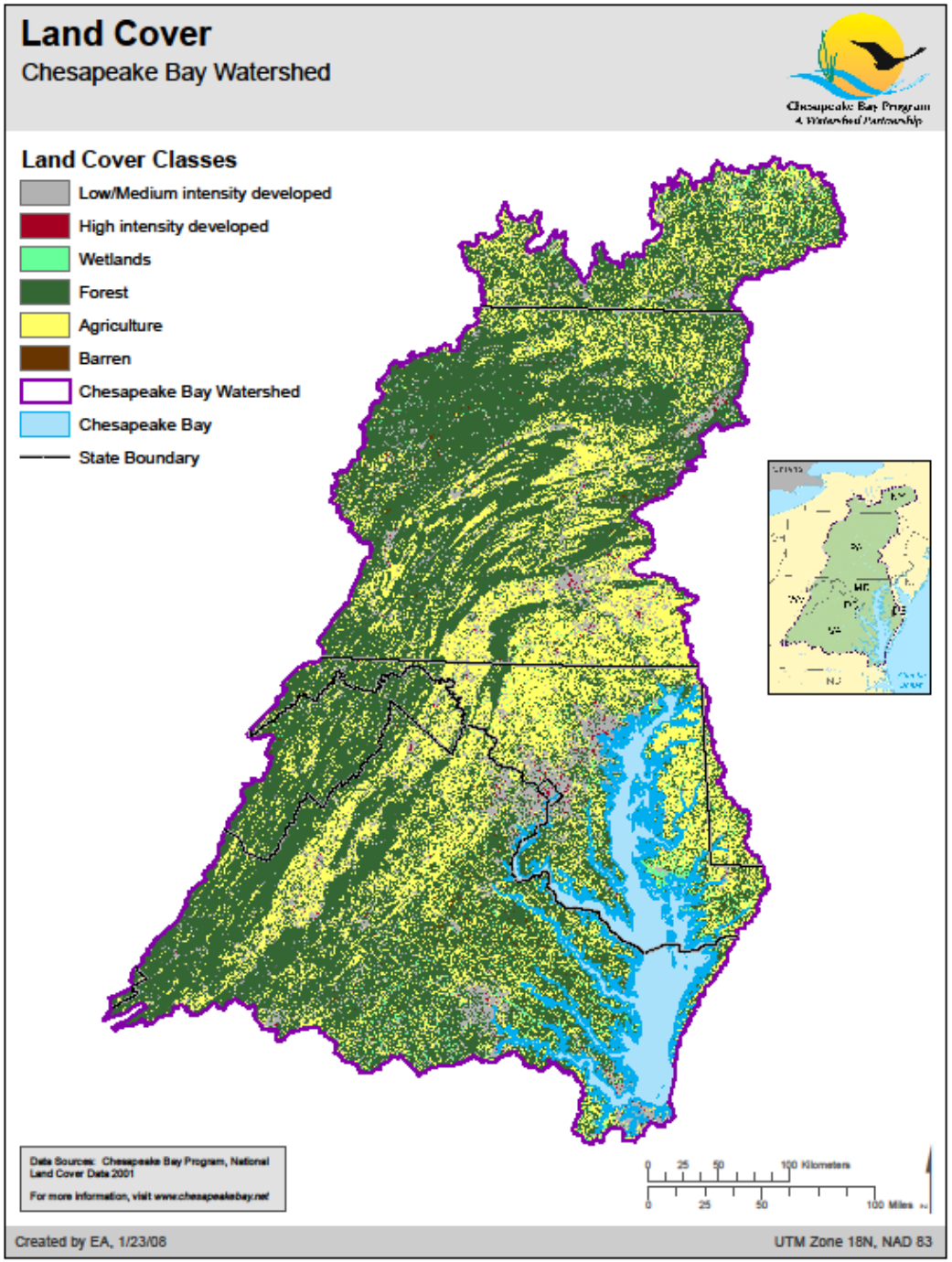
  Spray irrigation application systems

  Soil disturbance restrictions imposed by federal programs
- Winter cover crop planting required.

New Rules for Farming in the Chesapeake Bay Watershed

Setback requirements from streams, creeks, ponds & rivers

- **35-foot setback for broadcast fertilizer application**
- **10-foot setback for directed spray or injection**
- **10-foot setback for manure application on pastures or hayfields**
  - **Includes manure dropped by grazing animals**
  - **Requires fencing to keep grazing animals out**
  - **Requires dedicated stream crossings**



Farming in the Chesapeake Bay Watershed

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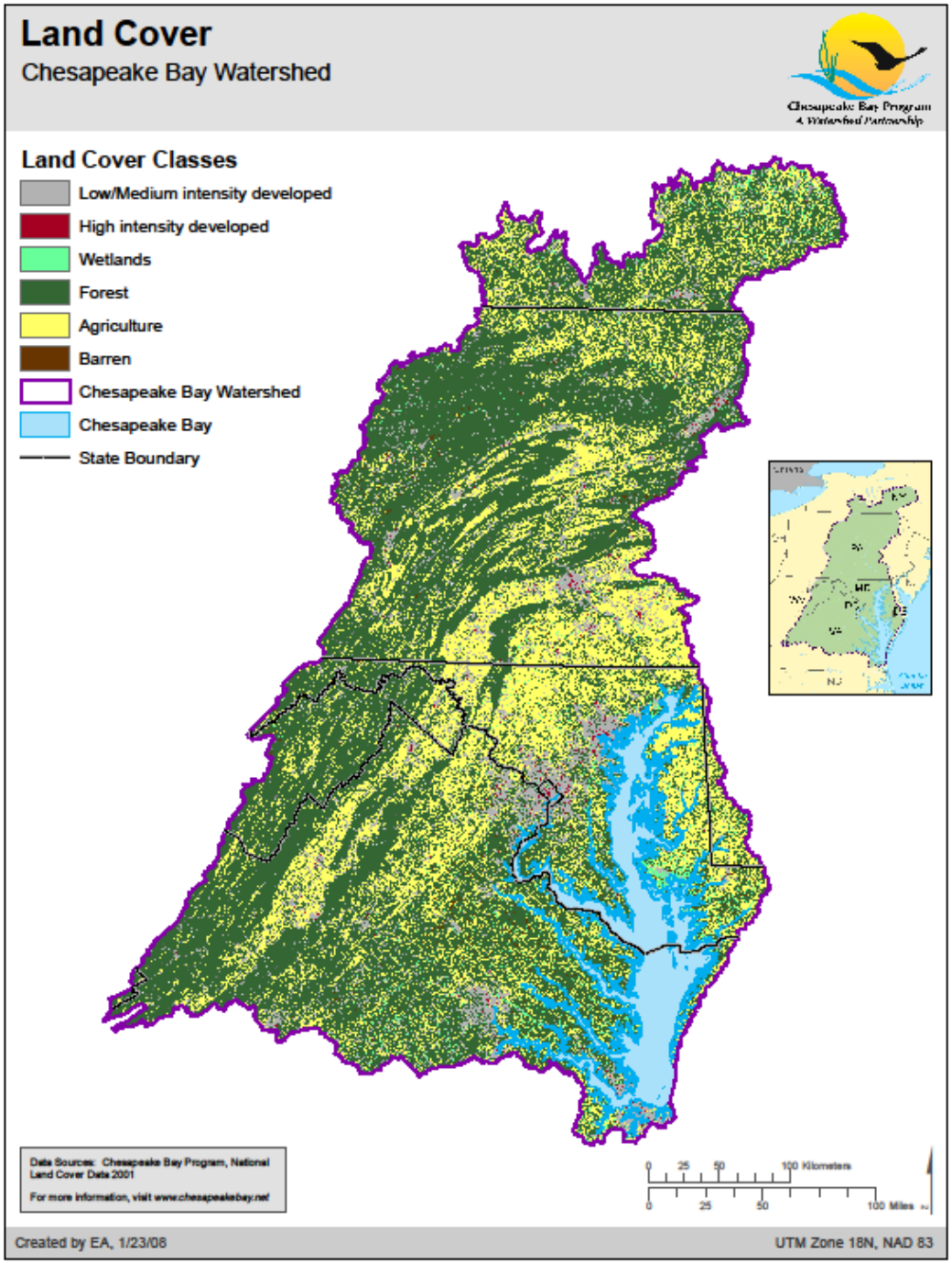
Question:
Will the new rules spread to the Mississippi River Watershed and elsewhere?



Farming in the Chesapeake Bay Watershed

The Game is the Same,
But the Rules are Changing

Question:
Will the new rules spread to the Mississippi River Watershed and elsewhere?

My Prediction:
Absolutely, yes.

Frank J. Coale

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