Activity 1 Team

Draft maps for discussion at November 21, 2019 Conowingo WIP Steering Committee Meeting

- This exercise is to facilitate the identification of focal geographies for Conowingo WIP Analysis, Outreach, and Implementation.

- Recommendations based on a combination of
  - GIS Analysis
  - Considerations of local capacity

- Definition of Land-river segment (LRS) as used by Chesapeake Bay Program: The intersection of land and river segments, used to proportion the load from the land segments into the appropriate reaches.
  - The Land Segments are based on Counties within the study area, with some counties subdivided if loading rates were not sufficiently consistent throughout the land segment.
  - Riverine processes on nutrient and sediment load delivery to the bay are simulated through small watersheds, roughly the size of 11-digit HUCS. Watershed boundaries and size were determined by the presence of a reach of at least 100 CFS or a calibration station.

- List of maps included in this slide deck:
  - Scenario 2 geography
  - Proposed CWIP priority geographies
  - Buffer Restoration Opportunities
  - Cover Crop Opportunities
  - Wetland Restoration Opportunities
  - Urban BMP Opportunities
  - Relative Nitrogen Effectiveness
  - CAST Analysis of Nitrogen Loading

Scenario 2

Geographic boundary included in the October 12, 2018 Final *Framework for the Conowingo Watershed Implementation Plan* document
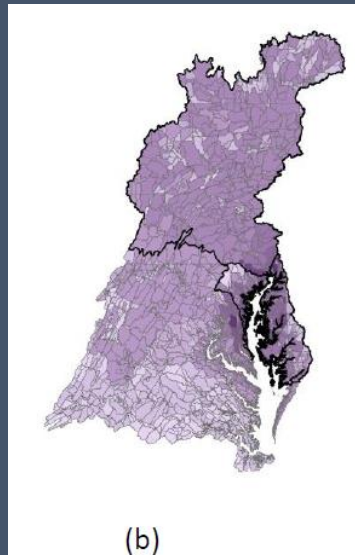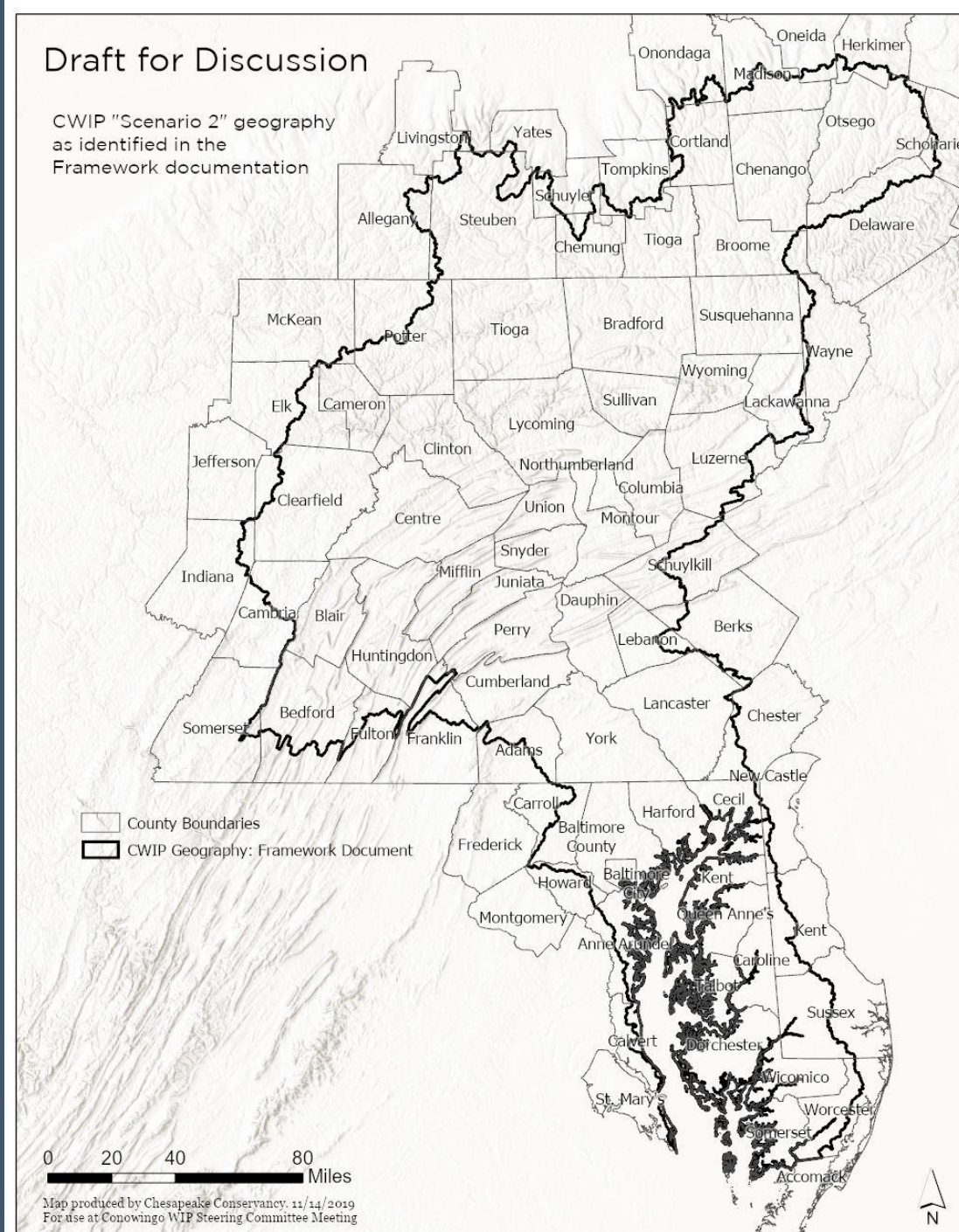

(b)

Image above copied directly from Framework for CWIP document. p2

Draft for Discussion

CWIP "Scenario 2" geography as identified in the Framework documentation

County Boundaries
CWIP Geography: Framework Document

0   20   40   80
                Miles

Map produced by Chesapeake Conservancy. 11/14/2019
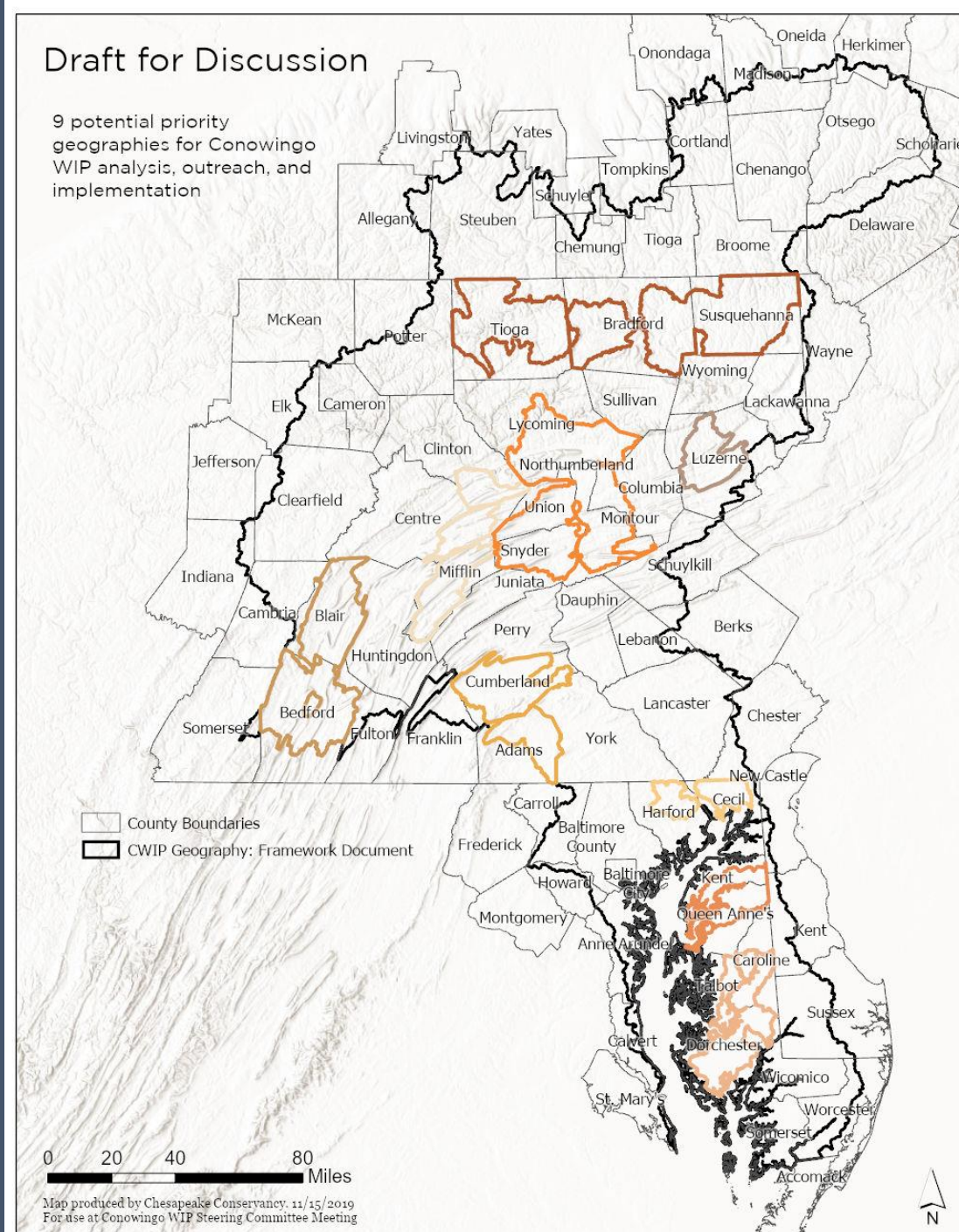For use at Conowingo WIP Steering Committee Meeting

Scenario 2 boundary:
Geobasins (major river basins segmented by geologic factors) as listed:
- Susquehanna
- Western Shore,
- Eastern Shore (Upper, Middle, and Lower)

Proposed CWIP Priority Geographies

- Recommendations based on a combination of
  - GIS Analysis (the following 6 maps)
  - Considerations of local capacity

Draft for Discussion

9 potential priority geographies for Conowingo WIP analysis, outreach, and implementation

County Boundaries
CWIP Geography: Framework Document

0 20 40 80 Miles

Map produced by Chesapeake Conservancy. 11/15/2019
For use at Conowingo WIP Steering Committee Meeting
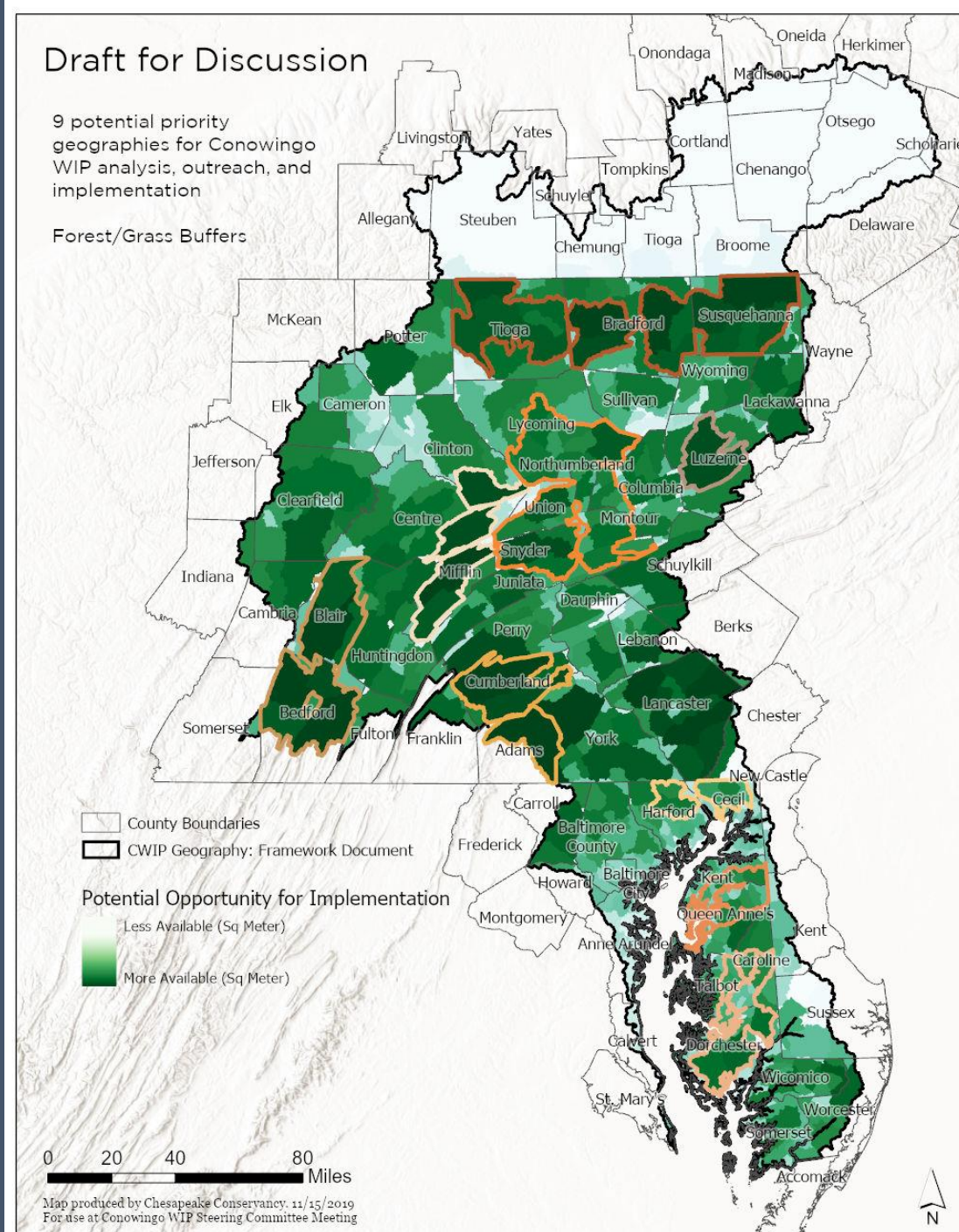
N

PA geographies:
1. Upper Susquehanna (portions of Tioga, Bradford, Susquehanna)
2. Portion of Luzerne
3. Confluence region (portions of Lycoming, Northumberland, Montour, Union, Snyder)
4. Central (portions of Clinton, Centre, Mifflin)
5. Western (Blair, Bedford)
6. South Central (Cumberland, Adams)

MD geographies:
1. Top of the Bay (portions of Harford, Cecil)
2. Mid-Eastern Shore (Portions of Kent, Queen Anne's)
3. Lower Eastern Shore (portions of Caroline, Talbot, Dorchester)

Buffer Restoration Opportunities

- Total area of land suitable for buffer restoration within 100 ft. of water network.

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9 potential priority geographies for Conowingo WIP analysis, outreach, and implementation

Forest/Grass Buffers

County Boundaries
CWIP Geography: Framework Document

Potential Opportunity for Implementation
Less Available (Sq Meter)
More Available (Sq Meter)

Map produced by Chesapeake Conservancy. 11/15/2019
For use at Conowingo WIP Steering Committee Meeting

Datasets used:
- Land Cover: 1-meter land cover data classified using 2013 NAIP imagery; Chesapeake Conservancy & University of Vermont; 2016
- Water network (MD/PA): Lidar-derived water network combined with 2013 1-meter land cover data; Chesapeake Conservancy; 2018

Cover Crop Opportunities
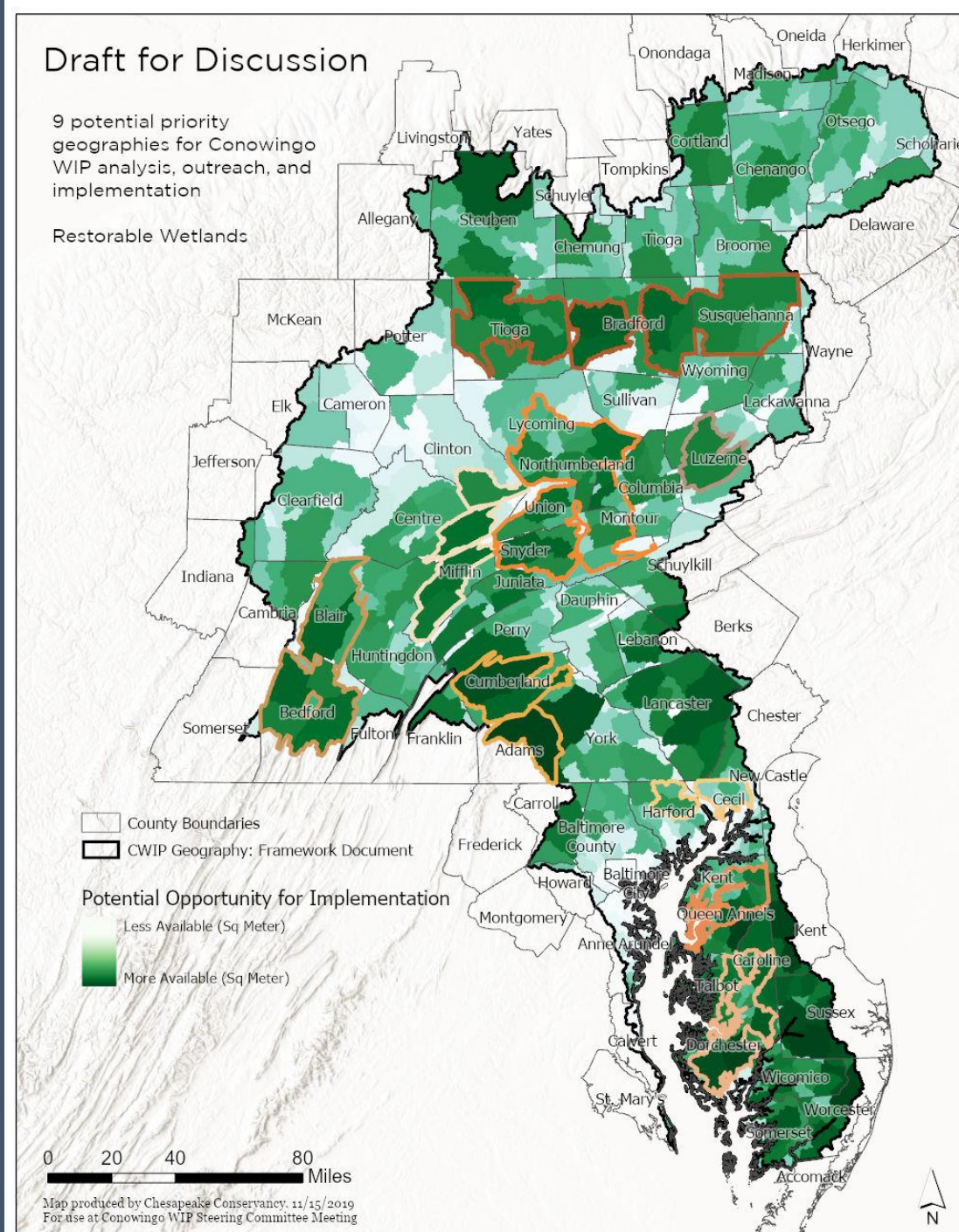
- Total area of agricultural land.
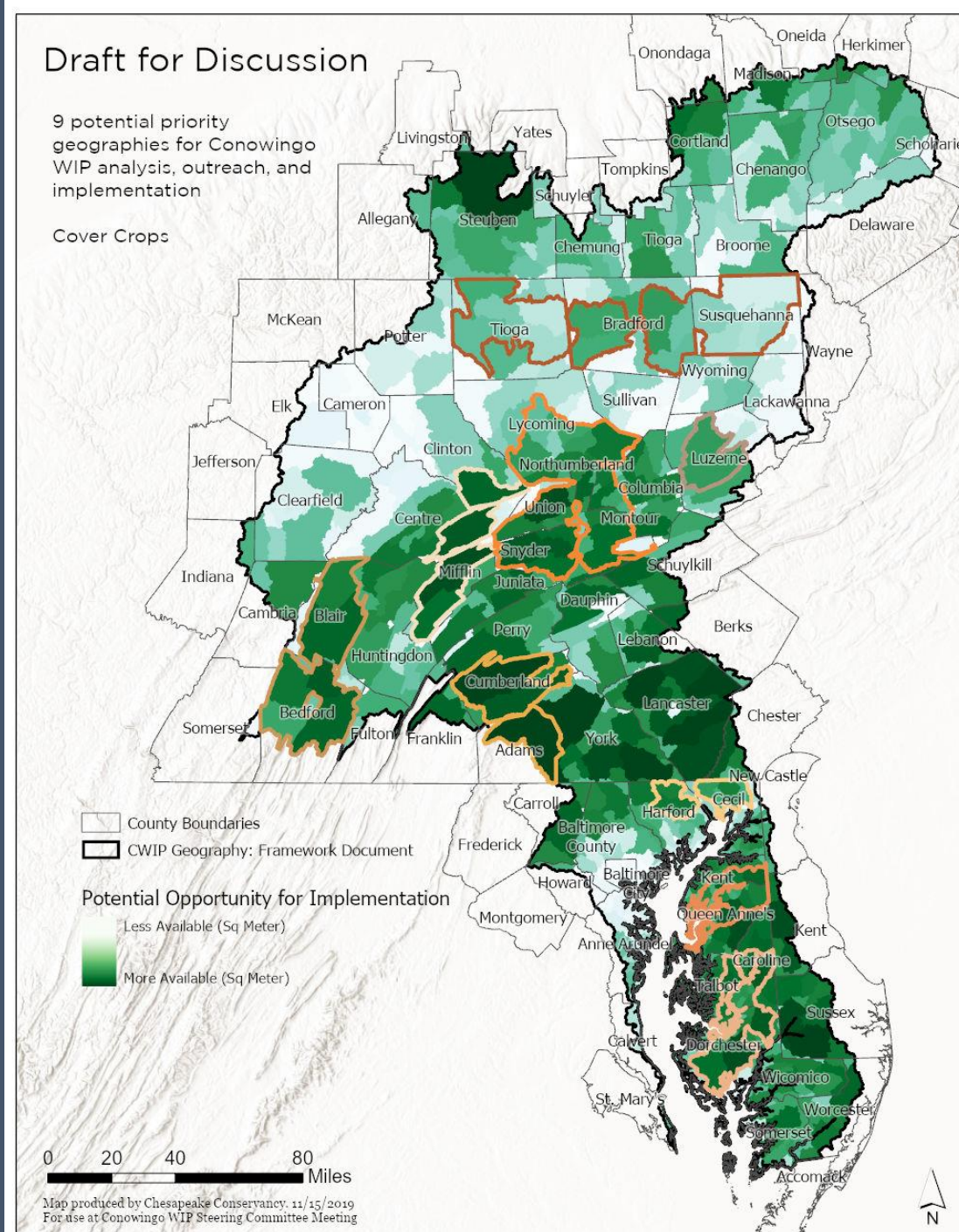
Datasets used:
- Land Cover: 30-meter resolution National Land Cover Dataset (NLCD); U.S. Geological Survey, 2016

Wetland Restoration Opportunities

- Lands currently in agriculture that naturally accumulate water due to topography and have historically had poorly draining soils.
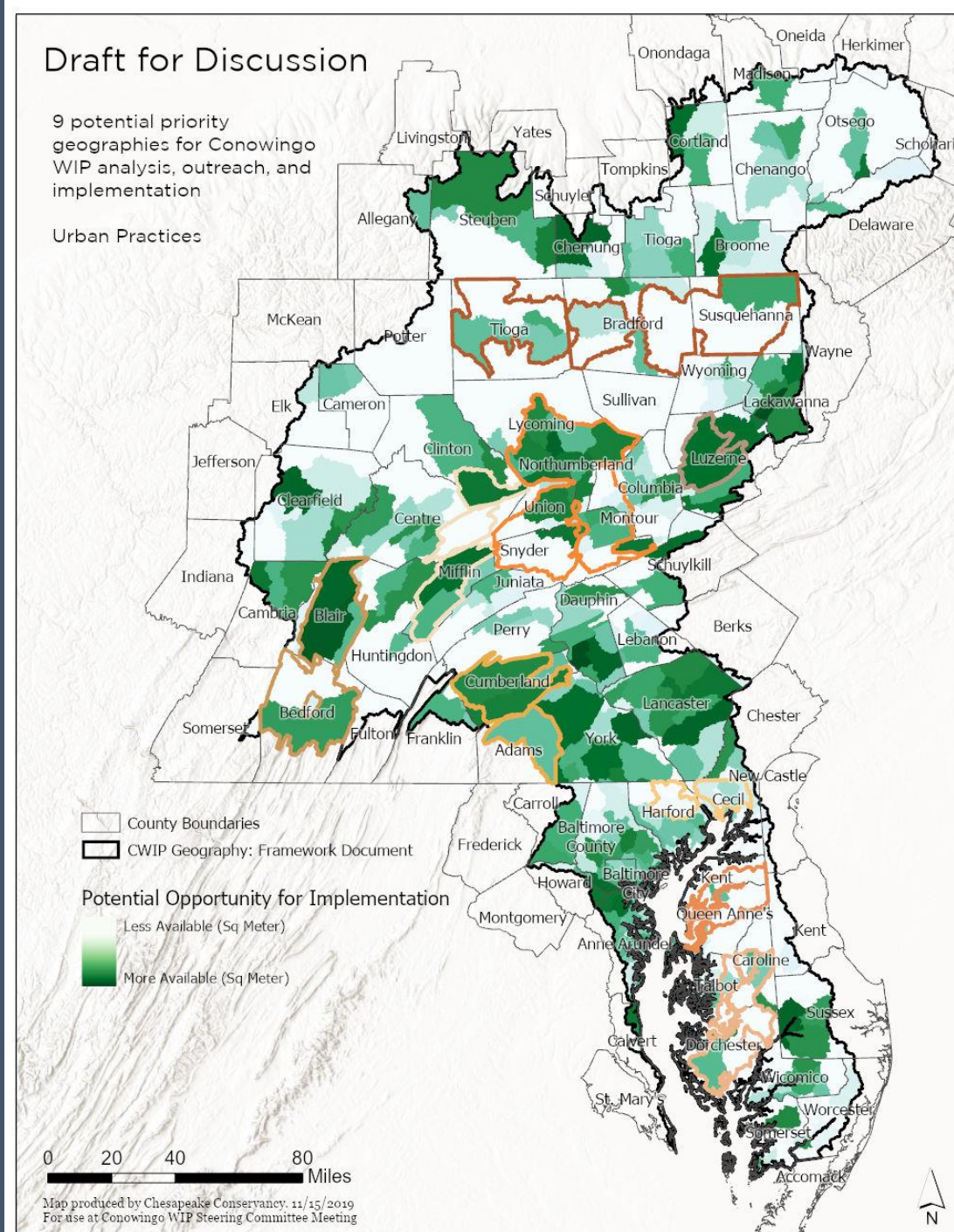
Datasets used:
- Potentially Restorable Wetlands; U.S. EPA; 2016

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9 potential priority geographies for Conowingo WIP analysis, outreach, and implementation

Restorable Wetlands

County Boundaries
CWIP Geography: Framework Document

Potential Opportunity for Implementation

Less Available (Sq Meter)

More Available (Sq Meter)

0   20   40   80
Miles

Map produced by Chesapeake Conservancy. 11/15/2019
For use at Conowingo WIP Steering Committee Meeting

Urban BMP Opportunities

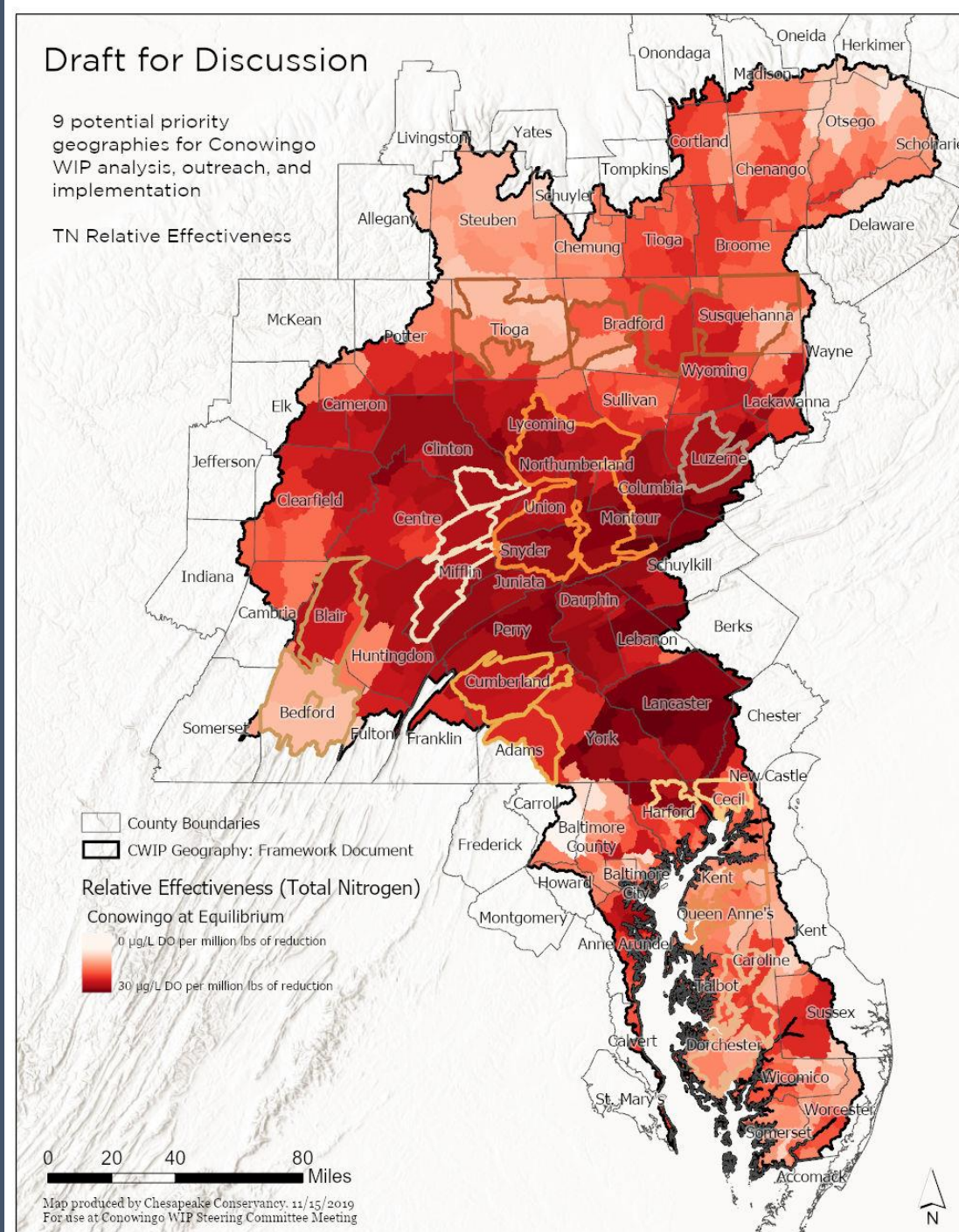- Urban land outside of MS4s

Datasets used:
- Urban Areas/Urban Clusters. U.S. Census Bureau. 2010
- Municipal Separate Storm Sewer System (MS4) Boundaries. Chesapeake Bay Program.

Total Nitrogen Relative Effectiveness

- Change in dissolved oxygen (DO) that occurs in the Bay per pound of nutrient changed locally in the watershed
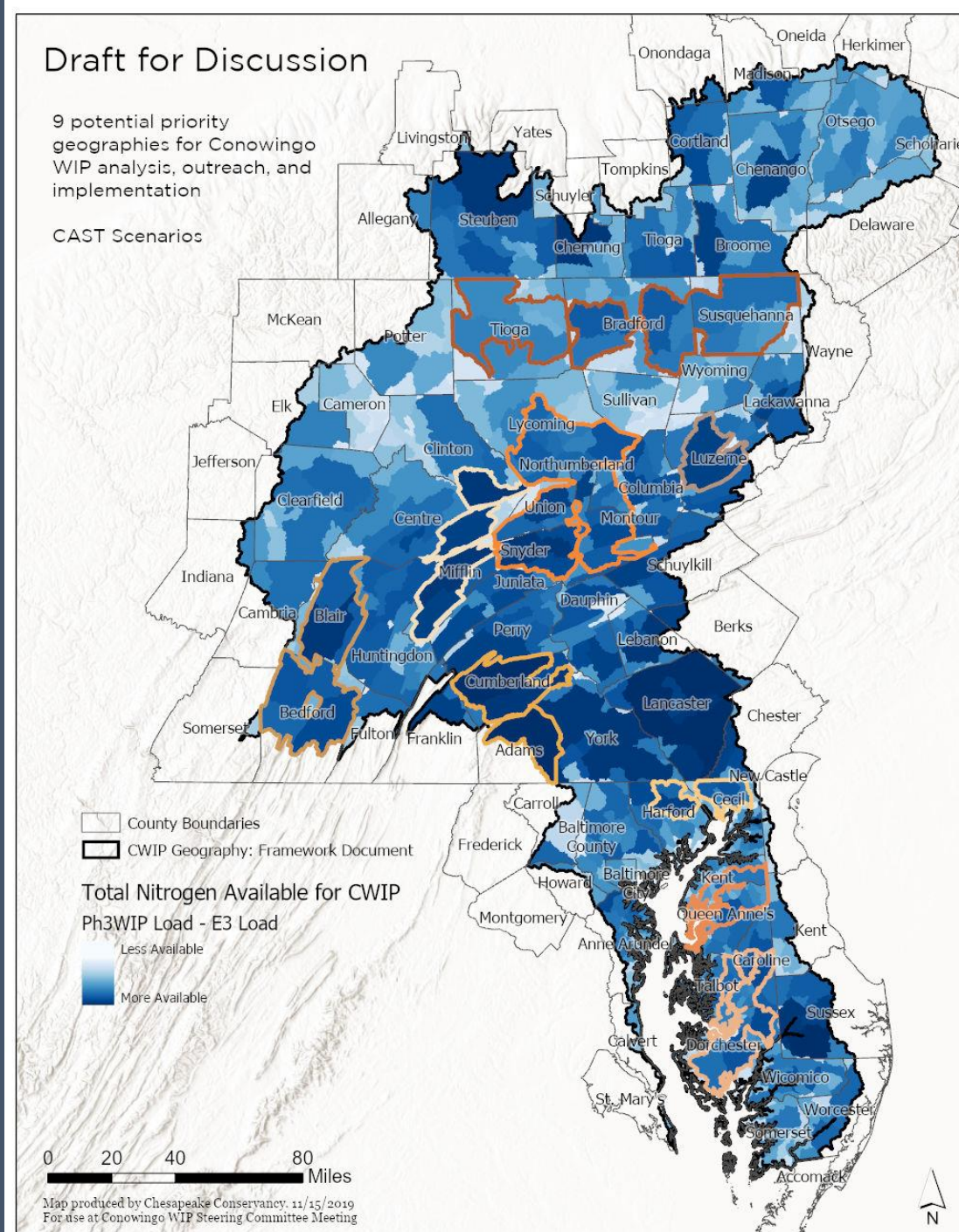
Datasets used:
- Relative Effectiveness; Chesapeake Bay Program. 2019.

CAST Analysis of Nitrogen Loading

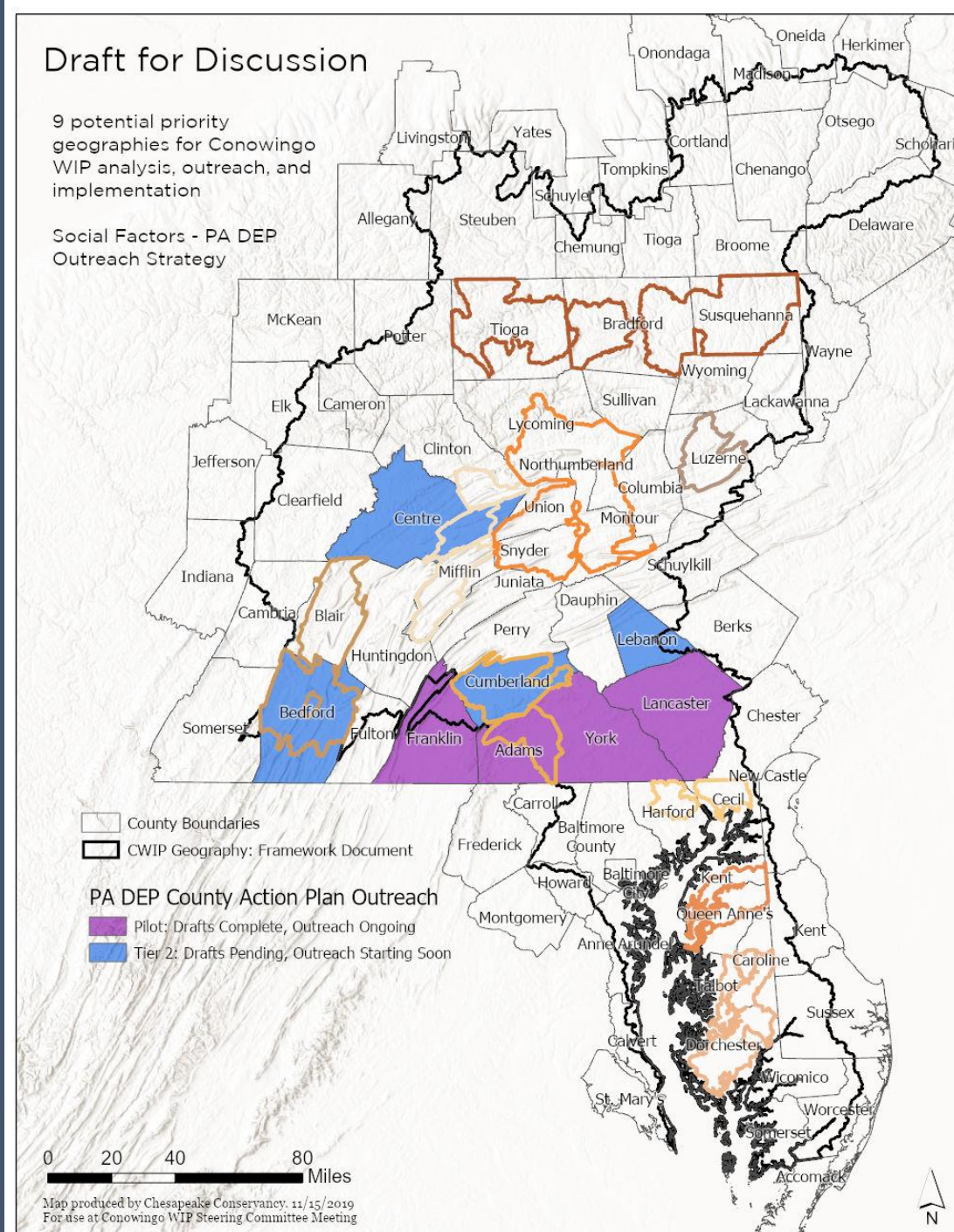- Opportunities for additional Nitrogen reductions post-Phase III WIP implementation.

Datasets used:
- WIP 3 load - E3 load = Opportunities for additional
- reduction through CWIP. Outputs for each layer are summed by LRS.

Further analysis and outreach

- Coordinate with Pennsylvania Dept. of Environmental protection on outreach.

Draft for Discussion

9 potential priority geographies for Conowingo WIP analysis, outreach, and implementation

Social Factors - PA DEP Outreach Strategy

County Boundaries
CWIP Geography: Framework Document

PA DEP County Action Plan Outreach
Pilot: Drafts Complete, Outreach Ongoing
Tier 2: Drafts Pending, Outreach Starting Soon

0 20 40 80 Miles

Map produced by Chesapeake Conservancy. 11/15/2019
For use at Conowingo WIP Steering Committee Meeting

Pennsylvania Phase 3 WIP County Action Planning

- County Action Plans complete for Franklin, Adams, York, Lancaster. Next focus will be on implementation.
- Next for County Action Planning: Bedford, Centre, Cumberland, Lebanon.

Map name	Brief Description	Map units	Datasets referenced	Methodologies used
Buffer Restoration opportunities	Total area of land suitable for buffer restoration within 100 ft. of water network.	Square Meters	• Land Cover: 1-meter land cover data classified using 2013 NAIP imagery; Chesapeake Conservancy & University of Vermont; 2016 • Water network (MD/PA): Lidar-derived water network combined with 2013 1-meter land cover data; Chesapeake Conservancy; 2018	Pixels from the high-resolution land cover dataset within 100 ft. distances of the water network were considered in the buffer analysis. Pixels classified as low vegetation, wetlands, or barren were considered buffer restoration opportunities. Area of buffer restoration opportunity was summed by LRS.
Cover crop opportunities	Total area of agricultural land	Square Meters	• Land Cover: 30-meter resolution National Land Cover Dataset (NLCD); U.S. Geological Survey, 2016	Total land area classified as cropland summed by LRS.
Wetland restoration opportunities	Lands currently in agriculture that naturally accumulate water due to topography and have historically had poorly draining soils	Square Meters	• Potentially Restorable Wetlands; U.S. EPA; 2016	Total land area identified as potential wetland restoration opportunities on agricultural land summed by LRS.
Urban BMP opportunities	Urban land outside of MS4s	Square Meters	• Urban Areas/Urban Clusters. U.S. Census Bureau. 2010 • Municipal Separate Storm Sewer System (MS4) Boundaries. Chesapeake Bay Program.	Area of urban land that falls outside of MS4 boundaries summed by LRS. These are potential locations for urban BMP implementation that is not already considered under current permitting processes.
Total nitrogen relative effectiveness	Change in dissolved oxygen (DO) that occurs in the Bay per pound of nutrient changed locally in the watershed	µg/L DO per million lbs of reduction	• Relative Effectiveness; Chesapeake Bay Program. 2019.	See Emily Trentacoste, Gary Shenk, or Jeff Sweeney.
CAST analysis on Nitrogen loads	Opportunities for additional Nitrogen reductions post-Phase III WIP implementation	Pounds of Nitrogen delivered to edge of stream/year	• CAST Phase 3 WIP analysis: jurisdictional phase 3 WIPs submitted to Chesapeake Bay Program 2019: nitrogen delivery post-Phase 3 WIP implementation. • CAST E3 analysis: E3 Definition: Everything by everyone everywhere, e.g. BMPs implemented to theoretical maximum extent. In other words, the lowest possible loads that could be delivered to local streams based on a combination of existing landscape conditions + potential to implement 100% of possible BMPs within the LRS. Created by CBP, 2017.	WIP 3 load - E3 load = Opportunities for additional reduction through CWIP. Outputs for each layer are summed by LRS.